Template of Program Specifications

1. Basic Information about the Program	
Program Title and Final Award	Bachelor of Pharmacy **(B. Pharm)**
Awarding Body/Institution	Faculty of pharmacy
Teaching Institution/Responsible Department	Faculty Departments
Other Departments involved in Teaching the program	-
Language of Instruction	English
Year of Entry to the Program (Applicable to New Programs)	-
Mode of Study	Regular
Place of Study	Faculty of pharmacy – Sana`a university
System of Study	Semesters
Duration of the program	5 years (174 credit hours)
Possible Future Career Options for Students	Pharmacist
Levels of Award/ Final Award	All the five level of Bachelor of Pharmacy
Prerequisite Qualifications	Secondary School- scientific section
Required Average Grade for Joining	Not less than 85%
Other terms	-
Program Coordinator	Associate Prof. Mahmoud M. Al-Buryhi Prof. Maged Alwan Associate Prof. Tawfeek A. Alobaidy Assistant Prof. Mohammed Hamid-Addeen Assistant Prof. Bushra A. Moharrm
Date of Program Specification/ Latest Accreditation	

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رئيس لجنة اعداد وتنسيق البرنامج — لجنة اعداد وتنسيق البرنامج

ا.د. محمد عباس حميدالدين — ا.د. ماجد علوان — ا.د. محمود البريهي — ا.د. توفيق العبيدي — ا.د. بشرى محرم

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2. University Vision, Mission and Aims:

A) University Vision

"The University of Sana`a aspires to the national leadership in teaching, learning, scientific research and community service, and to be among the best regional universities and the first house of expertise in Yemen.

B) University Mission:

Contribute to sustainable development efforts by providing a higher education environment that achieves quality standards and outstanding research services in light of a fruitful national partnership, based on transparency, professionalism and creativity.

C) University Aims:

The university works to achieve the following goals:

1- Providing specialized and in-depth study opportunities for students in various fields of knowledge to meet the country's needs in terms of specializations, technicians and experts.
2- Caring, teaching, developing, and generalizing the Arabic language as a scientific and educational language in the various fields of knowledge and science, as it is the cultural vessel for the meanings, values and ethics of Arab and Islamic civilization.
3- Developing knowledge by conducting scientific research in various fields of knowledge, whether at the individual or group level, and directing it to serve the needs of society and development plans.
4- Paying attention to developing "technology" technology, developing it and making use of it in developing the society.
5- Encouraging the movement of authorship, translation and publishing in various fields of knowledge, with a special focus on the Yemeni heritage.
6- Contributing to the promotion of arts and arts and the progress of sciences.
7- Providing an academic environment conducive to freedom of thought, expression and publication in a manner that does not contradict Islam, its supreme values and ideals.

8- Strengthening ties with universities and public and private institutions in the country to ensure mutual and constructive interaction of knowledge, experiences, resources and participation that ensure effective contribution to bringing about comprehensive development in the country.
9- Strengthening scientific and cultural ties with Arab and foreign universities, scientific organizations, and research and development centers in a way that helps the university develop and enhance its position.
10- Providing technical and specialized studies and consultations for the various state agencies and their general and mixed institutions.

11- Contributing to the development of policies and methods of work in state institutions and agencies in the public and private sectors, and providing innovative models and experiences to solve various problems.

12- Raising the efficiency of workers in state institutions and agencies, the public and private sectors, by contributing to in-service preparation and qualification program

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3. Faculty Vision, Mission and Aims: A)

Faculty Vision:

Excellence and leadership locally, regionally and globally, in providing knowledge and continuous education in the academic and research field in pharmaceutical sciences According to the markets needs and community services

B) Faculty Mission:

The College of Pharmacy seeks to prepare scientifically and practically qualified pharmaceutical graduates with high professional ethics and able to compete locally, regionally and globally in providing healthcare services through educational programs in accordance with quality standards that can support national pharmaceutical industries, market needs and serve community.

C) Faculty Aims:

1- Providing students with comprehensive knowledge about physiochemical properties and biological activities of medicinal substances required for formulating and preparing pharmaceutical products from their different sources, natural or synthetic.

2- Providing students with opportunities, practical skills, and training in different pharmaceutical sciences to ensure effective contribution in enhancing the requirements **of** pharmaceutical industries and labor market needs to serve the community.

3- Performing students the pharmaceuticals qualitative and quantitative analytical techniques according to GLP and GPMP guidelines to assess the quality and quantity of raw materials from natural or synthetic sources and different pharmaceutical products.

4- Possessing students the core knowledge concerning the principles of pathophysiology of diseases, pharmacotherapy, pharmacovigilence and pharmacoeconomics to be able to participate with other health care professionals in improving health care services using evidence-based.

5- Planning, designing and conducting undergraduate and postgraduate research using appropriate methodologies.

6- Developing student's presentation, promotion, pharmaceutical marketing, administration, numeric and computation skills.

7- Demonstrating student's capability of communication skills, time management, critical thinking, problem-solving, decision-making and team-working.
8- Manage the safe and efficient distribution of medications and participate in quality assurance and improvement programs to maintain the sustainability of good practice.
9- Demonstrate a professional attitude through practicing in an ethical, legal manner and according to the GMP and GPP guidelines and continuously maintaining his/her competence through lifelong learning.

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5. Program Mission and Aims:

A) Program Mission

To prepare graduates who are competent, professional and ethical in pharmaceutical manufacturing, offering and providing healthcare services in accordance with quality standards to provide the health-related needs of the society.

B) Program Aims:

1- Providing students with comprehensive understanding in physiochemical properties and biological activities of

medicinal substances by emphasizing the fundamental scientific principles in pharmaceutical and medical sciences.

2-Familiarizing the students with the principles of pharmacoeconomics and pharmaceutical marketing, pharmaceutical management, the legal requirements, and the ethical rules in the practice of pharmacy.

3-Providing students with opportunities, practical skills, and training in different pharmaceutical sciences (pharmaceutical chemistry, pharmacognosy, pharmaceutics, pharmacology, clinical pharmacy, and pharmacovigilence) as well as in pharmaceutical research to ensure effective contribution in healthcare needs of the society.

4-Equipping students with knowledge & skills necessary to meet the professional demands to participate effectively in healthcare provision at the patient's level and nationally.

5- Providing students with knowledge and professional practical skills, and training services in different pharmaceutical sciences that meet the requirements and aspirations of pharmaceutical industries and labor market needs to serve the community.

6- Developing the learning, information technology, communication and reflective skills that are necessary to enable students to undertake independent study, and to participate in lifelong learning.
7-Training students to think critically, communicate effectively and work in a team.

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6. Program Frame of Reference:-1ملحقات

Cairo University and NARS, Egypt, 2017
Accreditation Standards for Pharmacy Programs in Australia and New Zealand, 2014
Pharmacy Council of India, Rules & Syllabus for the Bachelor of Pharmacy (B. Pharm) Course, New Delhi, 2014
NARS, USM, Malaysia, 2014/2015
South Africa Pharmacy Council: Good Pharmacy Education Standards, 2014
• Transforming Pharmacy and Pharmaceutical Sciences Education in the Contex of Workforce Development, FIP , 2017 • FIP education initiatives, 2012 • Good pharmacy practice, Joint FIP/WHO guidelines on good pharmacy practice: Standards for quality of pharmacy services, 2011.

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7. The Graduate Attributes

At the end of the program, the graduates will be able to:

1) Practice pharmacy with responsibility, accountability, in a professional and ethical manner, and according to the GMP, GSP, GPP and GLP.
2) Apply pharmaceutical technology principles in designing, preparing, identifying, isolating, and analyzing the raw materials, cosmetics and pharmaceutical products of natural and synthetic sources.
3) Apply pharmaceutical technology principles in preformulating, formulating and manufacturing pharmaceutical substances in suitable pharmaceutical dosage forms.
4) Procure, handle, and store chemicals and pharmaceutical products in pharmacies, hospitals, and wholesale stores.
5) Relate therapeutic uses, adverse reactions, and toxicities of pharmaceutical products to their physiochemical properties, pharmacokinetics, and pharmacodynamics.
6) Rationalize drug roles in disease treatment through understanding disease pathophysiology, signs, and symptoms, and in relation to patient-specific factors.
7) Provide evidence-based, patient-centered pharmaceutical care through professional evaluation of patient's drug-related needs and problems.
8) Monitor and dispense prescriptions, and provide information and advice necessary for safe & effective use of drugs.
9) Plan, design, conduct, and participate in collaborative educational programs to promote disease prevention and rational drug use.
10) Plan, design, conduct, and participate in collaborative research using appropriate methodologies and participate in R&D activities to support national pharmaceutical industries, market needs and serve community.
11) Demonstrate self-confidence, skills, and capabilities (such as effective communication, time management, critical thinking, problem solving and decision-making) necessary for effective contribution in teamwork.
12) Be a life-long learner for continuous improvement of professional knowledge & skills.

8. Program Intended Learning Outcomes (PILOs)

A. Knowledge and Understanding:	
On successful completion of the program, the graduates should be able to:	
A1	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.
A2	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.
A3	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.
A5	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.

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B. Cognitive / Intellectual Skills:	
On successful completion of the program, the graduates should be able to:	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.
B2	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.
B4	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing
B5	Interpret the prescriptions, patient and clinical data, analysis all the encountered pharmaceutical problems and plan the strategies for their solution to develop the health care.

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C. Practical Skills:	
On successful completion of the program, the graduates should be able to:	
C1	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.
C2	Handle and dispose chemicals and pharmaceutical preparations including radio-pharmaceuticals safely and effectively.
C3	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.
C4	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.
C5	Conduct research studies and utilize the results in different pharmaceutical fields.

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D. General Transferable Skills:	
On successful completion of the program, the graduates should be able to:	
D1	Practice independent learning needed for continuous professional development
D2	Employ proper documentation and filing systems in different pharmaceutical fields
D3	Develop financial, market management, writing, presentation and time management skills as well as
	creativity, critical thinking, problem solving and decision making abilities.
D4	Take responsibility for adaptation to change needs in pharmacy practice.
D5	Apply information and communication technology and working effectively in a team.

9. Teaching Strategies

Teaching Strategy	Description of how it will be used
Lectures	The most widely used form of presentation. It is oral presentation of information including principles, concepts, ideas about the given topics.
Experimental Learning and Exercises	This teaching strategy is used for application of practical part in the program by using different equipments, materials and instruments
Group discussions and activities	It is a primary teaching method which allows to stimulate critical thinking of students.
Training field	This teaching strategy is used for gaining professional skills in hospitals, pharmacies, pharmaceutical factories

Cooperative learning	It is used for some practical parts in laboratories and researches.
Seminar/ project/presentation	It is used for discussion of topics for small group of students
Problem solving	It is a teaching strategy which engage students in developing deep understanding of important principles and concepts
Brainstorming	This teaching strategy used to encourage students to focus on a topics and contribute to the free flow of ideas. It helps promote thinking skills.

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10. Assessment Strategies:

Assessment Strategy	Its description (in which course it will be used and in which rate)
Written Final Exams	It is used to assess the overall outcomes.
Written Mid-term Exams	It is used to assess the ability of students to follow up the course subjects.
Oral exams	It is used to assess the ability of students in expressing and presentation their knowledge clearly in systemic approach.
Practical Lab exams	It is used to assess the professional and practical skills of students
Report/Project sessions	It is used to measure the higher thinking skills of students
Quiz	It is used to assess the ability of students to understand the course subjects.
Homework	It is significant tool for formative assessment

11. Alignment of Program Intended Learning Outcomes (PILOs) to Teaching Strategies and Assessment Methods:

(A) Alignment of Program Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

PILOs	Teaching Strategies	Assessment Methods
A1. Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	• Lectures • discussion • Group Working • Presentation	• Written exam Reports • quiz • Graduate Projects

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A2. Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	Lectures Discussion Group Working Presentation Brainstorming	• Reports • quiz • Oral and writing exam
A3. Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and	• Lectures • Discussion • Group Working • Problem Solving	Writing exam Reports Seminar
overall health needs.	Case Study	
A4. Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	Lectures Discussion Group Working Case Study	Reports Quiz
A5. Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.	Lectures Seminar Group Working	Small Projects Oral and writing test Workshop

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(B) Alignment of Program Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

PILOs	Teaching Strategies	Assessment Methods

B1. Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	Lecture Discussion Tutorials Mind-mapping Brain storming Creative problem solving	Quiz Oral exam Presentation Midterm exam Final exam
B2. Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	Lectures Creative problem solving Brain storming	Report Seminar Midterm exam Final exam
B3. Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and	Lectures Creative problem solving Simulation	Report Seminar Presentation Midterm exam
quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.		Final exam
B4. Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	Lectures Creative problem solving Brain storming	Report Seminar Midterm exam Final exam
B5. Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	Lecture Seminar Inquiry method Role play	Oral exam Midterm exam Final exam

(C) Alignment of Program Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

PILOs	Teaching Strategies	Assessment Methods
C1. Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	Lectures, practical, demonstration, simulation, group working, problem solving, experimental learning.	Practical Exams Oral presentation

C2. Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	Lectures, practical, demonstration, experimental learning	Exam Oral presentation Portfolio development
C3. Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	Lectures, practice, demonstration , group working, experimental learning	Practical Exam Oral presentation Project
C4. Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	Lectures, group working, practices	Exam Practices Oral presentation
C5. Conduct research studies and utilize the results in different pharmaceutical fields.	Lectures, group working, research project, brain storming, mind mapping, experimental learning	Exam Oral presentation Portfolio development

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(D) Alignment of Program Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:		
PILOs	**Teaching Strategies**	**Assessment Methods**
D1. Practice independent learning needed for continuous professional development	Learning, practical, lectures, problem solving	Exam, project portfoliodevelopment
D2. Employ proper documentation and filing systems in different pharmaceutical fields	Lecture, practical, group working	Exam, project portfoliodevelopment, revision
D3. Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	Lectures, Group Working, Problem Solving, Workshop	Reports, projects, Exam
D4. Take responsibility for adaptation to change needs in pharmacy practice.	Group Working, Problem Solving, Workshop	Reports, Exam, Observation
D5. Apply information and communication technology and working effectively in a team.	Group Working, Presentation	Report, Observation

12. Curriculum Map:

Courses	Program ILOs																			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Arabic language (101)																				
Psychology for Pharmacy	*		*		*			*	*	*				*	*	*		*	*	
Islamic Culture																				
Medical English (1)																				
History and Pharmacy Orientation	*		*	*		*									*			*		
General Pharmaceutical Chemistry	*					*	*					*			*			*		*
Pharmaceutical Calculations	*			*				*		*			*		*			*		
Anatomy	*		*			*				*					*		*			*
Arabic Language (102)																				
Computer Skills																				
Physical Pharmacy	*	*		*		*		*			*		*		*		*	*		
Medical English (II)																				
Pharmaceutical Organic Chemistry (I)	*	*				*	*				*	*			*			*		*
Histology	*		*	*		*									*			*		

Courses	Program ILOs																			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Pharmaceutical Organic Chemistry (II)	*	*				*	*				*	*			*			*		*
Pharmaceutical Analytical Chemistry (I)	*	*				*		*			*	*	*		*		*			*
Physiology (I)	*	*				*	*				*	*				*	*			
Pharmaceutical Microbiology (I)	*		*			*				*		*			*		*			*
Pharmaceutics (I)	*	*		*		*		*			*		*		*		*	*		
Medicinal Botany	*			*				*	*			*	*			*		*		

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Pharmaceutical Organic Chemistry (III)	*	*				*	*				*	*			*			*		*
Pharmaceutical Analytical chemistry (II)	*	*				*		*			*	*	*		*		*			*
Physiology (II)	*	*				*	*				*	*				*	*			
Pharmaceutical Microbiology (II)	*		*			*				*		*			*		*			*
Pharmaceutics (II)	*	*		*		*		*			*		*		*		*	*		
Pharmaceutical Biochemistry (I)	*		*			*					*	*			*		*	*		*

Courses																				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Pharmacology (I)		*	*			*	*			*	*	*			*	*				*
Pharmaceutical Biochemistry (II)	*		*			*					*	*			*		*	*		*
Pharmaceutical Care (I)	*	*								*				*	*	*	*		*	*
Pharmacognosy (I)	*			*				*	*			*	*			*		*		
General Pathology	*	*				*	*				*	*				*	*			
Pharmaceutics (III)	*	*		*		*		*			*		*		*		*	*		
Medical Parasitology	*		*						*	*					*			*		*
Toxicology		*	*			*	*			*	*	*				*				*
Pharmacology (II)		*	*			*	*			*	*	*			*	*				*

Courses																				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Pharmaceutical Instrumental Analysis (I)	*	*				*		*			*	*	*		*		*			*
Pharmaceutical Care (II)	*	*					*							*	*	*	*		*	*
Pharmacognosy (II)	*			*				*	*			*	*			*		*		
Medicinal Chemistry (I)	*	*	*			*	*				*	*			*	*			*	*
Pharmaceutics (IV)	*	*		*		*		*			*		*		*		*	*		
First Aid	*								*	*				*	*			*		*
Public Health	*		*		*	*				*				*	*		*		*	*

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Courses	Program ILOs																			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Phytochemistry (I)	*			*				*	*			*	*			*		*		
Pharmacology (III)		*	*			*	*			*	*	*			*	*				*
Pharmacy Law and Ethics	*		*	*	*	*		*	*		*			*	*	*	*		*	*
Biopharmaceutics	*		*	*	*	*		*		*	*		*	*	*		*	*	*	
Community Pharmacy Practice (I)	*		*							*				*	*	*			*	*
Sterile Preparations				*				*		*	*					*				*
Medicinal Chemistry (II)	*	*	*			*	*				*	*			*			*		*
Pharmaceutical Instrumental Analysis (II)	*	*				*		*			*	*	*		*		*			*
Phytochemistry (II)	*			*				*	*			*	*			*		*		
Pharmacology (IV)		*	*			*	*			*	*	*			*	*				*
Pharmacy Management					*				*	*		*		*			*	*		
Pharmacokinetics	*		*	*	*	*		*		*	*		*	*	*		*	*	*	
Community Pharmacy Practice (II)	*		*							*				*	*	*			*	*
Advanced Drug Delivery Systems	*		*	*		*		*			*			*	*		*		*	*
Medicinal Chemistry	*	*	*			*	*				*	*			*			*		*
(III)																				
Pharmaceutical Biostatistics					*			*		*				*	*		*	*		*
Field Pharmacy Training (300 Training Hours)			*	*	*			*		*				*	*	*		*	*	*

Courses	Program ILOs																			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Clinical Pharmacy & therapeutics (I)	*		*				*		*	*				*	*	*			*	*
Phytotherapy	*			*				*	*			*	*			*		*		
Medicinal Chemistry (IV)	*	*	*			*	*				*	*			*			*		*
Industrial Pharmacy (I)	*	*		*		*		*			*		*		*	*	*	*		*
Pharmaceutical Quality Control	*	*				*		*			*	*	*		*		*			*
Cosmetics	*		*		*		*	*					*			*			*	
Pharmacoeconomics				*	*			*		*				*	*	*	*			

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Applied and Evaluaton of Pharmaceutical arch Rese	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Clinical Pharmacy & therapeutics (II)	*		*				*		*	*				*	*	*			*	*
Complementary and Alternative Medicin	*			*				*	*			*	*			*		*		
Drug discovery and Development	*	*	*			*	*				*				*	*				*
Industrial Pharmacy (II)	*	*		*		*		*			*		*		*	*	*	*		*
Hospital Pharmacy	*				*				*	*				*	*	*	*			
Pharmaceutical keting Mar				*	*	*		*		*	*				*		*	*	*	*
Pharmacoepidemiol gy & Pharmacovigilance	*		*				*			*				*	*	*			*	*
Research Project	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Field Pharmacy Trai ning (300 Training Hours)			*	*	*		*		*	*			*	*		*	*	*	*	*

13. Program Study Plan

1. Total Number of Credit Hours required for Program Completion	**174 Credit Hours**

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2. Distribution of Credit Hours and their Percentage out of Total Hours of the Program:

Module Status	No. of Credit Hrs. & Average Percentage
*** General Courses (University Requirements)**	7 hours (4.0%)
*** Faculty Courses (Faculty Requirements)**	24 hours (13.8%)
*** Major Core Courses (Specialized requirements)**	141 hours (81.1%)
*** Graduation Research**	2 hours (1.1%)
***Field Pharmacy Training**	600 hours field training

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14. Admission Requirements

1. Scientific secondary school with score not less than 85%.
   Requirements of Evaluation exam.
3. Requirements and regulations of students affairs in University

..

15. Attendance and Program Completion

- Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
- Requirements and regulations of students affairs in University

16. Graduation Requirements

Total hours required for graduation : 2848 hours

- Requirements and regulations of students affairs in University

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Program Study Plan

Pharmacy Curriculum For B. PHARM. Sc.

First Year

First Year (First Semester)					First Year (Second Semester)				
Course title	**code**	**Weekly Hours**			**Course title**	**code**	**Weekly Hours**		
		L	**P**	**C. H**			**L**	**P**	**C. H**
Arabic language (101)		1	-	1	Arabic Language (102)		1	-	1
Psychology for Pharmacy	Ph811	1	-	1	Computer Skills		2	2	3
Islamic Culture		2	-	2	Physical Pharmacy	Ph223	2	2	3
Medical English (1)	Ph812	2	-	2	Medical English (II)	Ph823	2	-	2
History and Pharmacy Orientation	Ph211	1	-	1	Pharmaceutical Organic Chemistry (I)	Ph522	2	2	3
General Pharmaceutical Chemistry	Ph511	2	2	3	Histology	Ph422	2	-	2
Pharmaceutical Calculations	Ph212	1	-	1			-	-	-
Anatomy	Ph411	2	-	2	-		-	-	-
Total		12	**2**	13			11	**6**	14

L = Lecture P = Practical C.H = Credit Hours 2 Practical Hours = 1 credit hour

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Second Year

Second Year (First Semester)					Second Year (Second Semester)				
Course title	code	Weekly Hours			Course title	code	Weekly Hours		
		L	P	C.H			L	P	C.H
Pharmaceutical Organic Chemistry (II)	Ph533	2	2	3	Pharmaceutical Organic Chemistry (III)	Ph545	2	2	3
Pharmaceutical Analytical Chemistry (I)	Ph534	2	2	3	Pharmaceutical Analytical chemistry (II)	Ph546	2	2	3
Physiology (I)	Ph433	2	-	2	Physiology (II)	Ph444	2	-	2
Pharmaceutical Microbiology (I)	Ph631	2	2	3	Pharmaceutical Microbiology (II)	Ph642	2	2	3
Pharmaceutics (I)	Ph234	2	2	3	Pharmaceutics (II)	Ph245	2	2	3
Medicinal Botany	Ph331	2	2	3	Pharmaceutical Biochemistry (I)	Ph741	2	2	3
Total		**12**	**10**	**17**	**Total**		**12**	**10**	**17**

L = Lecture P = Practical C.H = Credit Hours 2 Practical Hours = 1 credit hour

Third Year

Third Year (First Semester)					Third Year (Second Semester)				
Course title	code	Weekly Hours			Course title	code	Weekly Hours		
		L	P	C.H			L	P	C.H
Pharmacology (I)	Ph455	2	2	3	Pharmacology (II)	Ph468	2	2	3
Pharmaceutical Biochemistry (II)	Ph752	2	2	3	Pharmaceutical Instrumental Analysis (I)	Ph567	2	2	3
Pharmaceutical Care (I)	Ph256	1	2	2	Pharmaceutical Care (II)	Ph268	1	2	2
Pharmacognosy (I)	Ph352	2	2	3	Pharmacognosy (II)	Ph363	2	2	3
General Pathology	Ph456	2	-	2	Medicinal Chemistry (I)	Ph568	2	2	3
Pharmaceutics (III)	Ph257	2	2	3	Pharmaceutics (IV)	Ph269	2	2	3
Medical Parasitology	Ph653	1	2	2	First Aid	Ph864	1	2	2
Toxicology	Ph457	1	2	2	Public Health	Ph865	1	-	1
Total		**13**	**14**	**20**	**Total**		**13**	**14**	**20**

L = Lecture P = Practical C.H = Credit Hours 2 Practical Hours = 1 credit hour

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ا.د. القاسم محمد عباس — ا.د. هدى العماد — ا.د. خالد الشوبه — ا.د. محمود البريهي

Fourth Year

Fourth Year (First Semester)					Fourth Year (Second Semester)				
Course title	code	Weekly Hours			Course title	code	Weekly Hours		
		L	P	C. H			L	P	C. H
Phytochemistry (I)	Ph374	2	2	3	Phytochemistry (II)	Ph385	2	-	2
Pharmacology (III)	Ph479	2	-	2	Pharmacology (IV)	Ph4810	2	2	3
Pharmacy Law and Ethics	Ph2710	2	-	2	Pharmacy Management	Ph2814	1	-	1
Biopharmaceutics	Ph2711	2	2	3	Pharmacokinetics	Ph2815	2	2	3
Community Pharmacy Practice (I)	Ph2712	2	2	3	Community Pharmacy Practice (II)	Ph2816	2	2	3
Sterile Preparations	Ph2713	1	-	1	Advanced Drug Delivery Systems	Ph2817	2	-	2
Medicinal Chemistry (II)	Ph579	2	2	3	Medicinal Chemistry (III)	Ph5811	2	2	3
Pharmaceutical Instrumental Analysis (II)	Ph5710	2	2	3	Pharmaceutical Biostatistics	Ph2818	1	-	1
-		-	-	-	Field Pharmacy Training (300 Training Hours)	Ph2819	-	-	-
Total		**15**	**10**	**20**	**Total**		**14**	**8**	**18**

L = Lecture P = Practical C.H = Credit Hours 2 Practical Hours = 1 credit hour

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Fifth Year

Fifth Year (First Semester)					Fifth Year (Second Semester)				
Course title	code	Weekly Hours			Course title	code	Weekly Hours		
		L	P	C. H			L	P	C. H
Clinical Pharmacy & therapeutics (I)	Ph2920	2	2	3	Clinical Pharmacy & therapeutics (II)	Ph21024	2	2	3
Phytotherapy	Ph396	2	-	2	Complementary and Alternative Medicine	Ph3107	2	-	2
Medicinal Chemistry (IV)	Ph5912	2	2	3	Drug discovery and Development	Ph51014	2	-	2
Industrial Pharmacy (I)	Ph2921	2	2	3	Industrial Pharmacy (II)	Ph21025	2	2	3
Pharmaceutical Quality Control	Ph5913	1	2	2	Hospital Pharmacy	Ph21026	2	-	2
Cosmetics	Ph2922	1	2	2	Pharmaceutical Marketing	Ph21027	2	-	2
Pharmacoeconomics	Ph2923	1	-	1	Pharmacoepidemiology & Pharmacovigilance	Ph21028	2	-	2
Applied and Evaluation of Pharmaceutical Research	Ph991	1	-	1	Research Project	Ph9102	-	4	2
-		-	-	-	Field Pharmacy Training (300 Training Hours)	Ph21029	-	-	-
Total		**12**	**10**	**17**	**Total**		**14**	**8**	**18**

L = Lecture P = Practical C.H = Credit Hours 2 Practical Hours = 1 credit hour

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18. The Facilities & Equipment Required to Achieve the Program

A. Learning Resources:

- Textbooks, note books, Electronic Materials and Web Sites

B. Laboratories, Facilities, Equipment and Learning Devices:

- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc.
- Well-equipped laboratories with all required equipment and reagents.
- Computer laboratory with internet facilities.
- Hospital, pharmacies, pharmaceutical factories for Training fields

19. Methods of Assessing Achievement of Program Objectives & Learning Outcomes:

TARGETED/ EVALUATED	EVALUATION STRATEGY	SAMPLES
Final Year Students	Interviews Questionnaires	All candidates
Graduates	Interviews Questionnaires Meetings	All candidates
Employers	Survey Questionnaires	As many as possible
Council of Accreditation and Quality Assurance	Reports Observations Visits	Experts from CAQA, Ministry of Higher Education.
External Experts and Specialist	Reports	Experts and Specialists invited by
	Visits	Academy for self-assessment

PROGRAM COORDINATOR:

Associate Prof. Mahmoud M. Al-Buryhi **Signature:**
Prof. Maged Alwan **Signature:** Associate
Prof. Tawfeek A. Alobaidy **Signature:**
Assistant Prof. Mohammed Hamid-Addeen **Signature:**
Assistant Prof. Bushra A. Moharrm **Signature:**

FACULTY DEAN: **Signature:**

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Annex (1): alignment the ILOTs of bachelor of pharmacy programm with that of international accredited programs (benchmark) **موائمة مخرجات التعلم المقصودة من برنامج بكالوريوس صيدلة مع مخرجات 1ملحق: البرامج والمعايير المرجعية المماثلة**

PILOs benchmarking

Good pharmacy practice, Joint FIP/WHO guidelines on good pharmacy practice Standards for quality of pharmacy services, 2011.	Accreditation Standards for Pharmacy Programs in Australia and New Zealand, 2014	Cairo University and NARS, Egypt, 2017	South Africa Pharmacy Council: Good Pharmacy Education Standards, 2014	NARS, USM, Malaysia, 2014/2015	PILOs (اكتب أرقام ورموز مخرجات برنامجك)
1	1, 2,3	1-1-1	ELO 1	3,4	A1
1,3	3, 4	1-1-3, 2-22, 2-2-3	ELO 1,2, 3, 4	4	A2
2,3, 4	1, 2	1-1-4, 2-2-4, 3-3-1, 3-3-4	ELO 6, 7, 8	2,3	A3
1,3	4	1-1-7, 2-51, 2-5-3	ELO 1,2, 3, 4	4	A4
2,3,4	6	2-1-1, 2-1-2, 2-1-3, 3-2-2	ELO 2, 5, 9	1	A5
1	1, 2, 3	2-2-1, 2-2-4	ELO 1, 6	4	B1
2,3	2	3-2-1	ELO 1, 6	2	B2
1,3	3, 4	2-2-3, 2-53, 3-1-3	ELO 1,2, 3, 4, 11	4,6	B3
2,4	5	2-6-1, 2-6-2	ELO 5 , 6, 10	7	B4
2,3,4	1	3-2-6,	ELO 5, , 7,8, 9	2,3	B5
1,3	4	2-2-3	ELO 3,4, 6	4	C1
1	3	2-3-1, 2-32, 2-4-1	ELO 1,3, 5	4	C2
1,3	3	2-2-1	ELO 1,3,	4	C3
2,4	1,2, 5	3-2-5	ELO 5,7,8,9	3,5	C4
1,3	1,2,3,4,5,6	2-5-3, 3-22, 3-2-4	ELO 1-11	6	C5
3	1,5	4-3-2	ELO 1, 2,7,8,11	6	D1
1,2	1, 5	2-1-2	ELO 7,8,11		D2
2,4	5	1-1-5, 1-16, 4-1-3,	ELO 2,3,4,5, 7,8,11	7	D3
2,3	1,2, 5	4-1-1	ELO 2,3,4,6, 7,8	3,5,7	D4
1,2, 3	1,5	4-2-1, 4-2-2	ELO 2,3,4, 7,8,9,11	5,8	D5

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Annex (2): survey the credit hours of bachelor of pharmacy program with that of similar universities program

ملحق: 2. مسح ساعات برنامج بكالوريوس صيدلة مع مخرجات ساعات البرامج المماثلة

No. credit hours	No. Academic years	Program name	Faculty name	University name
165	5	Bachelor of Pharmacy	Faculty of Pharmacy	**Sana`a University,**
163	5	Bachelor of Pharmacy	Faculty of Pharmacy	**Cairo university, Faculty of Pharmacy**
148	4	Bachelor of Pharmacy,	The School of Medical Sciences	**Bachelor of Pharmacy, USM, Malasyia**
144	4	Bachelor of Pharmacy,	Faculty of Pharmacy	**Saud university, KSA**

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Course Specification of Psychology for Pharmacy

I.	Course Identification and General Information:						
1	Course Title:	Psychology for Pharmacy					
2	Course Number & Code:	Ph811					
3	Credit hours: 1hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1				1	
4	Study level/ semester at which this course is offered:	First year/First semester					
5	Pre –requisite (if any):						
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:						
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof Dr/					
12	Date of approval:						

II. Course description:

The aim of the course is to provide students the scientific interpretations of behavior, improvement communication skills in work and life situations, self-control, self-adjustment skills and some applications of psychology in pharmacy.

III. Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Identify the conditions that affect memory and intelligence.
2. Determine the role of pharmacists in public health education.
3. Recognize the social and behavioral sciences related to pharmacy.
4. Recognize thinking and decision making skills.
5. Predict" How to improve your mood and money".
6. utilize knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject area
7. Demonstrate the role of the pharmacist in public health education, regarding vaccination, drug abuse and misuse.
8. Apply negotiation skills.
9. Adopt the principle of patient communication to gain trust from the patient.
10. Develop problem-solving skills.
11. Demonstrate self-protection skills.
12. Developing good selling, financial, stock management and negotiation skills

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Identify the conditions that affect memory and intelligence.
A3-	Understand the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication,	**a2-**	Determine the role of pharmacists in public health education
	rationalize drug use and overall health needs.		

A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.	**a3-**	Recognize the social and behavioral sciences related to pharmacy.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures brain storming and discussion	▪ Attendance, Quiz and project ▪ Written and oral exams
a1-	Identify the conditions that affect memory and intelligence.		
a2-	Determine the role of pharmacists in public health education.		
a3	The social and behavioral sciences related to pharmacy.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Recognize thinking and decision making skills.
B4	Plan a modern system for administration of	**b2-**	Predict" How to improve your mood and money".
	medical foundations and merge the ethics to business during the drug marketing		

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B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care. the prescriptions, patient and clinical data, to develop the health care.		
		b3-	Utilize knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject area.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, solving problem, discussion and brain storm	Report, Written and oral exams
b1-	Recognize thinking and decision making skills.		
b2-	Predict" How to improve your mood and money".		
b3	utilize knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject area		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Demonstrate the role of the pharmacist in public health education, regarding vaccination, drug abuse and misuse.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields	**c2-**	Apply negotiation skills.
		c3-	Adopt the principle of patient communication to gain trust from the patient.

Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		- Lectures, discussion and brain storm	- Written and oral exams
c1-	Demonstrate the role of the pharmacist in public health education, regarding vaccination, drug abuse and misuse.		
c2-	Apply negotiation skills.		
c3-	Adopt the principle of patient communication to gain trust from the patient.		

(D) General / Transferable Skills:			
Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D1	Practice independent learning needed for continuous professional development	d1-	Develop problem-solving skills.
		d2	Demonstrate self-protection skills.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d3	Developing good selling, financial, stock management and negotiation skills
D4	Take responsibility for adaptation to change needs in pharmacy practice.		

Teaching And Assessment Methods For Achieving Learning Outcomes:		
Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:		
Course Intended Learning Outcomes (CILOs) in		Methods of

		Teaching strategies/methods to be used	
General and Transferable Skills			**assessment**
After completing this course, students will be able to:		Lectures, discussion and brain storm	Written and oral exams
d1-	Develop problem-solving skills.		
d2	Demonstrate self-protection skills.		
d3	Developing good selling, stock financial, management and negotiation skills		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Number of weeks	Contact hours
1	Introduction and terminology Psychology of learning	**a1 , a2 , b1,d1-3**	**1**	**1**
2	Memory and intelligence	**a1 , a2 , b1**	**1**	**1**
3	Emotions in normal and pathological cases	**a1,d2,c1**	**1**	**1**
4	Psychology of communication skills	**a3, c3**	**1**	**1**
5	Psychological bases of crisis management	**a3 , b3 , d1**	**1**	**1**
6	Psychology of personality	**a3 , b2 ,d2**	**1**	**1**
7	Mid-term exam	**a1-3, b1-3, c1**	**1**	**1**
8	Psycho-therapy	**a3 , c1,d1 ,d2**	**1**	**1**
9	Interests, attitudes and values	**a1 , a3 , d2**	**1**	**1**
10	Group dynamics	**a1 , a3**	**1**	**1**
11	Thinking skills	**a1 , b3**	**1**	**1**

12	An introduction to pharmacological psychology	**a3,c1**	**1**	**1**
13	Consciousness in normal and pathological cases	**d1 , d2**	**1**	**1**
14	Psychological causes of drug abuse and addiction	**a3,b3,c1,d2**	**1**	**1**
15	Psychology of negotiation skill	**a1 ,a3,c2, d3**	**1**	**1**
16	Final-term exam	**a1-3, b1-3, c1**	**1**	**1**
Number of Weeks /and Units Per Semester			**16**	**16**

I. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-3, b1-3, c1**
2	Written Mid exam, Oral exam, reports, projects	2-14	**10**	20%	**a1-3, b1-3, c1**
3	Written Final exam	16th	**35**	70%	**a1-3, b1-3, c1**
	Total		**100**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)

1 hours per week	

VII. Learning Resource (MLA style or APA style)S:	
1- Required Textbook(s) (maximum two)	
	1. Irving B. Weiner, (2003), Handbook of psychology. Personality and social psychology, volume 5, 1st edition, John Wiley & Sons, Inc, Canada. 1. Susan Ayers, Andrew baum, (2007), Cambridge handbook of psychology, health and medicine,2nd edition, Cambridge University press, Cambridge, UK.
2- Recommended Readings and Reference Materials	
	Notes in psychology approved by the department
3- Electronic Materials and Web Sites *etc*.	
4- Other Learning Material:	

I. Facilities Required:	
1 - **Accommodation:**	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - **Computing resources:**	- Computer laboratory with internet facilities.
II. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	

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	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Psychology for Pharmacy

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member		Office Hours						
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:							
1-	Course Title:	Psychology for Pharmacy					
2-	Course Number & Code:	Ph811					
3-	Credit hours: 1hrs	C.H				Total	
		Th.	Seminar	Pr.	F. Tr.		
		1	-	-		1	
4-	Study level/year at which this course is offered:	First year/ First semester					
5-	Pre –requisite (if any):						
6-	Co –requisite (if any):						
7-	Program (s) in which the course is offered	Bachelor of Pharmacy					
8-	Language of teaching the course:	English					
9-	System of Study:	Semesters					
10-	Mode of delivery:	Regular					
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					

III. Course description:

The aim of the course is to provide students the scientific interpretations of behavior, improvement communication skills in work and life situations, self-control, self-adjustment skills and some applications of psychology in pharmacy.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Identify the conditions that affect memory and intelligence.
2. Determine the role of pharmacists in public health education.
3. Recognize the social and behavioral sciences related to pharmacy.
4. Recognize thinking and decision making skills.
5. Predict" How to improve your mood and money".
6. utilize knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject area
7. Demonstrate the role of the pharmacist in public health education, regarding vaccination, drug abuse and misuse.
8. Apply negotiation skills.
9. Adopt the principle of patient communication to gain trust from the patient.
10. Develop problem-solving skills.
11. Demonstrate self-protection skills.
12. Developing good selling, financial, stock management and negotiation skills

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	Contact hours
1	Introduction and terminology Psychology of learning	**a1 , a2 , b1,d1-3**	**1**	**1**
2	Memory and intelligence	**a1 , a2 , b1**	**2**	**1**
3	Emotions in normal and pathological cases	**a1,d2,c1**	**3**	**1**
4	Psychology of communication skills	**a3, c3**	**4**	**1**
5	Psychological bases of crisis management	**a3 , b3 , d1**	**5**	**1**
6	Psychology of personality	**a3 , b2 ,d2**	**6**	**1**
7	Mid-term exam	**a1-3, b1-3, c1**	**7**	**1**

8	Psycho-therapy	**a3 , c1,d1 ,d2**	**8**	**1**
9	Interests, attitudes and values	**a1 , a3 , d2**	**9**	**1**
10	Group dynamics	**a1 , a3**	**10**	**1**
11	Thinking skills	**a1 , b3**	**11**	**1**
12	An introduction to pharmacological psychology	**a3,c1**	**12**	**1**
13	Consciousness in normal and pathological cases	**d1 , d2**	**13**	**1**
14	Psychological causes of drug abuse and addiction	**a3,b3,c1,d2**	**14**	**1**
15	Psychology of negotiation skill	**a1 ,a3,c2, d3**	**15**	**1**
16	Final-term exam	**a1-3, b1-3, c1**	**16**	**1**
Number of Weeks /and Units Per Semester			**16**	**16**

II. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

II. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-3, b1-3, c1**
2	Written Mid exam, Oral exam, reports, projects	2-14	**10**	20%	**a1-3, b1-3, c1**
3	Written Final exam	16th	**35**	70%	**a1-3, b1-3, c1**
	Total		**100**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
1 hours per week	

VII. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

2. Irving B. Weiner, (2003), Handbook of psychology. Personality and social psychology, volume 5, 1st edition, John Wiley & Sons, Inc, Canada.
3. Susan Ayers, Andrew baum, (2007), Cambridge handbook of psychology, health and medicine,2nd edition, Cambridge University press, Cambridge, UK.

4. Recommended Readings and Reference Materials

Notes in psychology approved by the department

5. Electronic Materials and Web Sites *etc*.

6. Other Learning Material:

III. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	□ Student rating and feedback □ Peer rating and feedback □ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.

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	▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of History and Pharmacy Orientation

I. Course Identification and General Information:							
1	Course Title:	History and Pharmacy Orientation					
2	Course Number & Code:	Ph211					
3	Credit hours: 1hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1				1	
4	Study level/ semester at which this course is offered:	First year/First Semester					
5	Pre –requisite (if any):						
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

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The aim of this course to provide the students with information resources about prescription parts, types of dosage forms and acquire them the experience of handling, calculation, finding the incompatibilities between ingredient in prescription and identify the principles of basic and ethics of pharmacy practice. To be able to recognize international and national pharmaceutical organizations, history of pharmacy and the future of pharmacy.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Identify the principles of basic and ethics of pharmacy practice
2. Identify the different pharmacy careers and role of pharmacist as a member in health care team in community, hospital, governmental and military pharmacies and role of pharmacist in pharmaceutical industries.
3. Describe properties of different pharmaceutical dosage forms and drug delivery systems, routs of drug administration and different types of prescriptions.
4. Recognize international and national pharmaceutical organizations.
5. Know simple idea about history and development of pharmacy profession.
6. Specify the role of pharmacist in different pharmaceutical organizations
7. Compare between different types of physical, chemical and therapeutic incompatibilities in the prescription.
8. Utilize the proper pharmaceutical and medical terminology, to communicate with other health care professionals
9. Deal with prescription orders.
10. Demonstrate different routes of drug administration.
11. Work in a team in collection of research data .
12. Write reports on different dosage forms.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Identify the principles of basic and ethics of pharmacy practice
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics and pharmacogenetic of therapeutic agents to provide pharmaceutical	a2-	Identify the different pharmacy careers and role of pharmacist as a member in health care team in community, hospital, governmental and military pharmacies and role of pharmacist in pharmaceutical industries.
	care and facilitate management of patient's medication and overall health needs.		
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research	a3-	Describe properties of different pharmaceutical dosage forms and drug delivery systems, routs of drug administration and different types of prescriptions
		a4-	Recognize international and national pharmaceutical organizations.
		a5-	Know simple idea about history and development of pharmacy profession.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures, discussion	▪ Written and oral exams ▪ Small Projects
a1-	Identify the principles of basic and ethics of pharmacy practice		
a2-	Identify the different pharmacy careers and role of pharmacist as a member in health care team in community, hospital, governmental and military pharmacies and role of pharmacist in pharmaceutical industries.		

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a3-	Describe properties of different pharmaceutical dosage forms and drug delivery systems, routs of drug administration and different types of prescriptions		
a4-	Recognize international and national pharmaceutical organizations.		
a5-	Know simple idea about history and development of pharmacy profession.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Specify the role of pharmacist in different pharmaceutical organizations
		b2-	Compare between different types of physical, chemical and therapeutic incompatibilities in the prescription.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and discussion	Written and oral exams
b1-	Specify the role of pharmacist in different pharmaceutical organizations		

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b2-	Compare between different types of physical, chemical and therapeutic incompatibilities in the prescription.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C5	Conduct research studies and utilize the results in different pharmaceutical fields.	**c1-**	Utilize the proper pharmaceutical and medical terminology, to communicate with other health care professionals
		c2-	Deal with prescription orders.
		c3-	Demonstrate different routes of drug administration.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		- Lectures, discussion and brainstorming	- Written and oral exams
c1	Utilize the proper pharmaceutical and medical terminology, to communicate with other health care professionals		
c2	Deal with prescription orders.		

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c3	Demonstrate different routes of drug administration.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Work in a team in collection of research data .
		d2	Write reports on different dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, discussion and brain storming	Written and oral exams
d1-	Work in a team in collection of research data .		
d2-	Write reports on different dosage forms.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Introduction to pharmacy General introductions/definitions	**a1,a2,d1**	Pharmacy definition,	**1**	**1**

			Pharmacist, Pharmacy Orientation, Drug definition, Drug classes		
2	Fields of job activities dosage forms of Drugs	**a3, c1**	Pharmacy education Pharmacy career	**1**	**1**
3	Role of pharmacist in different pharmaceutical work area	**a4,b1,c1,d1,d2**	Drug sources, Drug information resources	**1**	**1**
4	Industrial pharmacy	**a1,a2,d1,d2**	Liquid Dosage Forms + Semi-Solid Dosage Forms, Solid Dosage Forms and Incompatibilities	**1**	**1**
5	Clinical pharmacy	**a2,a5,c1,c2,d1,d2**	Types of prescriptions, pharmacy practice	**1**	**1**
6	The pharmacy Profession and ethics	**a2,a5, c1,c2,c3**	Pharmacy ethics, practice	**1**	**1**
7	Mid-term exam	**a1-5, b1-2, c1-3**		**1**	**1**
8	Routes of administration	**. a1 ,b2,c1,d1,d2**	Classification of drugs and routes	**1**	**1**
9	pharmacist professional relationship	**a1,b1, c1,c2,c3, d1,d2**	Pharmacy fields, Characteristic of the profession	**2**	**2**

10	Pharmaceutical education	**a1,a4,b2, d1,d2**	Specific courses, References in pharmacy program	**1**	**1**
11	Pharmacopoeias standard	**a1,a5,b1,b2,c1,c2,c3, d1,d2**	Definitions, types	**1**	**1**
12	Pharmacy organizations.	**a1,a3,b2, d1,d2**	Definitions, types	**1**	**1**
13	History of pharmacy	**a1,a5,b1,b2, c1,c2,c3, d1,d2**	China-Egypt-Latin , Roman, Arab and	**1**	**1**
			Islamic Europe, modern century		
14	The future of pharmacy	**a1,a5, c1,c2,c3, d1,d2**	New drug informations	**1**	**1**
15	Final-term exam	**a1-5, b1-2, c1-3**		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-2, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-5, b1-2, c1-3, d1-2**
2	Written Mid exam, Oral exam, reports, projects	2-14	**15**	30%	**a1-5, b1-2, c1-3**
3	Written Final exam	16th	**30**	60%	**a1-5, b1-2, c1-3**
	Total		**50**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. A book prepared by the staff member
2. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th edition Churchill Livingstone, Edinburgh.
3. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.

2- Recommended Readings and Reference Materials

	Appleton and Lange, (2006), Drug information: A guide for Pharmacists. Malone PM (Ed. 3rd Edition. المحكم في تاريخ الطب والصيدلة عند العرب الجزء الثاني
3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com
4- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.
XII. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	

	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of History and Pharmacy Orientation

I. - Information about Faculty Member Responsible for the Course:		
Name of Faculty Member	Prof Dr/ Maged alwan	Office Hours

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
	علوان ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د.ماجد ا.د. القاسم محمد عباس

Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	**Course Title:**	**History and Pharmacy Orientation**				
2-	**Course Number & Code:**	**Ph211**				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		1	-	-		1
4-	**Study level/year at which this course is offered:**	First year/First semester				
5-	**Pre –requisite (if any):**	-				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

The aim of this course to provide the students with information resources about prescription parts, types of dosage forms and acquire them the experience of handling, calculation, finding the incompatibilities between ingredient in prescription and identify the principles of basic and ethics of pharmacy practice. To be able to recognize international and national pharmaceutical organizations, history of pharmacy and the future of pharmacy.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

13. Identify the principles of basic and ethics of pharmacy practice
14. Identify the different pharmacy careers and role of pharmacist as a member in health care team in community, hospital, governmental and military pharmacies and role of pharmacist in pharmaceutical industries.
15. Describe properties of different pharmaceutical dosage forms and drug delivery systems, routs of drug administration and different types of prescriptions.
16. Recognize international and national pharmaceutical organizations.
17. Know simple idea about history and development of pharmacy profession.
18. Specify the role of pharmacist in different pharmaceutical organizations
19. Compare between different types of physical, chemical and therapeutic incompatibilities in the prescription.
20. Utilize the proper pharmaceutical and medical terminology, to communicate with other health care professionals
21. Deal with prescription orders.
22. Demonstrate different routes of drug administration.
23. Work in a team in collection of research data .
24. Write reports on different dosage forms.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmacy General introductions/definitions	**a1,a2,d1**	Pharmacy definition, Pharmacist, Pharmacy Orientation, Drug definition, Drug classes	**1**	**1**

2	Fields of job activities dosage forms of Drugs	**a3, c1**	Pharmacy education Pharmacy career	**1**	**1**
3	Role of pharmacist in different pharmaceutical work area	**a4,b1,c1,d1,d2**	Drug sources, Drug information resources	**1**	**1**
4	Industrial pharmacy	**a1,a2,d1,d2**	Liquid Dosage Forms + Semi-Solid Dosage Forms, Solid Dosage Forms and Incompatibilities	**1**	**1**
5	Clinical pharmacy	**a2,a5,c1,c2,d1,d2**	Types of prescriptions, pharmacy practice	**1**	**1**
6	The pharmacy Profession and ethics	**a2,a5, c1,c2,c3**	Pharmacy ethics, practice	**1**	**1**
7	Mid-term exam	**a1-5, b1-2, c1-3**		**1**	**1**
8	Routes of administration	**. a1 ,b2,c1,d1,d2**	Classification of drugs and routes	**1**	**1**
9	pharmacist professional relationship	**a1,b1, c1,c2,c3, d1,d2**	Pharmacy fields, Characteristic of the profession	**2**	**2**
10	Pharmaceutical education	**a1,a4,b2, d1,d2**	Specific courses, References in pharmacy program	**1**	**1**
11	Pharmacopoeias standard	**a1,a5,b1,b2,c1,c2,c3, d1,d2**	Definitions, types	**1**	**1**
12	Pharmacy organizations.	**a1,a3,b2, d1,d2**	Definitions, types	**1**	**1**

13	History of pharmacy	**a1,a5,b1,b2, c1,c2,c3, d1,d2**	China-Egypt-Latin , Roman, Arab and Islamic Europe, modern century	**1**	**1**
14	The future of pharmacy	**a1,a5, c1,c2,c3, d1,d2**	New drug informations	**1**	**1**
15	Final-term exam	**a1-5, b1-2, c1-3**		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-2, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-5, b1-2, c1-3, d1-2**

2	Written Mid exam, Oral exam, reports, projects	2-14	**15**	30%	**a1-5, b1-2, c1-3**
3	Written Final exam	16th	**30**	60%	**a1-5, b1-2, c1-3**
	Total		**50**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

4. A book prepared by the staff member
5. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th edition Churchill Livingstone, Edinburgh.
6. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.

6- Recommended Readings and Reference Materials

Appleton and Lange, (2006), Drug information: A guide for Pharmacists. Malone PM (Ed. 3rd Edition.
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7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	☐ Student rating and feedback ☐ Peer rating and feedback ☐ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of General Pharmaceutical Chemistry

I. Course Identification and General Information:

1	**Course Title**	General Pharmaceutical Chemistry				
2	**Course Number & Code:**	Ph511				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	1st level /1st semester				
5	**Pre –requisite (if any):**					
6	**Co –requisite (if any):**	-				
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
	The department in which the course is offered:	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
9	**Location of teaching the course:**	Faculty of Pharmacy-Sana`a University				
10	**Prepared by:**	Dr. Mokhtar Al-Ghorafy				
11	**Date of approval:**					

II. Course description:

The course is concerned with the fundamental knowledge of chemistry, of chemical and physical properties of the elements, bonds, compounds and chemical reactions, kinetics, equilibrium, acidity basicity and methods of qualitative analysis.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the state of matter and units of measurements.
2. Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory 3. Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them 4. Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.
5. Recognize the importance of chemistry to human body.
6. Classify chemical reactions according to their rates and energy.
7. Predict structure, bonding and trends in the behavior of matter using the atomic theory.
8. Differentiate the bonding types, atomic structure, and geometrical shape of molecules.
9. Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Operate different equipment used in the lab
12. Prepare some inorganic compounds and Calculate the concentrations and pH of solutions
13. Carry out the separation and qualitative analysis of some mixtures of components and ions.
14. Communicate and cooperate effectively with his colleagues and other specialist.
15. Implement writing and presentation skills
16. Work effectively in a team to perform the required tasks.
17. Demonstrate creativity and time management.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students would be able to:	After participating in the course, students would be able to:

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize the state of matter and units of measurements.
		a2-	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory
		a3-	Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them.
		a4-	Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.
		a5-	Recognize the importance of chemistry in human body.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the state of matter and units of measurements.	Lecture method , group discussion, brain storming and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory		

a3-	Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them.		
a4-	Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.		
a5-	Recognize the importance of chemistry in human body.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Classify chemical reactions according to their rates and energy.
		b2-	Predict structure, bonding and trends in the behavior of matter using the atomic theory.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Differentiate the bonding types, atomic structure, and geometrical shape of molecules.
		b4-	Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in **Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Classify chemical reactions according to their rates and energy.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions, Brain Storming	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Predict structure, bonding and trends in the behavior of matter using the atomic theory.		
b3-	Differentiate the bonding types, atomic structure, and geometrical shape of molecules.		
b4-	Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c1-**	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Operate different equipment used in the lab
		c3-	Prepare some inorganic compounds and Calculate the concentrations and pH of solutions

		c4-	Carry out the separation and qualitative analysis of some mixtures of components and ions.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.	Lecture method, Practical sessions and group discussion	Practical works, homework, practical exam and practical
c2-	Operate different equipment used in the lab		
c3-	Prepare some inorganic compounds and Calculate the concentrations and pH of solutions		reports.
c4-	Carry out the separation and qualitative analysis of some mixtures of components and ions.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Communicate and cooperate effectively with his colleagues and other specialist.
		d2-	Implement writing and presentation skills
D5-	Apply information and communication technology and working effectively in a team.	**d3-**	Work effectively in a team to perform the required tasks.

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د .مختار الغرافي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

		d4-	Demonstrate creativity and time management

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.	Small group discussions, Tutorials, Self and Independed learning	Homework, and reports.
d2-	Implement writing and presentation skills.		
d3-	Work effectively in a team.		
d4-	Demonstrate creativity and time management		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Atomic and Electronic Structure	a1, a5, b2, d1-4	Introduction to Chemistry: Matter: Classification, state of matters, properties of matters, Measurements, units of measurements Focus on the Human Body: The Elements of life esis, metabolism,	1	2

2	Atoms, Molecules, and Ions	a2, a5,b2, b3, d1-4	Atoms, Molecules, and Ions: The Atomic Theory, The Structure of the Atom ,Atomic Number, Mass Number, Isotopes, The Periodic Table Molecules and molecular compounds, Ions and ionic compounds, Chemical Formulas, Naming Compounds Life Focus on Health & Medicine: Isotopes in Medicine	1	2
3	of Basic concepts chemical bonding:	a2, a5,b2, b3, d1-4	Basic concepts of chemical bonding: Chemical bonds, Lewis symbols, and the Octel Rule Ionic bonding, Covalent bonding, bond polarity and electronegativity, Lewis structure, Exception to the octel rule, Strengths of covalent bond. Electronegativity and Bond Polarity ,Polarity of Molecules .Focus on Health & Medicine: Covalent Drugs and Medical Product.	2	4
4	Ionic Compounds	a2, a5, b2, d1-4	Ionic Compounds Introduction to Bonding . Ions - Cations and Anions -Relating Group Number to Ionic Charge for Main Group Elements.	1	2
			-Metals with Variable Charge . -Focus on the Human Body: Important Ions in the Body .		
5	Molecular geometry , bonding theory	a2, a5, b3, d1-4	Molecular geometry , bonding theory and hybridization : Molecular shapes, Molecular shape and molecular polarity, Covalent bonding and orbital overlap, Hybrid orbitals, multiple bonds, molecular orbitals , application of molecular orbitals in drug interaction	1	2

6	Thermochemistry:	a4, b1, d1-4	Thermochemistry: Energy Changes, Reaction Rates, and Equilibrium Energy -The Units of Energy	1	2
7	**Mid Exam**	a1-5, b1-3		1	2
8	Equilibrium	a3, a5, b4, c3, d1-4	-Focus on the Human Body: Energy and Nutrition Reaction Rates -How Concentration and Temperature Affect Reaction Rate -Catalysts -Focus on the Human Body: Lactase, a Biological Catalyst - Focus on the Environment: Catalytic Converters Equilibrium -The Equilibrium Constant -The Magnitude of the Equilibrium Constant -Calculating the Equilibrium Constant -Le Châtelier's Principle -Concentration Changes -Temperature Changes -Pressure Changes Focus on the Human Body: Body Temperature .	1	2

9	Solutions	a4, a5, b4, c3, d1-4	Solutions Introduction Solubility—General Features -Basic Principles -Ionic Compounds—Additional Principles Solubility—Effects of Temperature and Pressure -Temperature Effects -Pressure Effects Concentration Units—Molarity -Dilution Osmosis and Dialysis -Osmotic Pressure -Focus on the Human Body: Osmosis and Biological Membranes -Focus on Health & Medicine: Dialysis	1	2
10	Chemical kinetics, introduction, reaction	a3, b1	Chemical kinetics, introduction, reaction rates, rate laws, concentration and time(half-lives), transition states, effect of temperature on reaction rate, catalysts	2	4
11	Acids and Bases	a4, a5, b4, c3, d1-4	Acids and Bases Introduction to Acids and Bases -Brønsted–Lowry Acids -Brønsted–Lowry Bases -Relating Acid and Base Strength -Using Acid Strength to Predict the Direction of Equilibrium Equilibrium and Acid Dissociation Constants Dissociation of Water The pH Scale -Calculating pH -Calculating pH Using a Calculator Focus on the Human Body: The pH of Body Fluids	2	4
12	**Revision**	a1-5, b1-4		1	2
13	**Final Exam**	a1-5, b1-4		1	2

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د .مختار الغرافي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Number of Weeks /and Units Per Semester	16	32

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	Lab. precautions and Safety practices in the chemistry Laboratory equipment	c1,c2	2	4
2	Identification of inorganic chemical substances by qualitative methods	c1,c2, c4	6	12
6	Mid-Exam	c1,c2, c4,	1	2
7	Preparations. a) Ferrous ammonium sulphate. b) Potassium trioxalato chromate(III) c) Tetraamminecopper(II) Sulphate. d) Microcosmic salt	c1,c2,c3.	3	6
8	Acidimetry Alkalimetry a) Estimation of sodium hydroxide – standard sodium carbonate. b) Estimation of Oxalic acid – standard Oxalic acid.	c1,c2,c3,d1,d4	3	6
16	Final Exam	c1-4	1	2
Number of Weeks /and Units Per Semester			16	32

VI. a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a2, a5, b1-4, d1-4**	Sporadic through the semester	**10**
2	Reports	**a1a5 ,b1, b2,c1-4, d1-4**		

III. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a3,a4,b1,b4, d1-4
	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a2, a5, b1-4, , d1-4
2	**Practical Reports and Practical midsemester exam**	8th	30	20%	c1-4
3	**Theoretical mid-semester exam**	9th	30	20%	a1-5, b1, b2, b3
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-4
6	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

V

I. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

II. Learning Resources:

1- Required Textbook(s) (maximum two).

1. J. W. Solomon's, 2008 "Organic Chemistry" 9th Ed., John Wiley, New York.
2. J.D. Brady, 2000, General Chemistry Principles & Structures, 7th Edition, John Wiley & Sons, New York.

2- Recommended Books and Reference Materials.

1- G.S. Thorpe, (2001), A.P.Chemistry, Third Edition, Hunory Minds Inc, New York.
2- W. S. Warren, (2001), The Physical Basis of Chemistry, Second Edition, Princeton, Harcourt Academic Press.
3- R. Brent,(1960) The Golden Book of Chemistry Experiments How To Set Up a Home Laboratory- Over 200 Simple Experiments, Golden Press Inc, New York.
4- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

-1- www.chem.duke.edu/-wwarren
2- www.cliffsnotes.com
3-http://www.cem.msu.edu/%7Ereusch/VirtualText/intro1.htm

III. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

2 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of General Pharmaceutical Chemistry

I- Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Dr. Mokhtar A. Al-Ghorafy	Office Hours						
Location & Telephone No.	770010749	SAT	SUN	MON	TUE	WED	THU
E-mail	Alghorafi2030@yahoo.com	2h					

II- Course Identification and General Information:			
1-	Course Title:	General Pharmaceutical Chemistry	
2-	Course Number & Code:	Ph511	
3-	Credit hours:	C.H	C.H

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		Th.	Seminar	Pr.	F. Tr.	Th.
		2		2		2
4-	**Study level/year at which this course is offered:**	1st Level / 2nd semester				
5-	**Pre –requisite (if any):**	-				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course is concerned with the fundamental knowledge of chemistry, of chemical and physical properties of the elements, bonds, compounds and chemical reactions, kinetics, equilibrium, acidity basicity and methods of qualitative analysis.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the state of matter and units of measurements.
2. Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory 3. Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them 4. Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.
5. Recognize the importance of chemistry to human body.
6. Classify chemical reactions according to their rates and energy.
7. Predict structure, bonding and trends in the behavior of matter using the atomic theory.
8. Differentiate the bonding types, atomic structure, and geometrical shape of molecules.
9. Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Operate different equipment used in the lab
12. Prepare some inorganic compounds and Calculate the concentrations and pH of solutions
13. Carry out the separation and qualitative analysis of some mixtures of components and ions.
14. Communicate and cooperate effectively with his colleagues and other specialist.
15. Implement writing and presentation skills
16. Work effectively in a team to perform the required tasks.
17. Demonstrate creativity and time management.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Atomic and Electronic Structure	a1, a5, b2, d1-4	Introduction to Chemistry: Matter: Classification, state of matters, properties of matters, Measurements, units of measurements Focus on the Human Body: The Elements of life esis, metabolism,	1	2

2	Atoms, Molecules, and Ions	a2, a5,b2, b3, d1-4	Atoms, Molecules, and Ions: The Atomic Theory, The Structure of the Atom ,Atomic Number, Mass Number, Isotopes, The Periodic Table Molecules and molecular compounds, Ions and ionic compounds, Chemical Formulas, Naming Compounds Life Focus on Health & Medicine: Isotopes in Medicine	2	2
3	of Basic concepts chemical bonding:	a2, a5,b2, b3, d1-4	Basic concepts of chemical bonding: Chemical bonds, Lewis symbols, and the Octel Rule Ionic bonding, Covalent bonding, bond polarity and electronegativity, Lewis structure, Exception to the octel rule, Strengths of covalent bond. Electronegativity and Bond Polarity ,Polarity of Molecules .Focus on Health & Medicine: Covalent Drugs and Medical Product.	3,4	4
4	Ionic Compounds	a2, a5, b2, d1-4	Ionic Compounds Introduction to Bonding . Ions - Cations and Anions -Relating Group Number to Ionic Charge for Main Group Elements. -Metals with Variable Charge . -Focus on the Human Body: Important Ions in the Body .	5	2
5	Molecular geometry , bonding theory	a2, a5, b3, d1-4	Molecular geometry , bonding theory and hybridization : Molecular shapes, Molecular shape and molecular polarity, Covalent bonding and orbital overlap, Hybrid orbitals, multiple bonds, molecular orbitals , application of molecular orbitals in drug interaction	6	2

6	Thermochemistry:	a4, b1, d1-4	Thermochemistry: Energy Changes, Reaction Rates, and Equilibrium Energy -The Units of Energy	7	2
7	**Mid Exam**	a1-5, b1-3		8	2
8	Equilibrium	a3, a5, b4, c3, d1-4	-Focus on the Human Body: Energy and Nutrition Reaction Rates -How Concentration and Temperature Affect Reaction Rate -Catalysts -Focus on the Human Body: Lactase, a Biological Catalyst - Focus on the Environment: Catalytic Converters Equilibrium -The Equilibrium Constant -The Magnitude of the Equilibrium Constant -Calculating the Equilibrium Constant -Le Châtelier's Principle -Concentration Changes -Temperature Changes -Pressure Changes Focus on the Human Body: Body Temperature .	9	2

9	Solutions	a4, a5, b4, c3, d1-4	Solutions Introduction Solubility—General Features -Basic Principles -Ionic Compounds—Additional Principles Solubility—Effects of Temperature and Pressure -Temperature Effects -Pressure Effects Concentration Units—Molarity -Dilution Osmosis and Dialysis	10	2
			-Osmotic Pressure -Focus on the Human Body: Osmosis and Biological Membranes -Focus on Health & Medicine: Dialysis		
10	Chemical kinetics, introduction, reaction	a3, b1	Chemical kinetics, introduction, reaction rates, rate laws, concentration and time(half-lives), transition states, effect of temperature on reaction rate, catalysts	11,12	4
11	Acids and Bases	a4, a5, b4, c3, d1-4	Acids and Bases Introduction to Acids and Bases -Brønsted–Lowry Acids -Brønsted–Lowry Bases -Relating Acid and Base Strength -Using Acid Strength to Predict the Direction of Equilibrium Equilibrium and Acid Dissociation Constants Dissociation of Water The pH Scale -Calculating pH -Calculating pH Using a Calculator Focus on the Human Body: The pH of Body Fluids	13,14	4
12	**Revision**	a1-5, b1-4		15	2
13	**Final Exam**	a1-5, b1-4		16	2

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Number of Weeks /and Units Per Semester	16	32

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	Lab. precautions and Safety practices in the chemistry Laboratory equipment	c1,c2	1, 2	4
2	Identification of inorganic chemical substances by qualitative methods	c1,c2, c4	3-8	12
6	Mid-Exam	c1,c2, c4,	9	2
7	Preparations. a) Ferrous ammonium sulphate. b) Potassium trioxalato chromate(III) c) Tetraamminecopper(II) Sulphate. d) Microcosmic salt	c1,c2,c3.	10-12	6
8	Acidimetry Alkalimetry a) Estimation of sodium hydroxide – standard sodium carbonate. b) Estimation of Oxalic acid – standard Oxalic acid.	c1,c2,c3,d1,d4	13-15	6
16	Final Exam	c1-4	16	2
Number of Weeks /and Units Per Semester			16	32

VI- a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII- Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a2, a5, b1-4,d1-4**	Sporadic through the semester	**10**
2	Reports	**a1a5 ,b1, b2,c1-4,d1-4**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a3,a4,b1,b4,d1-4
	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a2, a5, b1-4, , d1-4
2	**Practical Reports and Practical midsemester exam**	8th	30	20%	c1-4
3	**Theoretical mid-semester exam**	9th	30	20%	a1-5, b1, b2, b3
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-4
6	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

V. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VI. Learning Resources:

1- Required Textbook(s) (maximum two).

1. J. W. Solomon's, 2008 "Organic Chemistry" 9th Ed., John Wiley, New York.
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7- R. Brent,(1960) The Golden Book of Chemistry Experiments How To Set Up a Home Laboratory-Over 200 Simple Experiments, Golden Press Inc, New York.

8- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

-1-www.chem.duke.edu/-wwarren

-2-www.cliffsnotes.com

3-http://www.cem.msu.edu/%7Ereusch/VirtualText/intro1.htm **VII.**

Facilities Required:

1 - Accommodation:

- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc.
- Well-equipped laboratories with all required equipment and reagents.

3 - Computing resources:

- Computer laboratory with internet facilities.

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VIII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.

- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
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- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

6- Course development plans

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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty.
	▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Pharmaceutical Calculations

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutical Calculations					
2	Course Number & Code:	Ph212					
3	Credit hours: 1hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1				1	
4	Study level/ semester at which this course is offered:	First year/First semester					
5	Pre –requisite (if any):						
6	Co –requisite (if any):	Pharmacy Orientation					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof Dr/ Mahmoud Mahyoob Alburyhi					
12	Date of approval:						

II. Course description:

The aim of the course is to acquire students with the principles of pharmaceutical calculations. In addition to managing proper and safe dispensing of medicine.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Distinguish the methods of pharmaceutical calculation
2. Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice
3. Calculate the proper dose of drugs for adults and pediatrics
4. Apply simple mathematical conversions for weight, volume, temperatures
5. Utilize the proper medical terminology, to communicate with other health care professionals
6. Employ proper calculations for preparation of different pharmaceutical preparations
7. Communicate effectively with patients and health care professionals
8. Work effectively as a part of a team to perform the required tasks

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Distinguish the methods of pharmaceutical calculation
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a2-**	Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		**Teaching strategies/methods to be used**	**Methods of assessment**
completing this course, students will be able to:		▪ Lectures brain storming	▪ Attendance, Quiz and
a1-	Distinguish the methods of pharmaceutical calculation	and discussion	▪ project Written and oral exams
a2-	Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice		

(B) Intellectual Skills:			
Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Calculate the proper dose of drugs for adults and pediatrics
B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Apply simple mathematical conversions for weight, volume, temperatures

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures, solving problem, discussion and brain storm	Report, Written and oral exams
b1-	Calculate the proper dose of drugs for adults and pediatrics		
b2-	Apply simple mathematical conversions for weight, volume, temperatures		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Professional and Practical Skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use	**c1-**	Utilize the proper medical terminology, to communicate with other health care professionals
C5-	Conduct research studies and utilize the results in different pharmaceutical fields	**c2-**	Employ proper calculations for preparation of different pharmaceutical preparations

Teaching And Assessment Methods For Achieving Learning Outcomes:		
Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:		
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	**Teaching strategies/methods to be used**	**Methods of assessment**

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After completing this course, students will be able to:		- Lectures, discussion and brain storm	- Written and oral exams
c1-	Utilize the proper medical terminology, to communicate with other health care professionals		
c2	Employ proper calculations for preparation of different pharmaceutical preparations		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Communicate effectively with patients and health care professionals
		d2	Work effectively as a part of a team to perform the required tasks

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, discussion and brain storm	Written and oral exams
d1-	Utilize the proper medical terminology, to communicate with other health care professionals		
d2	Employ proper calculations for preparation of different pharmaceutical preparations		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction Some fundamentals of measurement and pharmaceutical calculations	**a1, b1,c1**	Pharmacy definition, units arithmetic symbols, Fractions Ratios Length, weight and volume	**1**	**1**
2	The International System of Units Interpretation of prescription or medication order	**b1, c2,d1**	Metric system Common system The apothecaries,` Avoirdupois measure	**1**	**1**
3	Household measures Reducing and enlarging formula	**a1, b2**	Applications	**1**	**1**
4	Density Specific gravity Specific volume	**a1, b2**	Applications	**1**	**1**
5	pharmaceutical measurement	**a1,a2,b1,c1,d1**	Weight and volume of liquids and percentage preparation	**1**	**1**

6	Percentage preparation Ratio strength Simple conversion from percentage to ratio strength	**a1,a2,b2,c2,d1**	Applications	**1**	**1**
7	Mid-term exam	**a1-2, b1-2, c1-2**		**1**	**1**
8	Dilution and concentration	**a1, b2**	Applications	**2**	**2**
9	Stock solution, Dilution	**a1, b2**	Applications	**1**	**1**
10	Allegation medial	**a1,b1,1**	Applications	**1**	**1**
11	Allegation alternate	**a1,b1,c2**	Applications	**1**	**1**
12	Calculation of pediatric dose according to body weight, age and body surface area	**a1,a2,b1,c2,d1**	Applications	**1**	**1**
13	Calculation of chemotherapeutic dose according to body weight, age	**a1,a2,c2,d1,d2**	Applications	**1**	**1**
14	Calculation of chemotherapeutic dose according to body surface area	**a1,a2, b2,c2,d1,d2**	Applications	**1**	**1**
15	Final-term exam	**a1-2, b1-2, c1-2**		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-2, b1-2, d1-2**	Sporadic through the semester	**10**

2	Reports	**c1-2, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-2, b1-2, c1-2, d1-2**
2	Written Mid exam, Oral exam, reports, projects	2-14	**15**	30%	**a1-2, b1-2, c1-2**
3	Written Final exam	16th	**30**	60%	**a1-2, b1-2, c1-2**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

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X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. A book prepared by the staff members
2. Howard C. Ansel.,2013, Pharmaceutical Calculation, Lippincott, (14th edition),Williams and Wilkins .
3. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
4. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editiChurchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition,

Pharmaceutical Press, London.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Calculations

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	**Prof Dr/ Mahmoud Mahyoob Alburyhi**	**Office Hours**					
Location & Telephone No.	777970600	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:		
1-	**Course Title:**	Pharmaceutical Calculations

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2-	**Course Number & Code:**	Ph212				
3-	**Credit hours: 1hrs**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		1	-	-		1
4-	**Study level/year at which this course is offered:**	First year/ First semester				
5-	**Pre –requisite (if any):**					
6-	**Co –requisite (if any):**	Pharmacy Orientation				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

The aim of the course is to acquire students with the principles of pharmaceutical calculations. In addition to managing proper and safe dispensing of medicine.

IV. Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Distinguish the methods of pharmaceutical calculation
2. Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice
3. Calculate the proper dose of drugs for adults and pediatrics
4. Apply simple mathematical conversions for weight, volume, temperatures
5. Utilize the proper medical terminology, to communicate with other health care professionals
6. Employ proper calculations for preparation of different pharmaceutical preparations
7. Communicate effectively with patients and health care professionals
8. Work effectively as a part of a team to perform the required tasks

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction Some fundamentals of measurement and pharmaceutical calculations	**a1, b1,c1**	Pharmacy definition, units arithmetic symbols, Fractions Ratios Length, weight and volume	**1**	**1**
					1

2	The International System of Units Interpretation of prescription or medication order	**b1, c2,d1**	Metric system Common system The apothecaries,` Avoirdupois	**1**	
			measure		
3	Household measures Reducing and enlarging formula	**a1, b2**	Applications	**1**	**1**
4	Density Specific gravity Specific volume	**a1, b2**	Applications	**1**	**1**
5	pharmaceutical measurement	**a1,a2,b1,c1,d1**	Weight and volume of liquids and percentage preparation	**1**	**1**
6	Percentage preparation Ratio strength Simple conversion from percentage to ratio strength	**a1,a2,b2,c2,d1**	Applications	**1**	**1**
7	Mid-term exam	**a1-2, b1-2, c1-2**		**1**	**1**
8	Dilution and concentration	**a1, b2**	Applications	**2**	**2**
9	Stock solution, Dilution	**a1, b2**	Applications	**1**	**1**
10	Allegation medial	**a1,b1,1**	Applications	**1**	**1**
11	Allegation alternate	**a1,b1,c2**	Applications	**1**	**1**
12	Calculation of pediatric dose according to body weight, age and body surface area	**a1,a2,b1,c2,d1**	Applications	**1**	**1**
13	Calculation of chemotherapeutic dose according to body weight, age	**a1,a2,c2,d1,d2**	Applications	**1**	**1**
14	Calculation of chemotherapeutic dose according to body surface area	**a1,a2, b2,c2,d1,d2**	Applications	**1**	**1**

15	Final-term exam	**a1-2, b1-2, c1-2**		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-2, b1-2, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-2, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-2, b1-2, c1-2, d1-2**
2	Written Mid exam, Oral exam, reports, projects	2-14	**15**	30%	**a1-2, b1-2, c1-2**
3	Written Final exam	16th	**30**	60%	**a1-2, b1-2, c1-2**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)

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2 hours per week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

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5. A book prepared by the staff members
6. Howard C. Ansel.,2013, Pharmaceutical Calculation, Lippincott, (14th edition),Williams and Wilkins .
7. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
8. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editiChurchill Livingstone, Edinburgh.

6- Recommended Readings and Reference Materials	
	Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
7- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com
8- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London.

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XI. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Anatomy

I. Course Identification and General Information:

1	**Course Title**	Anatomy				
2	**Course Number & Code:**	Ph411				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**-**			**2**
4	**Study level/ semester at which this course is offered:**	1st level /1st semester				
5	**Pre –requisite (if any):**					
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
10	**Prepared by:**	**Prof Hassan Al-Shamahy**				
11	**Date of approval:**					

II. Course description:

The general aim of this course is to enable students to become acquainted with the detailed structure and essential function of those parts of the human body necessary for clinical practice, and centered anatomy to equip students to be able to function effectively as part of the general medical health-care team.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize Knowledge and understanding terms and planes of gross anatomy.
2. Describe the knowledge and understanding about the structure and essential function of each organ
3. Recall the knowledge about the body systems
4. Name and locate the major arteries and veins of the body and understanding the basic arrangement of the nervous system.
5. Identify proper position and orientation of each organ and structure.
6. Correlate anatomical facts with its major clinical applications.
7. Apply understanding of human anatomy on demonstration of evidence based practice.
8. Develop communication with the internet critically as a source of information about human anatomy.
9. Organize working as a team member in collecting valuable information of evidence based practice.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize Knowledge and understanding terms and planes of gross anatomy.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics,	**a2-**	Describe the knowledge and understanding about the structure and essential function of each organ.
		a3-	Recall the knowledge about the body systems.

	pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a4-**	Name and locate the major arteries and veins of the body and understanding the basic arrangement of the nervous system.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize Knowledge and understanding terms and planes of gross anatomy.	Lectures Seminars Discussions	Written Mid &final theoretical exams Quizzes assignment Attendance
a2-	Describe the knowledge and understanding about the structure and essential function of each organ.		
a3-	Recall the knowledge about the body systems.		
a4-	Name and locate the major arteries and veins of the body and understanding the basic arrangement of the nervous system.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

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B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and	**b1-**	Identify proper position and orientation of each organ and structure.
	pharmacodynamic profiles of the drug		
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Correlate anatomical facts with its major clinical applications.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Identify proper position and orientation of each organ and structure.	Lectures Seminars Discussions	Written Mid &final theoretical exams Quizzes assignment Attendance
b2-	Correlate anatomical facts with its major clinical applications.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills
After completing this program, students would be able to:	After participating in the course, students would be able to:

C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c1-**	Apply understanding of human anatomy on demonstration of evidence based practice.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Apply understanding of human anatomy on demonstration of evidence based practice.	Lectures Seminars Discussions	Written Mid &final theoretical exams, Quizzes, Attendance Assignment

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills After completing this program, students would be able to:		Course Intended Learning Outcomes (CILOs) in General / Transferable skills After participating in the course, students would be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Develop communication with the internet critically as a source of information about human anatomy.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Organize working as a team member in collecting valuable information of evidence based practice.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

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Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Develop communication with the internet critically as a source of information about human anatomy.	Lectures Seminars Discussions	Written Mid &final theoretical exams, Quizzes, assignment Attendance
d2-	Organize working as a team member in collecting valuable information of evidence based practice.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Number of weeks	Contact hours
1.	**Introduction (medical terminology)**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
2.	**Skeletal system**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
3.	**Joints**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
4.	**Muscular System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
5.	**Cardiovascular System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	2	4
6.	**Mid Exam**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
7.	**Lymphatic System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
8.	**Respiratory System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2

9.	**Digestive System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
10.	**Urinary System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
11.	**Endocrine System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
12.	**Nervous System**	a1, a2, a3, a4, b1, b2 c1, d1,d2	2	4
13.	Review	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
14.	**Final Exam**	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures
Seminars
Discussions

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance and quizzes**	**All Weeks**	5	5%	a1-3,b1-b2, c1
2.	**Homework-assignments**	Sporadic through the semester	5	5%	a1,a2, a4, b1-2, c1, d1-2

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3.	**Theoretical mid-semester exam**	7th	20	20%	a1, a2, a3, a4, b1, b2 c1, d1,d2
4.	**Final Exam (theoretical)**	**16th**	70	70%	a1, a2, a3, a4, b1, b2 c1, d1,d2
	Total		**100**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

There is a long list of anatomy books present in the faculty library for the student to choose from. Course notes done by teaching staff.

2- Recommended Books and Reference Materials.

Course notes of Department theoretical books and practical manual (lectures and practical)
a

3- Electronic Materials and Web Sites *etc*.

I. Course Policies (To be determined by Faculty Deanship)

Based on university regulations, the following aspects should be figured out:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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1.	(Class Attendance) :Class Attendance: - Attendance of students is taken at beginning of lecture time. - The allowed absence percentage is 20% without excuse and 30% with acceptable excuse, - When student has been absent for more than 30% of course lectures without acceptable excuse, the student will be prohibited from entering subject the final exam.
2.	(Tardy) :If the student came late to class for 15 minutes, he/she is registered absent but he/she allowed to enter the hall to listen lecture presentation.
3.	(Exam Attendance/Punctuality) :According to examination roles or policies: - If the student is absent in the year works exams, the decision is referred to the teacher whether to allow or to reject according to the offered excuse. - If the student is absent in the final exam with an acceptable excuse, the student would be attended the re-sit exam as 1st trial. - If the student is absent in the final exam without an acceptable excuse, the student would be attended re-sit exam as 2nd trial.
4.	(Assignments & Projects) :According to examination roles or policies: - The student should be attended the final exam at certain time and according to the accredited exam table. - If the student came late after 15 minutes from the exam beginning, the student would be to attend the exam with oral monition of never repeat. - In case of the repeat, the student prevented from entrance and considered absent.
5.	(Cheating) :According to examination roles or policies: - If the student cheated in the year works exams of the course, the student prohibited from entrance the final exam and given zero degree with prevented him from entrance the re-sit exam of this course. - If the student cheated in the final exam of the course, the student prohibited from the cheated course and the followed course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheated course is the last at the exam
	table, the student prohibited from the cheated course and the past course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheating is discovered in subsequent time, the cheated student didn't escape from payment and ordinance is referred to precision committee and the final decision is referred to the collage council. - If the cheating is discovered during the correcting the answered books, the corrector has written a report to the chairman of concerned department for taking available procedure. - The faculty council is able to segregate the student for one academic year in 2nd cheating trial and final segregation from the university after accreditation of university council in 3rd cheating trial.
6.	(Plagiarism) :According to examination roles or policies: Plagiarism means a student plagiarizes the personality of another student. Plagiarism for exam purpose: 1- Both students are prohibited from the plagiarized academic year and all results of them are rejected with prohibition of them from entrance the resit exam. 2- If the plagiarized student is from outside the university, the student is referred to the university police. -Plagiarism for other purposes: 1- Both students are warned as segregation. 2- If the plagiarized student is from outside the university, the student is referred to the university police.
7.	(Other policies) :-The student should be followed the instructions for the exam entrance. - The student should be followed all systems & laws of the university.

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Course Plan of Anatomy

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof Hassan AlShamahy	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:						
1-	Course Title:	Anatomy				
2-	Course Number & Code:	Ph411				
3-	Credit hours: 1hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	

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		2	-	-		2
4-	**Study level/year at which this course is offered:**	1st level /1st semester				
5-	**Pre –requisite (if any):**					
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

The general aim of this course is to enable students to become acquainted with the detailed structure and essential function of those parts of the human body necessary for clinical practice, and centered anatomy to equip students to be able to function effectively as part of the general medical health-care team.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize Knowledge and understanding terms and planes of gross anatomy.
2. Describe the knowledge and understanding about the structure and essential function of each organ
3. Recall the knowledge about the body systems
4. Name and locate the major arteries and veins of the body and understanding the basic arrangement of the nervous system.
5. Identify proper position and orientation of each organ and structure.
6. Correlate anatomical facts with its major clinical applications.
7. Apply understanding of human anatomy on demonstration of evidence based practice.
8. Develop communication with the internet critically as a source of information about human anatomy.
9. Organize working as a team member in collecting valuable information of evidence based practice.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	Contact hours
1.	Introduction (medical terminology)	a1, a2, a3, a4, b1, b2 c1, d1,d2	1	2
2.	Skeletal system	a1, a2, a3, a4, b1, b2 c1, d1,d2	2	2
3.	Joints	a1, a2, a3, a4, b1, b2 c1, d1,d2	3	2
4.	Muscular System	a1, a2, a3, a4, b1, b2 c1, d1,d2	4	2
5.	Cardiovascular System	a1, a2, a3, a4, b1, b2 c1, d1,d2	5,6	4
6.	Mid Exam	a1, a2, a3, a4, b1, b2 c1, d1,d2	7	2
7.	Lymphatic System	a1, a2, a3, a4, b1, b2 c1, d1,d2	8	2
8.	Respiratory System	a1, a2, a3, a4, b1, b2 c1, d1,d2	9	2
9.	Digestive System	a1, a2, a3, a4, b1, b2 c1, d1,d2	10	2
10.	Urinary System	a1, a2, a3, a4, b1, b2 c1, d1,d2	11	2
11.	Endocrine System	a1, a2, a3, a4, b1, b2 c1, d1,d2	12	2
12.	Nervous System	a1, a2, a3, a4, b1, b2 c1, d1,d2	13,14	4
13.	Review	a1, a2, a3, a4, b1, b2 c1, d1,d2	15	2
14.	Final Exam	a1, a2, a3, a4, b1, b2 c1, d1,d2	16	2

Number of Weeks /and Units Per Semester	**16**	**32**

VI. Teaching strategies of the course:
Lectures Seminars Discussions

IV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
5.	**Attendance and quizzes**	**All Weeks**	5	5%	a1-3,b1-b2, c1
6.	**Homework-assignments**	Sporadic through the semester	5	5%	a1,a2, a4, b1-2, c1, d1-2
7.	**Theoretical mid-semester exam**	7^{th}	20	20%	a1, a2, a3, a4, b1, b2 c1, d1,d2
8.	**Final Exam (theoretical)**	**16^{th}**	70	70%	a1, a2, a3, a4, b1, b2 c1, d1,d2
	Total		**100**	**100%**	

V. Students' Support:

Office Hours/week	Other Procedures (if any)

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Two contact hours per week	None

VI. Learning Resources:

1- Required Textbook(s) (maximum two).

	There is a long list of anatomy books present in the faculty library for the student to choose from. Course notes done by teaching staff.

2- Recommended Books and Reference Materials.

	Course notes of Department theoretical books and practical manual (lectures and practical) a

3- Electronic Materials and Web Sites *etc*.

II. Course Policies (To be determined by Faculty Deanship)

Based on university regulations, the following aspects should be figured out:

8.	(Class Attendance) :Class Attendance: - Attendance of students is taken at beginning of lecture time. - The allowed absence percentage is 20% without excuse and 30% with acceptable excuse, - When student has been absent for more than 30% of course lectures without acceptable excuse, the student will be prohibited from entering subject the final exam.
9.	(Tardy) :If the student came late to class for 15 minutes, he/she is registered absent but he/she allowed to
	enter the hall to listen lecture presentation.
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11.	(Assignments & Projects) :According to examination roles or policies: - The student should be attended the final exam at certain time and according to the accredited exam table. - If the student came late after 15 minutes from the exam beginning, the student would be to attend the exam with oral monition of never repeat. - In case of the repeat, the student prevented from entrance and considered absent.
12.	(Cheating) :According to examination roles or policies: - If the student cheated in the year works exams of the course, the student prohibited from entrance the final exam and given zero degree with prevented him from entrance the re-sit exam of this course. - If the student cheated in the final exam of the course, the student prohibited from the cheated course and the followed course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheated course is the last at the exam table, the student prohibited from the cheated course and the past course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheating is discovered in subsequent time, the cheated student didn't escape from payment and ordinance is referred to precision committee and the final decision is referred to the collage council. - If the cheating is discovered during the correcting the answered books, the corrector has written a report to the chairman of concerned department for taking available procedure. - The faculty council is able to segregate the student for one academic year in 2nd cheating trial and final segregation from the university after accreditation of university council in 3rd cheating trial.
13.	(Plagiarism) :According to examination roles or policies: Plagiarism means a student plagiarizes the personality of another student. Plagiarism for exam purpose: 1- Both students are prohibited from the plagiarized academic year and all results of them are rejected with prohibition of them from entrance the resit exam. 2- If the plagiarized student is from outside the university, the student is referred to the university police. -Plagiarism for other purposes: 1- Both students are warned as segregation. 2- If the plagiarized student is from outside the university, the student is referred to the university police.
14.	(Other policies) :-The student should be followed the instructions for the exam entrance. - The student should be followed all systems & laws of the university.

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Course Specification of Physical Pharmacy

I. Course Identification and General Information:						
1	Course Title:	Physical Pharmacy				
2	Course Number & Code:	Ph223				
3	Credit hours: 3hrs	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2	2			3
4	Study level/ semester at which this course is offered:	First year / Second semester				
5	Pre –requisite (if any):	Pharmacy Orientation				
6	Co –requisite (if any):					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy				
8	Language of teaching the course:	English				
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy				
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				
11	Prepared by:	Prof Dr/ Mahmoud Mahyoob Alburyhi				
12	Date of approval:					

II. Course description:

This course aims to provide the students with the ability to recognize the physicochemical properties of drugs and various substances used in preparation of medicines, in addition to the properties of different pharmaceutical dosage forms, to utilize these principles in the design of active drugs and pharmaceutical dosage forms.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the physico-chemical properties of drugs and various substances used in preparation of medicines, in addition to the properties of different pharmaceutical dosage forms
2. Describe properties of different pharmaceutical dosage forms and drug delivery systems.
3. Describe the interfacial phenomena and surface active agents and Identify adsorption/desorption phenomena
4. Describe different types of flow.
5. Identify the reaction kinetics and drug degradation pathways.
6. Interpret the influence of physicochemical properties on formulation of drug products
7. Recognize the order of reaction kinetics and drug stability
8. Utilize the fundamental basics of physical pharmacy in dosage form.
9. Practice the rheological properties of some pharmaceutical substance and develop pharmaceutical preparation Calculate the Surface tension, solubility and partition coefficient of some pharmaceutical substance.
10. Examine the proper storage conditions based on drug degradation pathway
11. Calculate the reaction kinetic order and expiry date of some pharmaceutical substance 12. Implement writing and presentation skills
13. Work effectively in a team

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.	
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**

After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the physico-chemical properties of drugs and various substances used in preparation of medicines, in addition to the properties of different pharmaceutical dosage forms
A2-	Recognize the physicochemical properties, preparation, structure activity relationship	**a2-**	Describe properties of different pharmaceutical dosage forms and drug delivery systems.
	(SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3-**	Describe the interfacial phenomena and surface active agents and Identify adsorption/desorption phenomena
		a4-	Describe different types of flow.
		a5-	Identify the reaction kinetics and drug degradation pathways.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures solving problem, and group discussion	Attendance, Written, oral exams, project and small projects
a1-	Recognize the physico-chemical properties of drugs and various substances used in preparation of medicines, in addition to the properties of different pharmaceutical dosage forms		
a2-	Describe properties of different pharmaceutical dosage forms and drug delivery systems.		
a3-	Describe the interfacial phenomena and surface active agents and Identify adsorption/desorption phenomena		

a4-	Describe different types of flow.		
a5-	Identify the reaction kinetics and drug degradation pathways.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Interpret the influence of physicochemical properties on formulation of drug products
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Recognize the order of reaction kinetics and drug stability
		b3-	Utilize the fundamental basics of physical pharmacy in dosage form.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams and small projects
b1-	Interpret the influence of physicochemical properties on formulation of drug products		
b2-	Recognize the order of reaction kinetics and drug stability		

b3-	Utilize the fundamental basics of physical pharmacy in dosage form.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products	**c1-**	Practice the rheological properties of some pharmaceutical substance and develop pharmaceutical preparation
	according to GLP, GSP and cGMP guidelines.		
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	Calculate the Surface tension, solubility and partition coefficient of some pharmaceutical substance.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Examine the proper storage conditions based on drug degradation pathway
		c4-	Calculate the reaction kinetic order and expiry date of some pharmaceutical substance

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, tutorials, practical, discussion and brain storming	Attendance, homework, Written, practical, oral exams, report, project and observation.
c1-	Practice the rheological properties of some pharmaceutical substance and develop pharmaceutical preparation		
c2-	Calculate the Surface tension, solubility and partition coefficient of some pharmaceutical substance.		

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c3-	Examine the proper storage conditions based on drug degradation pathway		
c4-	Calculate the reaction kinetic order and expiry date of some pharmaceutical substance		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2	Employ proper documentation and filing systems in different pharmaceutical fields.	**d1-**	Implement writing and presentation skills
		d2	Work effectively in a team
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1	Implement writing and presentation skills		
d2	Work effectively in a team		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect					
Order	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Number of weeks**	**Contact hours**
1	Introduction to physical pharmacy	**a1, a2, b1,b2, b3, c1, d1,d2**	Definition, process, factors affecting	1	2
2	State of matter, Solids	**a1, a2, a4, b1,b3, d1,d2**	Crystal structure and external appearance, polymorphism, crystal hydrates, wetting of solid surfaces and powders dissolution of drugs Solid dispersions	1	2
3	Solubility and solution properties of drugs	**a1,a2,a3, b1,b2, b3, d1,d2**	Solvents for pharmaceutical aerosols, pH of drug solutions, Buffers	1	2
4	Factors influencing solubility	**a1-3, b1, b3, d1,d2**	isotonic solutions, Diffusion of drugs in solution	1	2
5	Drug stability	**a1, a2, a4, a5, b2,b3, d1,d2**	Factors stability of liquid and solids dosage forms	1	2
6	Reaction Kinetics and drug stability	**a1, a2, a4, a5, b2, b3, d1, d2**	Kinetics of chemical decomposition in solution Stability testing and calculation of shelf-life	1	2
7	Mid-term exam	**a1-5, b1-3**		1	2
8	Surface and interfacial tensions	**a2, a3, b1, b3, d1,d2**	Definition , factors	1	2
9	Surface active agents	**a2, a3, b1, b3, d1,d2**	Some typical surfactants	1	2
10	Emulsions, suspensions and other dispersed systems	**a1,a2,a3,a4,a5, b3, d1,d2**	Foams and defoamers	1	2

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11	Polymers, drug absorption	**a1, a2, a4, b3, d1,d2**	Properties, Solution properties of polymers Routes of administration	1	2
12	Physicochemical drug interactions and incompatibilities Complexes; classification and use.	**a1, a2, a3, a4, b3, d1,d2**	Solubility problems pH effects in vitro and in vivo Analysis of complexes.	1	2
13	Peptides, proteins and other biopharmaceuticals	**a2, a4, b1,b2, d1,d2**	Structure and solution properties of peptides and proteins The stability of proteins and peptides	1	2
14	Adsorption at solid and liquid interface.	**a2, a3, a4, b3 ,d2**	Adsorption of drugs	1	2
15	Rheology, classification and use.	**a2, a3, a4, b3,d2**	Application of polymers in drug delivery, Rheological characteristics of products	1	2
16	Final-term exam	**a1-5, b1-3**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Practice the of types crystals, and of solvents used to form this crystals	**c1,c2, d1,d2**	1	2
2.	Carry out experiments for solubility of some pharmaceutical substances	**c1,c2, d1,d2**	1	2
3.	Determine the effect of buffers on drug solubility	**c2,c3, d1,d2**	2	4
4.	Determine the drug order of some pharmaceutical substances	**c4, d1,d2**	1	2
5.	Practice the factors affecting stability of some pharmaceutical substances	**c3,c4, d1,d2**	1	2

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6.	Mid-term exam	**c1-4**	1	2
7.	Determine the Surface tension of some pharmaceutical substances	**c2, d1,d2**	1	2
8.	Determine the critical micelle concentration	**c2, d1,d2**	1	2
9.	Determine the hydrophilic lipophilic balance	**c2, d1,d2**	2	4
10.	Determine the adsorption of some pharmaceutical substances	**c3, d1,d2**	1	2
11.	Carry the type of Rheology some pharmaceutical substances	**c1, d1,d2**	1	2
12.	Prepare the isotonisity of some pharmaceutical solutions	**c2,c4, d1,d2**	2	4
13.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-2**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-4,b1-2,d1-2
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-3, b2-3, d1-2
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
5.	**Theoretical mid-semester exam**	7th	30	20%	**a1-5, b1-3**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-3**
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

c

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

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1. Notes on Physical Pharmacy prepared by the department staff.
2. Florence, A.T. and Attwood, D., 2008, "FASTtrack physical pharmacy" 1st edition, Pharmaceutical Press, London.
3. Martin, A., 2006, 'Physical Pharmacy – physical chemical principles in pharmaceutical scien 5th edition, Lippincott Williams & Wilkins., Philadelphia.

2- Recommended Readings and Reference Materials

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1. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
2. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
3. Modern Pharmaceutics, 3rd edn. (1999) (Eds Banker, G.S., Rhodes, C.T.) Marcel Dekker.
4. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
5. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci

	Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

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4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.
	▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Physical Pharmacy

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof Dr/ Mahmoud Mahyoob Alburyhi	Office Hours					
Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:						
1-	Course Title:	Physical Pharmacy				
2-	Course Number & Code:	Ph223				
3-	Credit hours:3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	First year/Second semester				
5-	Pre –requisite (if any):	Pharmacy Orientation				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				

10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University

III. Course description:

This course aims to provide the students with the ability to recognize the physicochemical properties of drugs and various substances used in preparation of medicines, in addition to the properties of different pharmaceutical dosage forms, to utilize these principles in the design of active drugs and pharmaceutical dosage forms.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the physico-chemical properties of drugs and various substances used in preparation of medicines, in addition to the properties of different pharmaceutical dosage forms
2. Describe properties of different pharmaceutical dosage forms and drug delivery systems.
3. Describe the interfacial phenomena and surface active agents and Identify adsorption/desorption phenomena
4. Describe different types of flow.
5. Identify the reaction kinetics and drug degradation pathways.
6. Interpret the influence of physicochemical properties on formulation of drug products
7. Recognize the order of reaction kinetics and drug stability
8. Utilize the fundamental basics of physical pharmacy in dosage form.
9. Practice the rheological properties of some pharmaceutical substance and develop pharmaceutical preparation Calculate the Surface tension, solubility and partition coefficient of some pharmaceutical substance.
10. Examine the proper storage conditions based on drug degradation pathway
11. Calculate the reaction kinetic order and expiry date of some pharmaceutical substance 12. Implement writing and presentation skills
13. Work effectively in a team

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to physical pharmacy	**a1, a2, b1,b2, b3, c1, d1,d2**	Definition, process, factors affecting	1	2
2	State of matter, Solids	**a1, a2, a4, b1,b3, d1,d2**	Crystal structure and external appearance, polymorphism, crystal hydrates, wetting of solid surfaces and powders dissolution of drugs Solid dispersions	1	2
3	Solubility and solution properties of drugs	**a1,a2,a3, b1,b2, b3, d1,d2**	Solvents for pharmaceutical aerosols, pH of drug solutions, Buffers	1	2
4	Factors influencing solubility	**a1-3, b1, b3, d1,d2**	isotonic solutions, Diffusion of drugs in solution	1	2
5	Drug stability	**a1, a2, a4, a5, b2,b3, d1,d2**	Factors stability of liquid and solids dosage forms	1	2
6	Reaction Kinetics and drug stability	**a1, a2, a4, a5, b2, b3, d1, d2**	Kinetics of chemical decomposition in solution Stability testing and calculation of shelf-life	1	2
7	Mid-term exam	**a1-5, b1-3**		1	2
8	Surface and interfacial tensions	**a2, a3, b1, b3, d1,d2**	Definition , factors	1	2
9	Surface active agents	**a2, a3, b1, b3, d1,d2**	Some typical surfactants	1	2

10	Emulsions, suspensions and other dispersed systems	**a1,a2,a3,a4,a5, b3, d1,d2**	Foams and defoamers	1	2
11	Polymers, drug absorption	**a1, a2, a4, b3, d1,d2**	Properties, Solution properties of polymers Routes of administration	1	2
12	Physicochemical drug interactions and incompatibilities Complexes; classification and use.	**a1, a2, a3, a4, b3, d1,d2**	Solubility problems pH effects in vitro and in vivo Analysis of complexes.	1	2
13	Peptides, proteins and other biopharmaceuticals	**a2, a4, b1,b2, d1,d2**	Structure and solution properties of peptides and proteins The stability of proteins and peptides	1	2
14	Adsorption at solid and liquid interface.	**a2, a3, a4, b3 ,d2**	Adsorption of drugs	1	2
15	Rheology, classification and use.	**a2, a3, a4, b3,d2**	Application of polymers in drug delivery, Rheological characteristics of products	1	2
16	Final-term exam	**a1-5, b1-3**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
14.	Practice the of types crystals, and of solvents used to form this crystals	**c1,c2, d1,d2**	1	2
15.	Carry out experiments for solubility of some pharmaceutical substances	**c1,c2, d1,d2**	1	2
16.	Determine the effect of buffers on drug solubility	**c2,c3, d1,d2**	2	4

17.	Determine the drug order of some pharmaceutical substances	**c4, d1,d2**	1	2
18.	Practice the factors affecting stability of some pharmaceutical substances	**c3,c4, d1,d2**	1	2
19.	Mid-term exam	**c1-4**	1	2
20.	Determine the Surface tension of some pharmaceutical substances	**c2, d1,d2**	1	2
21.	Determine the critical micelle concentration	**c2, d1,d2**	1	2
22.	Determine the hydrophilic lipophilic balance	**c2, d1,d2**	2	4
23.	Determine the adsorption of some pharmaceutical substances	**c3, d1,d2**	1	2
24.	Carry the type of Rheology some pharmaceutical substances	**c1, d1,d2**	1	2
25.	Prepare the isotonisity of some pharmaceutical solutions	**c2,c4, d1,d2**	2	4
26.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-2**		

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VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-4,b1-2, d1-2
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-3, b2-3, d1-2
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
12.	**Theoretical mid-semester exam**	7th	30	20%	**a1-5, b1-3**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-3**
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

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X. Learning Resource (MLA style or APA style)s:

5- Required Textbook(s) (maximum two)

4. Notes on Physical Pharmacy prepared by the department staff.
5. Florence, A.T. and Attwood, D., 2008, "FASTtrack physical pharmacy" 1st edition, Pharmaceutical Press, London.
6. Martin, A., 2006, 'Physical Pharmacy – physical chemical principles in pharmaceutical scien 5th edition, Lippincott Williams & Wilkins., Philadelphia.

6- Recommended Readings and Reference Materials

6. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
7. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
8. Modern Pharmaceutics, 3rd edn. (1999) (Eds Banker, G.S., Rhodes, C.T.) Marcel Dekker.
9. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
10. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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	J. Pharm. Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	□ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. □ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after

	consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Organic Chemistry I

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Organic Chemistry I				
2	**Course Number & Code:**	Ph522				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	1st Level /2nd semester				
5	**Pre –requisite (if any):**	General Pharmaceutical chemistry				
6	**Co –requisite (if any):**	-				
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy-Sana`a University				
11	**Prepared by:**	Dr. Mokhtar A. Al-Ghorafy				
12	**Date of approval:**					

II. Course description:

This course provides students with the fundamental knowledge of aliphatic compounds including the nomenclatures, properties, synthesis, chemical reactions and the pharmaceutical application of these compounds. Some practical differentiation methods are also provided.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principles of pharmaceutical organic chemistry.
2. Describe the factors affecting the chemical reactivity and orbital hybridization.
3. Recognize the type of chemical bonds, reaction mechanisms and their application in the synthesis of simple medicinal agents.
4. Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons.
5. Predict the methods of preparation of the aliphatic organic compounds.
6. Understand the reaction mechanisms and effect of conditions on the type of products.
7. Discuss the differences between the types of hydrocarbons.
8. Diagram the schemes that relate all the reactions of hydrocarbons.
9. Select the suitable methods for identification of organic compounds in accordance with the physical and chemical properties of functional groups.
10. Identify organic compounds from their physical and chemical properties
11. Operate different equipment and instruments.
12. Handle chemicals according to safety guidelines.
13. Use the principle rules to solve problem and questions related to sthe course.
14. Work effectively in a team to perform the required tasks.
15. Manage, organize the time effectively and implement writing and presentation skills

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students would be able to:	After participating in the course, students would be able to:

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the basic principles of pharmaceutical organic chemistry.
		a2-	Describe the factors affecting the chemical
	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.		reactivity and orbital hybridization.
		a3-	Recognize the type of chemical bonds, reaction mechanisms and their application in the synthesis of simple medicinal agents.
		a4-	Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
a1-	Recognize the basic principles of pharmaceutical organic chemistry.	Lecture method , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Describe the factors affecting the chemical reactivity and orbital hybridization.		
a3-	Recognize the type of chemical bonds, reaction mechanisms and their application in the synthesis of simple medicinal agents.		
a4-	Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

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Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect	b1-	Predict the methods of preparation of the aliphatic organic compounds.
		b2-	Understand the reaction mechanisms and effect of
	on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.		conditions on the type of products.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	b3-	Discuss the differences between the types of hydrocarbons.
		b4-	Diagram the schemes that relate all the reactions of hydrocarbons
		b5-	Select the suitable methods for identification of organic compounds in accordance with the physical and chemical properties of functional groups.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Predict the methods of preparation of the aliphatic organic compounds.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions and brainstorming	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Understand the reaction mechanisms and effect of conditions on the type of products.		
b3-	Discuss the differences between the types of hydrocarbons.		
b4-	Diagram the schemes that relate all the reactions of hydrocarbons		

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b5-	Select the suitable methods for identification of organic compounds in accordance with the physical and chemical properties of functional groups.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Identify organic compounds from their physical and chemical properties
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c2-**	Operate different equipment and instruments in the lab.
		c3-	Handle chemicals according to safety guidelines
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:	Teaching strategies/methods to be used	Methods of assessment

c1-	Identify organic compounds from their physical and chemical properties	Lecture method, Practical sessions and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Operate different equipment and instruments in the lab.		
c3-	Handle chemicals according to safety guidelines		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Use the principle rules to solve problem and questions related to the course.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Work effectively in a team to perform the required tasks.
		d3-	Manage, organize the time effectively and implement writing and presentation skills

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Use the principle rules to solve problem and questions related to the course.	Small group discussions, Tutorials and Practical sessions.	Homework, and reports.
d2-	Work effectively in a team to perform the required tasks.		

d3-	Manage, organize the time effectively and implement writing and presentation skills		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to Pharmaceutical Organic Compounds: The fundamentals of Pharmaceutical Organic Chemistry	a1-a3, d1-d3	- Introduction, solubility , type of chemical bonds, - hybridization and their types - chemical bonding in drug–receptor interactions - Representation of organic compounds, type of isomerism, electronic effects (inductive & resonance), and Steric effect - Types chemical bond cleavage	2	4
			The effect of cleavage of bond on drug stability Applications in physical and chemical properties of drugs		
2	Organic reactions	a3,b2, ,d1-d3	-Type of organic reactions, and type of their mechanisms: -Substitution -Addition -Elimination -Types of reagents	1	2

3	Alkanes	a3-a4,b1,b3, b4, b5, d1-d3	- Nomenclature, preparations, and reaction properties), and free radical substitution reaction mechanism. -Pharmaceutical importance of alkane (action, activity ,stability and metabolism)	1	2
4	Alkenes	a3-a4,b1,b3, b4, b5, d1-d3	-Alkenes and cycloalkenes (nomenclature, preparations, and reaction properties), and elimination & addition reaction mechanism -Pharmaceutical importance of alken (Isomer , activity , stability and metabolism)	2	4
5	Alkynes	a3-a4,b1,b3, b4, b5, d1-d3	-Alkynes (nomenclature, preparations, and properties), acidity of acetylene physical and chemical properties of alkyne group in drug structure	1	2
6	Organic halides	a3-a4,b1,b3, b4, b5, d1-d3	- Alkyl halides (nomenclature, preparations, and properties), Nucleophilic substitution reactions mechanism, and reactions of organometallic compounds. -Pharmaceutical importance of alkyl halide in drug synthesis	1	2
7	**Mid Exam**	a1-4, b1-5		1	2
8	Alcohols	a3-a4,b1,b3, b4, b5, d1-d3	- Alcohols (nomenclature, preparations, and properties), esterification reaction mechanisms – Ethers (nomenclature, preparations, and properties) physical and chemical properties of drugs contain alcohol functional group (prodrug and metabolism)	1	2

9	Aldehydes and ketones	a3-a4,b1,b3, b4, b5, d1-d3	-Aliphatic aldehydes & Ketones (nomenclature, preparations, and properties), Addition, condensation (Aldol) reaction mechanism, and cannizaro reaction -Pharmaceutical importance of Aliphatic aldehydes & Ketones in synthesis andstbility of drugs	2	4
10	Carboxylic acid	a3-a4,b1,b3, b4, b5, d1-d3	-Aliphatic carboxylic acids (nomenclature, preparations, and properties), factors affecting on the acidity of drugs	1	2
11	Derivatives of carboxylic acid	a3-a4,b1,b3, b4, b5, d1-d3	-Acyl halides -Anhydride -Esters -Amides -Stability of drugs containing one or more of that compounds	1	2
12	Amines	a3-a4,b1,b3, b4, b5, d1-d3	-Aliphatic amines (nomenclature, preparations, and properties), factors affecting on the basicity of drugs	1	2
13	**Final Exam**	a1-4, b1-5		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	Laboratory safety	**c1-3,d1-3**	1	2
2	Combustion experiments (benzene and hexane)	**c1-3,d1-3**	1	2
3	Test of alcohols	**c1-3,d1-3**	1	2

4	Test of aldehydes	**c1-3,d1-3**	1	2
5	Test of ketones	**c1-3,d1-3**	1	2
6	Mid-Exam	**c1-3**	1	2
7	Test of acids and their derivatives	**c1-3,d1-3**	2	4
8	Test of ammonium salt	**c1-3,d1-3**	1	2
9	Lassaigne's test ,test for nitrogen	**c1-3,d1-3**	1	2
10	**Identification of amines**	**c1-3,d1-3**	1	2
11	Test for sulfur	**c1-3,d1-3**	1	2
12	Test for halogen in absence of nitrogen and sulfur	**c1-3,d1-3**	1	2
13	**Fisher method of esterification (preparation of ethylacetate)**	**c1-3,d1-3**	1	2
14	**Revision**	**c1-3,d1-3**	1	2
16	Final Exam	**c1-3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VII. a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark

1	Homework Assignments	**a1- 4, b2,b2-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1, a3, b1, b4,b5, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a1- 4, b2,b2-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	6th	30	20%	c1-3
3	**Theoretical mid-semester exam**	9th	30	20%	a1-4, b1-5
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
6	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- R. T. Morrison and R. N. Boyd. 2002. Organic Chemistry, 6th edition, Pearson Prentice Hall of India Pvt. Ltd, New Delhi.
2- Francis A. Carey and Richard J. Sundberg. 2001. Advanced Organic Chemistry; Part B: Reactions and Synthesis, 4thedition, Wiley and Sons., Inc. New York.
3- Michael Heidelberger. 1923. Advanced Laboratory Manual of Organic Chemistry, The chemical catalog company, inc. New York.

2- Recommended Books and Reference Materials.

1. L. Finar,. ,1963. Organic Chemistry: The Fundamental Principles, 4th edition, longman green and company ltd. London.
2. John McMurry. 2011, " Fundamentals of Organic Chemistry " Seventh Edition, Brooks/Cole 20 Davis Drive, Belmont.
3. Jerry and March,. 2007,. Advanced Organic Chemistry ; reaction, mechanism and structure, 6th edition, John Wiley & Sons, Inc., Hoboken, New Jersey
4. Janice Gorzynski Smith. 2011,." Organic Chemistry", Third Edition, McGraw-Hill, a business unit of The McGraw-Hill Companies, New York.
5. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1- http://www.chemaxon/marvin 2- www.orgsyn.org.

XI. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

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- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
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- Checking of a sample of students' work by an independent faculty member.
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- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Organic Chemistry I

I- Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Dr. Mokhtar A. Al-Ghorafy						
Location & Telephone No.	770010749	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Alghorafi2030@yahoo.com	2h					

II- Course Identification and General Information:

1-	**Course Title:**	Pharmaceutical Organic Chemistry I				
2-	**Course Number & Code:**	Ph522				
3-	**Credit hours:**	**C.H**				**C.H Th.**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	

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ا.د. القاسم محمد عباس	ا.م.د. هدى العماد	د.خالد الشوبة	ا.م.د.توفيق العبيدي	ا.د. محمود البريهي	د .مختار الغرافي

		2		**2**		**2**
4-	**Study level/year at which this course is offered:**	1st Level / 2nd semester				
5-	**Pre –requisite (if any):**	General Pharmaceutical Chemistry				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

This course provides students with the fundamental knowledge of aliphatic compounds including the nomenclatures, properties, synthesis, chemical reactions and the pharmaceutical application of these compounds. Some practical differentiation methods are also provided.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principles of pharmaceutical organic chemistry.
2. Describe the factors affecting the chemical reactivity and orbital hybridization.
3. Recognize the type of chemical bonds, reaction mechanisms and their application in the synthesis of simple medicinal agents.
4. Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons.
5. Predict the methods of preparation of the aliphatic organic compounds.
6. Understand the reaction mechanisms and effect of conditions on the type of products.
7. Discuss the differences between the types of hydrocarbons.
8. Diagram the schemes that relate all the reactions of hydrocarbons.
9. Select the suitable methods for identification of organic compounds in accordance with the physical and chemical properties of functional groups.
10. Identify organic compounds from their physical and chemical properties
11. Operate different equipment and instruments.
12. Handle chemicals according to safety guidelines.
13. Use the principle rules to solve problem and questions related to sthe course.
14. Work effectively in a team to perform the required tasks.
15. Manage, organize the time effectively and implement writing and presentation skills

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Introduction to Pharmaceutical Organic Compounds: The fundamentals of Pharmaceutical Organic Chemistry	a1-a3, d1-d3	- Introduction, solubility , type of chemical bonds, - hybridization and their types - chemical bonding in drug–receptor interactions - Representation of organic compounds, type of isomerism,	1,2	4

			electronic effects (inductive & resonance), and Steric effect - Types chemical bond cleavage The effect of cleavage of bond on drug stability Applications in physical and chemical properties of drugs		
2	Organic reactions	a3,b2, ,d1-d3	-Type of organic reactions, and type of their mechanisms: -Substitution -Addition -Elimination -Types of reagents	3	2
3	Alkanes	a3-a4,b1,b3, b4, b5, d1-d3	- Nomenclature, preparations, and reaction properties), and free radical substitution reaction mechanism. -Pharmaceutical importance of alkane (action, activity ,stability and metabolism)	4	2
4	Alkenes	a3-a4,b1,b3, b4, b5, d1-d3	-Alkenes and cycloalkenes (nomenclature, preparations, and reaction properties), and elimination & addition reaction mechanism -Pharmaceutical importance of alken (Isomer , activity , stability and metabolism)	5,6	4
5	Alkynes	a3-a4,b1,b3, b4, b5, d1-d3	-Alkynes (nomenclature, preparations, and properties), acidity of acetylene physical and chemical properties of alkyne group in drug structure	7	2

6	Organic halides	a3-a4,b1,b3, b4, b5, d1-d3	- Alkyl halides (nomenclature, preparations, and properties), Nucleophilic substitution reactions mechanism, and reactions of organometallic compounds. -Pharmaceutical importance of alkyl halide in drug synthesis	8	2
7	**Mid Exam**	a1-4, b1-5		9	2
8	Alcohols	a3-a4,b1,b3, b4, b5, d1-d3	- Alcohols (nomenclature, preparations, and properties), esterification reaction mechanisms – Ethers (nomenclature, preparations, and properties) physical and chemical properties of drugs contain alcohol functional group (prodrug and metabolism)	10	2
9	Aldehydes and ketones	a3-a4,b1,b3, b4, b5, d1-d3	-Aliphatic aldehydes & Ketones (nomenclature, preparations, and properties), Addition, condensation (Aldol) reaction mechanism, and cannizaro reaction -Pharmaceutical importance of Aliphatic aldehydes & Ketones in synthesis andstbility of drugs	11,12	4
10	Carboxylic acid	a3-a4,b1,b3, b4, b5, d1-d3	-Aliphatic carboxylic acids (nomenclature, preparations, and properties), factors affecting on the acidity of drugs	13	2
11	Derivatives of carboxylic acid	a3-a4,b1,b3, b4, b5, d1-d3	-Acyl halides -Anhydride -Esters -Amides -Stability of drugs containing one or more of that compounds	14	2

12	Amines	a3-a4,b1,b3, b4, b5, d1-d3	-Aliphatic amines (nomenclature, preparations, and properties), factors affecting on the basicity of drugs	15	2
13	**Final Exam**	a1-4, b1-5		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	Laboratory safety	**c1-3,d1-3**	1	2
2	Combustion experiments (benzene and hexane)	**c1-3,d1-3**	2	2
3	Test of alcohols	**c1-3,d1-3**	3	2
4	Test of aldehydes	**c1-3,d1-3**	4	2
5	Test of ketones	**c1-3,d1-3**	5	2
6	Mid-Exam	**c1-3**	6	2
7	Test of acids and their derivatives	**c1-3,d1-3**	7,8	4
8	Test of ammonium salt	**c1-3,d1-3**	9	2
9	Lassaigne's test ,test for nitrogen	**c1-3,d1-3**	10	2
10	**Identification of amines**	**c1-3,d1-3**	11	2
11	Test for sulfur	**c1-3,d1-3**	12	2
12	Test for halogen in absence of nitrogen and sulfur	**c1-3,d1-3**	13	2
13	**Fisher method of esterification (preparation of ethylacetate)**	**c1-3,d1-3**	14	2
14	**Revision**	**c1-3,d1-3**	15	2

16	Final Exam	**c1-3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VIII. a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions**,** tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1- 4, b2,b2-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-3**		

XIV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1, a3, b1, b4,b5, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a1- 4, b2,b2-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	6th	30	20%	c1-3

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3	**Theoretical mid-semester exam**	9th	30	20%	a1-4, b1-5
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
6	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

XV. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

XVI. Learning Resources:

1- Required Textbook(s) (maximum two).

4- R. T. Morrison and R. N. Boyd. 2002. Organic Chemistry, 6th edition, Pearson Prentice Hall of India Pvt. Ltd, New Delhi.
5- Francis A. Carey and Richard J. Sundberg. 2001. Advanced Organic Chemistry; Part B: Reactions and Synthesis, 4thedition, Wiley and Sons., Inc. New York.
6- Michael Heidelberger. 1923. Advanced Laboratory Manual of Organic Chemistry, The chemical catalog company, inc. New York.

2- Recommended Books and Reference Materials.

6. L. Finar,. ,1963. Organic Chemistry: The Fundamental Principles, 4th edition, longman green and company ltd. London.
7. John McMurry. 2011, " Fundamentals of Organic Chemistry " Seventh Edition, Brooks/Cole 20 Davis Drive, Belmont.
8. Jerry and March,. 2007,. Advanced Organic Chemistry ; reaction, mechanism and structure, 6th

	9.	edition, John Wiley & Sons, Inc., Hoboken, New Jersey Janice Gorzynski Smith. 2011,." Organic Chemistry", Third Edition, McGraw-Hill, a business unit of The McGraw-Hill Companies, New York.
	10.	Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

	3- http://www.chemaxon/marvin 4- www.orgsyn.org.

XVII. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XVIII. **Course Improvement Processes:**

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Histology

I. Course Identification and General Information:							
1	Course Title:	Histology					
2	Course Number & Code:	Ph422					
3	Credit hours: 2hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2				2	
4	Study level/ semester at which this course is offered:	First year/Second semester					
5	Pre –requisite (if any):	Anatomy					
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Histology Dep., Faculty of Medicine					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof Dr/					
12	Date of approval:						

II. Course description:

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This course aims to provide the students the basis histological structure and ultra structure of the eukaryotic cell with correlation to biological cellular activities. The normal histological structure of different tissues of human body in addition to some of its systems. Different tissues under the microscope, with functional and clinical correlation whenever possible. The historical structure of various organs and systems of the body and to correlate between the structure and function with relevant clinical notes whenever possible.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Know the structure and functions of the cytoplasmic components and identify the subunits of each nuclear component and their role in its function
2. Know the structural characteristics of the four basic tissue types and differentiate the functional capabilities of each tissues type and their structure.
3. Identify the different blood elements and Describethe basic histological structure of some systems (vascular & lymphatic).
4. Describe the normal histological structure of various body systems (respiratory, digestive, endocrine, urinary, male & female reproductive, eye, ear, and central nervous system) and distinguish structural features of organs, regions and cell types present in each system and relate the structural variations to differences in organ function.
5. Know ultrastructure and function of different cell types in different organs of the body. Acquire good, scientific knowledge so his counseling abilities to patients improve health
6. Recognize the composition of each tissues type to its specific functions.
7. Select appropriate methods to reveal specific microscopic features of cells and tissues.
8. Utilize information to predict the intracellular or tissue type components likely to be involved in a functional deficit.
9. Use information to correlate between histological structural and function of different organs of all studied systems.
10. Recognize the pathology of cells, tissues and organs in his study during next years, based on enough knowledge of their normal structure.
11. Use the microscope efficiently
12. Use effectively the histological glass slides and examine them using the maximum microscopic facilities.
13. Assess different cellular and intracellular components in electron Photomicrographs
14. Differentiate between types of cells and tissues in histological slides.
15. Analyze drawing and labeling the structures they have seen in electron photomicrographs and under light microscope during practical classes.
16. Communicate actively with his colleagues as well as the employees and staff members.
17. Retrieve the sources of biomedical information available to remain current with advance in knowledge and practice

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**			
Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Know the structure and functions of the cytoplasmic components and identify the subunits of each nuclear component and their role in its function
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Know the structural characteristics of the four basic tissue types and differentiate the functional capabilities of each tissues type and their structure.
		a3-	Identify the different blood elements and Describethe basic histological structure of some systems (vascular & lymphatic).
A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.	**a4-**	Describe the normal histological structure of various body systems (respiratory, digestive, endocrine, urinary, male & female reproductive, eye, ear, and central nervous system) and distinguish structural features of organs, regions and cell types present in each system and relate the structural variations to differences in organ function.

		a5-	Know ultrastructure and function of different cell types in different organs of the body. Acquire good, scientific knowledge so his counseling abilities to patients improve health

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures and group discussion	Attendance, Written, oral exams and small projects
a1-	Know the structure and functions of the cytoplasmic components and identify the subunits of each nuclear component and their role in its function		
a2-	Know the structural characteristics of the four basic tissue types and differentiate the functional capabilities of each tissues type and their structure.		
a3-	Identify the different blood and Describethe basic histological structure of some systems (vascular & lymphatic).		
a4-	Describethe normal histological structure of various body systems (respiratory, digestive, endocrine, urinary, male & female reproductive, eye, ear, and central nervous system) and distinguish structural features of organs, regions and cell types present in each system and relate the structural variations to differences in organ function.		

a5-	Know ultrastructure and function of different cell types in different organs of the body. Acquire good, scientific knowledge so his counseling abilities to patients improve health		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Recognize the composition of each tissues type to its specific functions.
		b2-	Select appropriate methods to reveal specific microscopic features of cells and tissues.
B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b3-**	Utilize information to predict the intracellular or tissue type components likely to be involved in a functional deficit.
		b4-	Use information to correlate between histological structural and function of different organs of all studied systems.
		b5-	Recognize the pathology of cells, tissues and organs in his study during next years, based on enough knowledge of their normal structure.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams project, and small projects
b1-	Recognize the composition of each tissues type to its specific functions.		
b2-	Select appropriate methods to reveal specific microscopic features of cells and tissues.		
b3-	Utilize information to predict the intracellular or tissue type components likely to be involved in a functional deficit.		
b4-	Use information to correlate between histological structural and function of different organs of all studied systems.		
b5-	Recognize the pathology of cells, tissues and organs in his study during next years, based on enough knowledge of their		
	normal structure.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	c1-	Use the microscope efficiently
		c2-	

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C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		Use effectively the histological glass slides and examine them using the maximum microscopic facilities.
		c3-	Assess different cellular and intracellular components in electron Photomicrographs
		c4-	Differentiate between types of cells and tissues in histological slides.
		c5-	Analyze drawing and labeling the structures they have seen in electron photomicrographs and under light microscope during practical classes.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
c1-	Use the microscope efficiently		
c2	Use effectively the histological glass slides and examine them using the maximum microscopic facilities.		
c3	Assess different cellular and intracellular components in electron Photomicrographs		
c4-	Differentiate between types of cells and tissues in histological slides.		
c5-	Analyze drawing and labeling the structures they have seen in electron photomicrographs and under light microscope during practical classes.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Communicate actively with his colleagues as well as the employees and staff members.
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	d2	Retrieve the sources of biomedical information available to remain current with advance in knowledge and practice
D5-	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
d1-	Communicate actively with his colleagues as well as the employees and staff members.		
d2-	Retrieve the sources of biomedical information available to remain current with advance in knowledge and practice		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

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Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Cytology	**a1, b1, c1, d1**		**1**	**2**
2	Cytology (cont.)	**a1,a2, b2, b3, c2, d2**		**1**	**2**
3	Epithelium+nucleus	**a3,a4, b2, b3, c4, d2**		**1**	**2**
4	Connective tissue	**a4,a5, b2, b5, c5, d1,d2**		**1**	**2**
5	Cartilage+bone	**a5 , b3, c1, c3 , c4, c5**		**1**	**2**
6	Blood & muscle tissue	**a5,b3, c4 , c5 , d1 , d2**		**1**	**2**
7	**Mid-term exam**	**a1-5, b1-5, c1-5**		**1**	**2**
8	Nerve tissue & lymphatics	**a4, a5 , b5, c2 , c3 , c4 , d1 ,d2**	,	**1**	**2**
9	Cardiovascular system	**a5 , b4 , c4 , c5 ,d1**		**1**	**2**
10	Histology of respiratory system	**a4 ,a5 , b5 ,c1 , c2 , d1, d2**		**1**	**2**
11	Histology of digestive glands	**a5 , b4 , c2 , c3 , d1 , d2**		**1**	**2**
12	Urinary system	**a3,b4 , c3 , c4 , c5 ,d2**		**1**	**2**
13	male reproductive system	**a3 ,a5 , b4 , c1, c2 , c3 ,c4 , c5 ,d1 , d2**		**1**	**2**
14	female reproductive system	**a3 ,a5 , b4 , c1, c2 , c3 ,c4 , c5 ,d1 , d2**		**1**	**2**
15	Skin & endocrine	**a3 ,a4,a5 , b4 ,b5, c1, c2 , c3 ,c4 , c5 ,d1 , d2**		**1**	**2**
16	Final-term exam	**a1-5, b1-5, c1-5**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**10**	10%	**a1-5, b1-5, c1-5**
2	Written Mid exam, Oral exam, reports, projects	2-14	**30**	30%	**a1-5, b1-5, c1-5**
3	Written Final exam	16th	**60**	60%	**a1-5, b1-5, c1-5**
	Total		**100**	**100%**	

VIII. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

IX. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

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2- Recommended Readings and Reference Materials	
	1. Basic histology Text and Atlas (2010). Junqueira. L. C. 12 th edition. McGraw-Hill Companie Inc. 2. - Atlas of histology (2004). Di Fiore.10 th edition. Lippincott Williams & Wilkins. 3. - Functional Histology (2005) .Wheater'sText & Atlas of Histology. 5 th edition. Churchill Livingstone
3- Electronic Materials and Web Sites *etc*.	
	http://www.histology-world.com/ http://www.bu.edu/histology/m/index.htm
4- Other Learning Material:	
	.
	1. Essentials of Human Histology (Department of Histology faculty of Medicine. 2. Electron Microscopic Atlas of Mammalian Tissues (2001). H. Jastrow. Work shop Anatomy of the internet.

s

I. Facilities Required:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:**
	▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Histology

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof Dr/	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:		
1-	Course Title:	Histology
2-	Course Number & Code:	Ph422

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		C.H				Total
3-	Credit hours: 2hrs	Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	**Study level/year at which this course is offered:**	First year/Second semester				
5-	**Pre –requisite (if any):**					
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

This course aims to provide the students the basis histological structure and ultra structure of the eukaryotic cell with correlation to biological cellular activities. The normal histological structure of different tissues of human body in addition to some of its systems. Different tissues under the microscope, with functional and clinical correlation whenever possible. The historical structure of various organs and systems of the body and to correlate between the structure and function with relevant clinical notes whenever possible.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Know the structure and functions of the cytoplasmic components and identify the subunits of each nuclear component and their role in its function
2. Know the structural characteristics of the four basic tissue types and differentiate the functional capabilities of each tissues type and their structure.
3. Identify the different blood elements and Describethe basic histological structure of some systems (vascular & lymphatic).
4. Describe the normal histological structure of various body systems (respiratory, digestive, endocrine, urinary, male & female reproductive, eye, ear, and central nervous system) and distinguish structural features of organs, regions and cell types present in each system and relate the structural variations to differences in organ function.
5. Know ultrastructure and function of different cell types in different organs of the body. Acquire good, scientific knowledge so his counseling abilities to patients improve health
6. Recognize the composition of each tissues type to its specific functions.
7. Select appropriate methods to reveal specific microscopic features of cells and tissues.
8. Utilize information to predict the intracellular or tissue type components likely to be involved in a functional deficit.
9. Use information to correlate between histological structural and function of different organs of all studied systems.
10. Recognize the pathology of cells, tissues and organs in his study during next years, based on enough knowledge of their normal structure.
11. Use the microscope efficiently
12. Use effectively the histological glass slides and examine them using the maximum microscopic facilities.
13. Assess different cellular and intracellular components in electron Photomicrographs
14. Differentiate between types of cells and tissues in histological slides.
15. Analyze drawing and labeling the structures they have seen in electron photomicrographs and under light microscope during practical classes.
16. Communicate actively with his colleagues as well as the employees and staff members.
17. Retrieve the sources of biomedical information available to remain current with advance in knowledge and practice

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Cytology	**a1, b1, c1, d1**		**1**	**2**
2	Cytology (cont.)	**a1,a2, b2, b3, c2, d2**		**1**	**2**
3	Epithelium+nucleus	**a3,a4, b2, b3, c4, d2**		**1**	**2**
4	Connective tissue	**a4,a5, b2, b5, c5, d1,d2**		**1**	**2**
5	Cartilage+bone	**a5 , b3, c1, c3 , c4, c5**		**1**	**2**
6	Blood & muscle tissue	**a5,b3, c4 , c5 , d1 , d2**		**1**	**2**
7	**Mid-term exam**	**a1-5, b1-5, c1-5**		**1**	**2**
8	Nerve tissue & lymphatics	**a4, a5 , b5, c2 , c3 , c4 , d1 ,d2**	,	**1**	**2**
9	Cardiovascular system	**a5 , b4 , c4 , c5 ,d1**		**1**	**2**
10	Histology of respiratory system	**a4 ,a5 , b5 ,c1 , c2 , d1, d2**		**1**	**2**
11	Histology of digestive glands	**a5 , b4 , c2 , c3 , d1 , d2**		**1**	**2**
12	Urinary system	**a3,b4 , c3 , c4 , c5 ,d2**		**1**	**2**
13	male reproductive system	**a3 ,a5 , b4 , c1, c2 , c3 ,c4 , c5 ,d1 , d2**		**1**	**2**
14	female reproductive system	**a3 ,a5 , b4 , c1, c2 , c3 ,c4 , c5 ,d1 , d2**		**1**	**2**
15	Skin & endocrine	**a3 ,a4,a5 , b4 ,b5, c1, c2 , c3 ,c4 , c5 ,d1 , d2**		**1**	**2**

الموصف | نائب العميد لشؤون الجودة ا.د. محمود البريهي | رئيس القسم | عميد الكلية د.خالد الشوبة | عميدة مركز التطوير وضمان الجودة ا.م.د. هدى العماد | رئيس الجامعة ا.د. القاسم محمد عباس

16	Final-term exam	**a1-5, b1-5, c1-5**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**10**	10%	**a1-5, b1-5, c1-5**
2	Written Mid exam, Oral exam, reports, projects	2-14	**30**	30%	**a1-5, b1-5, c1-5**
3	Written Final exam	16th	**60**	60%	**a1-5, b1-5, c1-5**
	Total		**100**	**100%**	

VIII. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

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IX. Learning Resource (MLA style or APA style)S:	
5- Required Textbook(s) (maximum two)	
	3. Essentials of Human Histology (Department of Histology faculty of Medicine. 4. Electron Microscopic Atlas of Mammalian Tissues (2001). H. Jastrow. Work shop Anatomy of the internet.
6- Recommended Readings and Reference Materials	
	4. Basic histology Text and Atlas (2010). Junqueira. L. C. 12 th edition. McGraw-Hill Companie Inc. 5. - Atlas of histology (2004). Di Fiore.10 th edition. Lippincott Williams & Wilkins. 6. - Functional Histology (2005) .Wheater'sText & Atlas of Histology. 5 th edition. Churchill Livingstone
7- Electronic Materials and Web Sites *etc*.	
	http://www.histology-world.com/ http://www.bu.edu/histology/m/index.htm
8- Other Learning Material:	
	.

III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:
6- Strategies for obtaining student feedback on effectiveness of teaching

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	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	☐ Student rating and feedback ☐ Peer rating and feedback ☐ Regular meeting of the Curriculum Committee of the faculty.

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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Course Specification of Pharmaceutical Organic Chemistry II

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Organic Chemistry II				
2	**Course Number & Code:**	Ph533				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	2nd Level /1st semester				
5	**Pre –requisite (if any):**	General Pharmaceutical Chemistry & Pharmaceutical Organic Chemistry I				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy-Sana`a University				
11	**Prepared by:**	Dr. Mokhtar A. Al-Ghorafy				
12	**Date of approval:**					

II. Course description:

This course provides students with the fundamental knowledge of stereochemistry and aromatic compounds including the nomenclatures, properties, synthesis, chemical reactions and the pharmaceutical application of these compounds. The practical part includes the preparation of some aromatic compounds.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Define the concepts of aromaticity and the differences between benzenoid and non benzenoid compounds.
2. Recognize the nomenclatures of aromatic and polynuclear compounds.
3. Identify the functional groups in organic compounds and their use in some synthetic procedures of drugs 4. Understand some chemical and physical concepts and their effect on drug molecule characters 5. Outline the synthesis and chemical reactions of aromatic and polynuclear organic compounds.
6. Detect the difference between aromatic and non aromatic compounds using chemical reactions
7. Correlate the structure of organic molecules with their effect on the biological activity.
8. Suggest the suitable methods for synthesizing aromatic and polynuclear compounds of pharmaceutical interest.
9. Use laboratory reagents adequately and safely
10. Synthesize and Purify some aromatic compounds as starting material for synthesis of some drugs.
11. Synthesize and Purify some polynuclear compounds as starting material for synthesis of some drugs.
12. Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.
13. Search and evaluate the literature from different sources including the library, internet ….etc
14. Manage and organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Define the concepts of aromaticity and the differences between benzenoid and non benzenoid compounds.
		a2-	Recognize the nomenclatures of aromatic and
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.		polynuclear compounds.
		a3-	Identify the functional groups in organic compounds and their use in some synthetic procedures of drugs
		a4-	Understand some chemical and physical concepts and their effect on drug molecule characters
		a5-	Outline the synthesis and chemical reactions of aromatic and polynuclear organic compounds.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Define the concepts of aromaticity and the differences between benzenoid and non benzenoid compounds.	Lecture method , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Recognize the nomenclatures of aromatic and polynuclear compounds.		

a3-	Identify the functional groups in organic compounds and their use in some synthetic procedures of drugs		
a4-	Understand some chemical and physical concepts and their effect on drug molecule characters		
a5-	Outline the synthesis and chemical reactions of aromatic and polynuclear organic compounds.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Detect the difference between aromatic and non aromatic compounds using chemical reactions
		b2-	Correlate the structure of organic molecules with their effect on the biological activity.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Suggest the suitable methods for synthesizing aromatic and polynuclear compounds of pharmaceutical interest

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.** **After participating in the course, students would be able to:**	**Teaching strategies/methods to be used.**	***Methods of assessment***

b1-	Detect the difference between aromatic and non aromatic compounds using chemical reactions	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Correlate the structure of organic molecules with their effect on the biological activity.		
b3-	Suggest the suitable methods for synthesizing aromatic and polynuclear compounds of pharmaceutical interest		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Use laboratory reagents adequately and safely and
C2	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c2-**	Synthesize and Purify some aromatic compounds as starting material for synthesis of some drugs..
C5-	Conduct research studies and utilize the results in some drugs	**c3-**	Synthesize and Purify some polynuclear compounds as starting material for synthesis of different pharmaceutical fields.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in		Teaching	Methods of
	5		

Professional and Practical Skills strategies/methods to be assessment used After participating in the course, students would be able to:

c1-	Use laboratory reagents adequately and safely	Lecture method, Practical sessions and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Synthesize and Purify some aromatic compounds as synthesis of some drugs..		
c3-	Synthesize and Purify some polynuclear compounds as starting material for synthesis of some drugs		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3-	Develop financial, market management, writing, making abilities.	**d1-**	Collaborate effectively in groups to solve some presentation and time management skills as well as problems encountered in pharmaceutical creativity, critical thinking, problem solving and decision organic chemistry.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Search and evaluate the literature from different sources including the library, internet ….etc
		d3-	Manage and organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.	Small group discussions, Tutorials and Practical sessions.	Homework, and reports.
d2-	Search and evaluate the literature from different sources including the library, internet ….etc		
d3-	Manage and organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	Introduction of aromatic chemistry	a 1, b1-3, d1-3	- Definition of aromatic compounds, aromaticity. Huckl, rule and properties of aromatic compounds. - Nomenclature of aromatic	2	4
			-The effect of aromaticity on stability and chemical properties of drugs		

2.	Reaction of aromatic compounds - Effect of substituent	a2-5, b1-3, d1-3	-Halogenations -Nitration -sulphonation -Friedel-Craft alkylation and acylation Donating and withdrawing mechanism and their effect on the chemical properties of drugs	2	4
3.	Aryl halide	a2-5, b1-3, d1-3	-Nomenclature -Properties -Synthesis -Reactions -The structure activity of halide and their effect on the physical and chemical characters of drugs	1	2
4.	Phenols	a2-5, b1-3, d1-3	Structure, acidity character .nomenclature, preparation ,reactions and uses -The structure activity of phenol in drugs	1	2
5.	-Aromatic Aldehydes and ketones	a2-5, b1-3, d1-3	Structure, reactivity .nomenclature, preparation and reaction and their application in drug development	2	4
6.	**Mid Exam**	a1-5, b1-3		1	2
7.	- Aromatic Carboxylic acids	a2-5, b1-3, d1-3	-Acidity -Nomenclature -synthesis -Reactions the structure activity of carboxylic acid in the physical and chemical characters of drugs	2	4

8.	Aromatic Amines	a2-5, b1-3, d1-3	-structure ,nomenclature ,synthesis reaction, diazonium salt ,basicity and uses the structure activity of amine in the physical and chemical properties of drugs	2	4
9.	Polynuclear Aromatic Compounds	a2-5, b1-3, d1-3	-Naphthalene, anthracene Phenanthrene Pharmaceutical importance of polynuclear compounds	2	4
10.	**Final Exam**	a1-5, b1-3		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1.	Synthesis of aspirin	c1, c2,d1-3	1	2
2.	Preparation of salicylamide	c1, c2,d1-3	1	2
3.	Preparation of acetanilide	c1, c2,d1-3	1	2
4.	Nitration of acetanilide	c1, c2,d1-3	1	2
5.	Preparation of p-nitroaniline	c1, c2,d1-3	1	2
6.	Preparation of sulfanilic acid	c1, c2,d1-3	1	2
7.	Mid-Exam	c1-2	1	2
8.	Preparation of benzoic acid oxidation of benzyl alcohol	c1, c2,d1-3	1	2
9.	Preparation of α-nitronaphthalene	c1, c3,d1-3	1	2

10.	Preparation of naphthalene picrate	c1, c3,d1-3	1	2
11.	Preparation of Anthracene picrate	c1, c3,d1-3	1	2
12.	Acylation of β-naphthol and Crystallization of 2naphthylacetate	c1, c3,d1-3	2	4
13.	Final Exam	c1-3	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VII. a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
	Homework Assignments	**a2, a3, a5, b2, b3, d1-3**	Sporadic through the semester	**10**
	Reports	c2-4, d1-3		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a4,a5, b1,b3, d1-3

	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a2, a3, a5, b2, b3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	7th	30	20%	c1-3
3	**Theoretical mid-semester exam**	9th	30	20%	a1-5, b1- b3
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-3
6	**Final Exam (practical)**	**16th**	20	20%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- R. T. Morrison and R. N. Boyd. 2002. Organic Chemistry, 6th edition, Pearson Prentice Hall of India Pvt. Ltd, New Delhi.

2- Francis A. Carey and Richard J. Sundberg. 2001. Advanced Organic Chemistry; Part B: Reactions and Synthesis, 4thedition, Wiley and Sons., Inc. New York.

3- Michael Heidelberger. 1923. Advanced Laboratory Manual of Organic Chemistry, The chemical catalog company, inc. New York.

2- Recommended Books and Reference Materials.

1. L. Finar,. ,1963. Organic Chemistry: The Fundamental Principles, 4th edition, longman green and company ltd. London.
2. John McMurry. 2011, " Fundamentals of Organic Chemistry " Seventh Edition, Brooks/Cole 20 Davis Drive, Belmont.
3. Jerry and March,. 2007,. Advanced Organic Chemistry ; reaction, mechanism and structure, 6th edition, John Wiley & Sons, Inc., Hoboken, New Jersey
4. Janice Gorzynski Smith. 2011," Organic Chemistry", Third Edition, McGraw-Hill, a business unit of The McGraw-Hill Companies, New York.
5. K.-H. Hellwich · C. D. Siebert, "Stereochemistry Workbook" 2006, Springer-Verlag Berlin Heidelberg , Berlin.
6. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1- http://www.chemaxon/marvin 2-

www.orgsyn.org.

3-

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback

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الغرافي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Organic Chemistry II

I- Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Dr. Mokhtar A. Al-Ghorafy						
Location & Telephone No.	770010749	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Alghorafi2030@yahoo.com	2h					

II- Course Identification and General Information:

1-	**Course Title:**	Pharmaceutical Organic Chemistry II				
2-	**Course Number & Code:**	Ph533				
3-	**Credit hours:**	**C.H**				**C.H Th.**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2		2		2
4-	**Study level/year at which this course is offered:**	2nd Level /2nd semester				
5-	**Pre –requisite (if any):**	General Pharmaceutical Chemistry & Pharmaceutical Organic Chemistry I				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				

8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

This course provides students with the fundamental knowledge of stereochemistry and aromatic compounds including the nomenclatures, properties, synthesis, chemical reactions and the pharmaceutical application of these compounds. The practical part includes the preparation of some aromatic compounds.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Define the concepts of aromaticity and the differences between benzenoid and non benzenoid compounds.
2. Recognize the nomenclatures of aromatic and polynuclear compounds.
3. Identify the functional groups in organic compounds and their use in some synthetic procedures of drugs 4. Understand some chemical and physical concepts and their effect on drug molecule characters 5. Outline the synthesis and chemical reactions of aromatic and polynuclear organic compounds.
6. Detect the difference between aromatic and non aromatic compounds using chemical reactions
7. Correlate the structure of organic molecules with their effect on the biological activity.
8. Suggest the suitable methods for synthesizing aromatic and polynuclear compounds of pharmaceutical interest.
9. Use laboratory reagents adequately and safely
10. Synthesize and Purify some aromatic compounds as starting material for synthesis of some drugs.
11. Synthesize and Purify some polynuclear compounds as starting material for synthesis of some drugs.
12. Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.
13. Search and evaluate the literature from different sources including the library, internet ….etc
14. Manage, organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1)	Introduction of aromatic chemistry	a 1, b1-3, d1-3	- Definition of aromatic compounds, aromaticity. Huckl rule and properties of aromatic compounds. - Nomenclature of aromatic -The effect of aromaticity on stability and chemical properties of drugs	1,2	4
2)	Reaction of aromatic compounds - Effect of substituent	a2-5, b1-3, d1-3	-Halogenations -Nitration -sulphonation -Friedel-Craft alkylation and acylation Donating and withdrawing mechanism and their effect on the chemical properties of drugs	3,4	4
3)	Aryl halide	a2-5, b1-3, d1-3	-Nomenclature -Properties -Synthesis -Reactions -The structure activity of halide and their effect on the physical and chemical characters of drugs	5	2

4)	Phenols	a2-5, b1-3, d1-3	Structure, acidity character .nomenclature, preparation ,reactions and uses -The structure activity of phenol in drugs	6	2
	-Aromatic Aldehydes and ketones	a2-5, b1-3, d1-3	Structure, reactivity .nomenclature, preparation and reaction and their application in drug development	7,8	4
	6Mid Exam	a1-5, b1-3		9	2
	- Aromatic Carboxylic acids	a2-5, b1-3, d1-3	-Acidity -Nomenclature -synthesis -Reactions the structure activity of carboxylic acid in the physical and chemical characters of drugs	10,11	4
	Aromatic Amines	a2-5, b1-3, d1-3	-structure ,nomenclature ,synthesis reaction, diazonium salt ,basicity and uses the structure activity of amine in the physical and chemical properties of drugs	12,13	4
	Polynuclear Aromatic Compounds	a2-5, b1-3, d1-3	-Naphthalene, anthracene Phenanthrene Pharmaceutical importance of polynuclear compounds	14,15	4
	Final Exam	a1-5, b1-3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**
b - Practical Aspect					

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
	Synthesis of aspirin	c1, c2,d1-3	1	2
	Preparation of salicylamide	c1, c2,d1-3	2	2
	Preparation of acetanilide	c1, c2,d1-3	3	2
	Nitration of acetanilide	c1, c2,d1-3	4	2
	Preparation of p-nitroaniline	c1, c2,d1-3	5	2
	Preparation of sulfanilic acid	c1, c2,d1-3	6	2
	Mid-Exam	c1-2	7	2
	Preparation of benzoic acid oxidation of benzyl alcohol	c1, c2,d1-3	8	2
	Preparation of α-nitronaphthalene	c1, c3,d1-3	9	2
	Preparation of naphthalene picrate	c1, c3,d1-3	10	2
	Preparation of Anthracene picrate	c1, c3,d1-3	11,12	4
	Acylation of β-naphthol and Crystallization of 2naphthylacetate	c1, c3,d1-3	13,14	4
	Revision	c1-3,d1-3	15	2
	Final Exam	c1-3	16	2

Number of Weeks /and Units Per Semester	16	32
VIII. a-Teaching strategies of the course:		
Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion		

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الغرافي ا.د. محمود البريهي ا.م.د.توفيق العبيدي د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
	Homework Assignments	**a2, a3, a5, b2, b3,d1-3**	Sporadic through the semester	**10**
	Reports	c2-4, d1-3		

XIV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a4,a5, b1,b3, d1-3
	Oral Tests and Homework-assignments	Sporadic through the semester	10	7%	a2, a3, a5, b2, b3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	7th	30	20%	c1-3
3	**Theoretical mid-semester exam**	9th	30	20%	a1-5, b1- b3
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-3
6	**Final Exam (practical)**	**16th**	20	20%	c1-3
	Total		**150**	**100%**	

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XV. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

XVI. Learning Resources:

1- Required Textbook(s) (maximum two).

4- R. T. Morrison and R. N. Boyd. 2002. Organic Chemistry, 6th edition, Pearson Prentice Hall of India Pvt. Ltd, New Delhi.

5- Francis A. Carey and Richard J. Sundberg. 2001. Advanced Organic Chemistry; Part B: Reactions and Synthesis, 4thedition, Wiley and Sons., Inc. New York.

6- Michael Heidelberger. 1923. Advanced Laboratory Manual of Organic Chemistry, The chemical catalog company, inc. New York.

2- Recommended Books and Reference Materials.

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8. John McMurry. 2011, " Fundamentals of Organic Chemistry " Seventh Edition, Brooks/Cole 20 Davis Drive, Belmont.

9. Jerry and March,. 2007,. Advanced Organic Chemistry ; reaction, mechanism and structure, 6th edition, John Wiley & Sons, Inc., Hoboken, New Jersey

10. Janice Gorzynski Smith. 2011,." Organic Chemistry", Third Edition, McGraw-Hill, a business unit of The

	McGraw-Hill Companies, New York. 11. K.-H. Hellwich · C. D. Siebert, "Stereochemistry Workbook" 2006, Springer-Verlag Berlin Heidelberg , Berlin. 12. Lectures Notes and Practical Manual.
3- Electronic Materials and Web Sites *etc*.	
	4- http://www.chemaxon/marvin 5- www.orgsyn.org. 6-

XVII. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XVIII. **Course Improvement Processes:**
6- Strategies for obtaining student feedback on effectiveness of teaching
▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.

	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIX. Course Policies: (including plagiarism, academic honesty, attendance etc)

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الغرافي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Analytical Chemistry I

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Analytical Chemistry I				
2	**Course Number & Code:**	Ph534				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	2nd level / 1st semester				
5	**Pre –requisite (if any):**	General Pharmaceutical Chemistry				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy				
11	**Prepared by:**	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen				

12	**Date of approval:**	

II. Course description:

The course is concerned with the fundamental knowledge about the basic principles of the quantitative chemical analysis including, acid-base reactions, redox reaction, complexometric and precipitimetric analysis. The course will also cover the applications of these methods to pharmaceutical compounds.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principle of pharmaceutical analytical chemistry and its classification.
2. Describe the important terminology used in pharmaceutical analysis.
3. Recognize different method of quantitative analysis of drugs in different pharmaceutical preparations and mention their advantage and disadvantages.
4. Identify the required calculations that are used in drugs analysis.
5. Select the suitable method for determination of different pharmaceutical preparations depending on the chemical nature of the drugs.
6. Diagram the schemes that explain different method of quantitative analysis.
7. Determine the functional groups that affect on acidity and basicity of pharmaceutical compounds and predict the pH of the compounds.
8. Operate different pharmaceutical instrument and equipment in the lab.
9. Practice the qualitative and quantitative estimation of pharmaceutical substances.
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Communicate and cooperate effectively with the others as a team work to perform the report on the results of the method of analysis.
12. Apply the information technology skills, such as word processing and internet communication and online searches.
13. Manage the time in an work effectively.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize the basic principle of pharmaceutical analytical chemistry and its classification.
		a2-	Describe the important terminology used in pharmaceutical analysis.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a3-	Recognize different method of quantitative analysis of drugs in different pharmaceutical preparations and mention their advantage and disadvantages.
		a4-	Identify the required calculations that are used in drugs analysis

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the basic principle of pharmaceutical analytical chemistry and its classification.		

a2-	Describe the important terminology used in pharmaceutical analysis.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
a3-	Recognize different method of quantitative analysis of drugs in different pharmaceutical preparations and mention their advantage and disadvantages.		
a4-	Identify the required calculations that are used in drugs analysis		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Select the suitable method for determination of different pharmaceutical preparations depending on the chemical nature of the drugs.
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Diagram the schemes that explain different method of quantitative analysis.
		b3-	Determine the functional groups that affect on acidity and basicity of pharmaceutical compounds and predict the pH of the compounds.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in **Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Select the suitable method for determination of different pharmaceutical preparations depending on the chemical nature of the drugs.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
b2-	Diagram the schemes that explain different method of quantitative analysis.		
b3-	Determine the functional groups that affect on acidity and basicity of pharmaceutical compounds and predict the pH of the compounds.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Operate different pharmaceutical instrument and equipment in the lab.

C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c2-**	Practice the qualitative and quantitative estimation of pharmaceutical substances.
		c3-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.		
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
c1-	Operate different pharmaceutical instrument and equipment in the lab.	Lectures method, group discussion and practical	Oral Exam, homework, report, Quizzes, hort answers and
c2-	Practice the qualitative and quantitative estimation of pharmaceutical substances.	sessions	Written exam
c3-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**

After completing this program, students would be able to:		After participating in the course, students would be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.
D5-	Apply information and communication technology and working effectively in a team.	d2-	Manage the time in an work effectively.
		d3-	Apply the information technology skills, such as word processing and internet communication and online searches.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short

d2-	Manage the time in an work effectively.		answers and Written exam
d3-	Apply the information technology skills, such as word processing and internet communication and online searches.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	**Introduction to analytical chemistry**	a1-2 , b2, d1-3	- Definitions - Classifications, types of analytical techniques. - Qualitative and quantitative analysis	1	2
2	**Basic Tools of Analytical Chemistry**	a1-2, a4, b3, d1-3	-Review the fundamental concepts of the nucleus, relative atomic mass and molecular mass, moles and equivalents. - Methods of expressing the concentrations: molarity, normality, molality, dilution, ppm, ppb, Weight, Volume, and Weight-to-Volume Ratios	1	2
3	**Volumetric methods of analysis**	a1-3 , b1-3, d1-3	Definition, tools, types and Principle of volumetric analysis	1	2
4	**Acid - base titration**	a1,a4,b3, d1-3	1-Acid - base titration in aqueous medium: -Arhenius, Pronsted and Lewis definitions - -pH of acids, base and salt solutions, buffer solutions and Henderson-Hesselbach equations. Factors affecting pH of buffers, buffer capacity. Acid base indicators, - Principle, mechanism, neutralization titration curves	4	8

			- Pharmaceutical applications 2- Acid - base titration in nonaqueous medium: Theory, advantages and limitation, non-aqueous solvents, ionization and dissociation in nonaqueous media, titration of weak acids and bases, indicators in non-aqueous titration, preparation of standard solutions, Pharmaceutical applications		
5	**Precipitation titrations**	a1,a3,a4,b1, d13	- Solubility product constant, -Principle of precipitation reaction, - Factors affecting solubility of precipitates, -Types of argentimetric titration and end point detection in Mohr's, Volhard's, Fajan's methods. - Pharmaceutical applications	2	4
6	**Mid Exam**	a1-4, b1-3		1	2
7	**Redox titration**	a1,a3,a4,b1, d13	-Theory of redox reactions, strength and equivalent weights of oxidizing agents and reducing agents. - redox titration curves, redox indicators. - Iodometry and iodimetry -Pharmaceutical applications	3	6
8	**Complexation Titration**	a1,a3,a4,b1, d13	-Concepts of complexation and chelation - coordination number of metal ions, ligands, and chelating agents, titrants. -Stability constant of complex, factors affecting the stability of complex,. - methods of end point detection - Pharmaceutical applications	2	4

9	**Final Exam**	a1-4, b1-3		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	Calibration of volumetric apparatus	c1,c2, c3**, d1-3**	1	2
2	Preparation and standardization of HCl and NaOH solutions	c1,c2, c3**, d1-3**	1	2
3	Assay of sodium bicarbonate	c1,c2, c3**, d1-3**	1	2
4	Assay of benzoic acid,	c1,c2, c3**, d1-3**	1	2
5	Preparation and standardization of perchloric acid	c1,c2, c3**, d1-3**	1	2
6	Preparation and standardization of sodium methoxide solutions	c1,c2, c3**, d1-3**		
6	Mid-Exam	c1,c2, c3	1	2
7	Preparation and standardization of potassium permanganate solution	c1,c2, c3**, d1-3**	1	2
8	Preparation and standardization of potassium iodide solution	c1,c2, c3**, d1-3**	1	2
9	Assay of hydrogen peroxide	c1,c2, c3**, d1-3**	1	2
10	Preparation and standardization of ammonium thiocynate solution.	c1,c2, c3**, d1-3**	1	2
11	Preparation and standardization of a silver nitrate solution.	c1,c2, c3**, d1-3**	1	2
12	Assay of sodium chloride.	c1,c2, c3**, d1-3**	1	2
13	Preparation and standardization of EDTA solution	c1,c2, c3**, d1-3**	1	2

14	Assay of Calcium lactate	c1,c2, c3**, d1-3**	1	2
15	Preparation and standardization of ceric ammonium sulphate solution	c1,c2, c3**, d1-3**	1	2
16	Final Exam	**c1-3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures method, Discussions, Small group discussions, Tutorials and Practice session.

VII. Assignments:

- Homework
- Reports

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a3,a4,b1,b2, d1-3
2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2, a4, b1-3,d1-3
3	**Attendance, Practical Reports and Practical mid-semester exam**	7^{th}	30	20%	c1-3

5	**Theoretical mid-semester exam**	10th	30	20%	a1-4, b1, b2
6	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1, b2
7	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

U

X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004.Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

2- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

1- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,
2- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.
3- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.
4- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.
5- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1. the Analyst;
2. J. Pharm. & Biomed. Anal.
3. J. Assoc. off Anal. Chem.
4. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPageSearchPage.cfm)
5. The Analytical Forum on ChemWeb (http://analytical.
6. chemweb.com/search/search.exe)

I. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty.
	▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Analytical Chemistry I

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU

E-mail							

II- Course Identification and General Information:

1-	Course Title:	Pharmaceutical Analytical Chemistry I				
2-	Course Number & Code:	Ph534				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	2nd level /1st semester				
5-	Pre –requisite (if any):	General Pharmaceutical Chemistry				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course is concerned with the fundamental knowledge about the basic principles of the quantitative chemical analysis including, acid-base reactions, redox reaction, complexometric and precipitimetric analysis. The course will also cover the applications of these methods to pharmaceutical compounds.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

14. Recognize the basic principle of pharmaceutical analytical chemistry and its classification.
15. Describe the important terminology used in pharmaceutical analysis.
16. Recognize different method of quantitative analysis of drugs in different pharmaceutical preparations and mention their advantage and disadvantages.
17. Identify the required calculations that are used in drugs analysis.
18. Select the suitable method for determination of different pharmaceutical preparations depending on the chemical nature of the drugs.
19. Diagram the schemes that explain different method of quantitative analysis.
20. Determine the functional groups that affect on acidity and basicity of pharmaceutical compounds and predict the pH of the compounds.
21. Operate different pharmaceutical instrument and equipment in the lab.
22. Practice the qualitative and quantitative estimation of pharmaceutical substances.
23. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
24. Communicate and cooperate effectively with the others as a team work to perform the report on the results of the method of analysis.
25. Apply the information technology skills, such as word processing and internet communication and online searches.
26. Manage the time in an work effectively.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	**Introduction to analytical chemistry**	a1-2 , b2, d1-3	- Definitions - Classifications, types of analytical techniques. - Qualitative and quantitative analysis	1	2
2	**Basic Tools of Analytical Chemistry**	a1-2, a4, b3, d13	-Review the fundamental concepts of the nucleus, relative atomic mass and molecular mass, moles and equivalents. - Methods of expressing the concentrations: molarity, normality, molality, dilution, ppm, ppb, Weight, Volume, and Weight-to-Volume Ratios	2	2
3	**Volumetric methods of analysis**	a1-3 , b1-3, d1-3	Definition, tools, types and Principle of volumetric analysis	3	2
4	**Acid - base titration**	a1,a4,b3, d1-3	1-Acid - base titration in aqueous medium: -Arhenius, Pronsted and Lewis definitions - -pH of acids, base and salt solutions, buffer solutions and Henderson-Hesselbach equations. Factors affecting pH of buffers, buffer capacity. Acid base indicators, - Principle, mechanism, neutralization titration curves - Pharmaceutical applications 2- Acid - base titration in nonaqueous medium: Theory, advantages and limitation, non-aqueous solvents, ionization and dissociation in nonaqueous media, titration of weak acids and bases,	4-7	8
			indicators in non-aqueous titration, preparation of standard solutions, Pharmaceutical applications		

5	**Precipitation titrations**	a1,a3,a4,b1, d13	- Solubility product constant, -Principle of precipitation reaction, - Factors affecting solubility of precipitates, -Types of argentimetric titration and end point detection in Mohr's, Volhard's, Fajan's methods. - Pharmaceutical applications	8,9	4
6	**Mid Exam**	a1-4, b1-3		10	2
7	**Redox titration**	a1,a3,a4,b1, d13	-Theory of redox reactions, strength and equivalent weights of oxidizing agents and reducing agents. - redox titration curves, redox indicators. - Iodometry and iodimetry -Pharmaceutical applications	11-13	6
8	**Complexation Titration**	a1,a3,a4,b1, d13	-Concepts of complexation and chelation - coordination number of metal ions, ligands, and chelating agents, titrants. -Stability constant of complex, factors affecting the stability of complex,. - methods of end point detection - Pharmaceutical applications	14,15	4
9	**Final Exam**	a1-4, b1-3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	Calibration of volumetric apparatus	c1,c2, c3**, d1-3**	1	2
2	Preparation and standardization of HCl and NaOH solutions	c1,c2, c3**, d1-3**	2	2
3	Assay of sodium bicarbonate	c1,c2, c3**, d1-3**	3	2
4	Assay of benzoic acid	c1,c2, c3**, d1-3**	4	2
5	Preparation and standardization of perchloric acid **,** Preparation and standardization of sodium methoxide solutions	c1,c2, c3**, d1-3**	5	2
6	Mid-Exam	c1,c2, c3	6	2
7	Preparation and standardization of potassium permanganate solution	c1,c2, c3**, d1-3**	7	2
8	Preparation and standardization of potassium iodide solution	c1,c2, c3**, d1-3**	8	2
9	Assay of hydrogen peroxide	c1,c2, c3**, d1-3**	9	2
10	Preparation and standardization of ammonium thiocynate solution.	c1,c2, c3**, d1-3**	10	2
11	Preparation and standardization of a silver nitrate solution.	c1,c2, c3**, d1-3**	11	2
12	Assay of sodium chloride.	c1,c2, c3**, d1-3**	12	2
13	Preparation and standardization of EDTA solution	c1,c2, c3**, d1-3**	13	2
14	Assay of Calcium lactate	c1,c2, c3**, d1-3**	14	2
15	Preparation and standardization of ceric ammonium sulphate solution	c1,c2, c3**, d1-3**	15	2
16	Final Exam	**c1-3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة د. يحيى الدخين
ا.د. محمود البريهي ا.م.د.توفيق العبيدي د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس د. محمد عباس

VI- Teaching strategies of the course:

Lectures method, Discussions, Small group discussions, Tutorials and Practice session.

VII- Assignments:

- Homework
- Reports

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a3,a4,b1,b2, d1-3
2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2, a4, b1-3,d1-3
3	**Attendance, Practical Reports and Practical mid-semester exam**	7th	30	20%	c1-3
5	**Theoretical mid-semester exam**	10th	30	20%	a1-4, b1, b2
6	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1, b2
7	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X- Learning Resources:

1- Required Textbook(s) (maximum two).

3- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004.Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

4- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

6- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,

7- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.

8- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.

9- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.

10- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

7. the Analyst;
8. J. Pharm. & Biomed. Anal.
9. J. Assoc. off Anal. Chem.
10. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)
11. The Analytical Forum on ChemWeb (http://analytical.
12. chemweb.com/search/search.exe)

III. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Physiology I

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة د .صادق
عبدالمغني	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

I. General information about the course :

1.	Course Title:	Physiology I				
2.	Course Code and Number :	Ph433				
3.	Credit Hours :	Lecture	Seminar/Tutorial	Practical	Training	Total
		2	-----	-	----	2
4.	Study Level and Semester:	2nd level, 1st semester				
5.	Pre-requisites (if any):	NA				
6.	Co-requisites (if any) :	NA				
7.	Program in which the course is offered	Bachelor of Pharmacy				
8.	Teaching Language:	English				
9.	Location of teaching the course:	Faculty of Pharmacy				
0.	Prepared by :	Dr. Sadeq Abdulmogny				
1.	Approval date :					

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1

II. Course Description:

This introductory physiology course introduces basics concepts in physiology of human body. The course familiarizes students with basic definitions and principles related to physiology. This course helps students to understand body fluid and cellular physiology including the functions of cell components. The course gives an overview on the physiology of autonomic nervous system, structure of nerve, and compositions of blood.

III. Course Aims

1- To introduce and familiarize students with basic definitions and principles related to physiology as a study of the living body at molecular, cellular as well as the level of intact organism.
2- To provide student with a basic knowledge and understanding concerning the fundamental mechanisms of human life as a continuous process.
3- To develop the basic skills and ethical behavior required for scientific research, as well as effective communication and team work attitude.
4- To provide the student with the knowledge about the theoretical principles outlined in the syllabus in relation to ongoing basic sciences.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Understand the basic concepts of the physiology.
2. Define the physiology and their types, the structure and function of the studied systems.
3. Know more information about units and medical analysis.
4. Apply the new techniques in solving problems.
5. Reform hematological analysis related to units.
6. Choose and classify data obtained from physiological experiments.
7. Communicate effectively with students by discussing results obtained from experimental physiological lab.

VI. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	**After completing this course, students would be able to:**
A1. Recognize the principles of physical, chemical, clinical, social, behavioral, health and Pharmaceutical sciences.	**a1-** Understand the basic concepts of the physiology

A3. Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2**- Define the physiology and their types, the structure and function of the studied systems.

Intellectual Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Intellectual Skills PILOs	**Intellectual Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**
B1. Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	b1- Know more informations about units and medical analysis
B2. Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	b2- Apply the new techniques in solving problems.

Professional and Practical Skills	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Professional and Practical Skills PILOs	**Professional and Practical Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**

C1. Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	c1- Reform hematological analysis related to units.
C2. Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c2- Choose and classify data obtained from physiological experiments.

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	**Transferable (General) Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**
D1. Practice independent learning needed for continuous professional development	d1- Present data in graphical using IT methods.
D2. Employ proper documentation and filing systems in different pharmaceutical fields	d2- Communicate effectively with students by discussing results obtained from experimental physiological lab.

VII. Alignment of CILOs to Teaching and Assessment Strategies

First: Alignment of Knowledge and Understanding CILOs

Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
a1- Understand the basic concepts of some physiological concepts.	Lectures Presentation	Quizzes
a2- Define the general principles of physiological analysis	Lectures	Quizzes

Second: Alignment of Intellectual Skills CILOs		
Intellectual Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
b1- Know more informations about units and medical analysis	Lectures Assignments	Oral examinations Quizzes
b2- Apply the new laboratory techniques in solving problems.	Lectures Brainstorming session	Quizzes Written examinations

Third: Alignment of Professional and Practical Skills CILOs		
Professional and Practical Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
c1- Reform hematological analysis related to units.	Brainstorming session	Micro-reports
c2 - Choose and classify data obtained from physiological experiments	Lectures Activation	Problem solving

Fourth: Alignment of Transferable (General) Skills CILOs		
Transferable (General) Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
d1- Present data in graphical using IT methods.	Lectures Activation	Micro-reports
d2- Communicate effectively with students by discussing results obtained from experimental physiological lab.	Presentation Activation	Micro-reports

V. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs
Topics/Units of Course Contents

First: Theoretical Aspects					
No.	**Course Topics/Units**	**Sub-topics**	**No. of Weeks**	**Contact Hours**	**CILOs**
1	1-Physiology of the cell. 2- Transport across the cell membrane.	**Cell compositions** Cell membrane Cytoplasmic organelles Nucleus Movements of molecules across membranes Mechanism of particles and water diffusion across cell membrane	2	4	a1, a2
2	1-Body fluids, composition, distribution, general functions. 2- Osmosis, tonicity and water balance	Body fluid importance Body fluid compartments Intracellular fluid (ICF) Extracellular fluid (ECF)	2	4	a1, b1,b2
3	1-Composition and functions of the blood. 2- RBCs, Formation and general functions.	Blood Composition of blood: Plasma Blood elements Red blood corpuscles Most common types of normal and abnormal hemoglobin Anemia: Types of anemia RBCs functions	2	4	a1, a2 b1,b2
4	Midterm	———	1	2	All
5	1- WBCs: structures, classifications and functions 2- Hemostasis and its disorders	White blood cells Types of leucocytes White blood cells functions Platelets Hemostasis and WBCs disorders	2	4	a1, a2, b1,b2, c1, c2

6	1- Nerve fibers, structures, classifications, functions	The neuron (Nerve cell) neuron classification, structure and	2	4	
	and properties of nerves. 2- Resting membrane potentials, action potentials and factors affecting them. 3- Conduction of nerve impulse, neuromuscular transmission.	function Resting and action potential Myelin sheath Neuroglia or glial cells General functions of neuroglia Types of neuroglia cells			a1, a2, b1,b2, c1, c2, d2
7	1-Autonomic nervous system, origin, organization, distribution. 1- Autonomic ganglia, chemical transmitters & functions of ANS.	Autonomic (involuntary or visceral) nervous system (ANS) Types of autonomic nervous system	2	4	a1, a2, b1,b2, c1, d2
8	Review		2	4	All
9	Final exam		1	2	All
Total number of weeks and hours			**16**	**32**	

VI. Learning Assessment:

No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment	Aligned CILOs
1	**Homework/Tasks/Assignments**	3, 6, 8, 11	5	5%	a1, a2, b1, b2, d1, d2
2	**Quiz**	4	5	5%	a1, a2

3	**Midterm Exam**	7	20	20%	a1, a2, b1, b2,
5	**Final Exam**	16	70	70%	a1, a2, b1, b2
Total			100	100%	

V. Teaching Strategies

1- Lectures and presentation
2- Activation
3- micro-report
4- micro- assignments

I. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

1. Guyton and Hall, (2006), Text book of medical physiology, 11th Ed Mississippi Medical Center, Jackson, Mississippi, USA
2. Laurie Kelly, (2005), Essentials of Human Physiology for Pharmacy, 1st Ed. CRC Press, Pharmacy Education series

Essential References-not less than 4

1- Stuart Ira Fox, (2011), Textbook: Human Physiology, 13th Ed.
2- Thibodeah & patton (1999), Anatomy & Physiology, 5th Ed, Thieme Stuttgart, New York.
3- Barbara J. Bain and Rajeev Gupta, (2003), A–Z of Haematology 1st Ed. Blackwell Publishing Ltd. London.
4- Fox, (2010), Human Physiology, 10th Ed, McGraw-Hill companies
5- Human Physiology, the basis of medicine, (2006), 3rd Ed, Oxford university press.

Electronic Materials and Web Sites

1. www.csun.edu/science/biology/anatomy/anatomy.html
2. www.cliffsnotes.com
3. www.innerbody.com
4. www.anatomyandphysiology.com/
5. www.mhhe.com/biosci2/anatomyrevealed
6. www.le.ac.uk/pa/teach/va/anatomy

I. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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عبدالمغني	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating**: ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism**: ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Physiology II

II. General information about the course instructor :		
Name	**Dr Sadeq Saad Abdulomgny**	**Office Hours (2 Hours Weekly)**

Location & phone number	**773609090**	**Sat**	**Sun**	**Mon**	**Tue**	**Wed**	**Thu**
Email	**asdhod@yahoo.com**						

III. General information about the course :

Course Title:	**Physiology I**				
Course Code and Number :	**Ph433**				
Credit Hours :	**Lecture**	**Seminar/Tutorial**	**Practical**	**Training**	**Total**
	2	**-----**	**-**	**----**	**2**
Study Level and Semester:	2nd level, 1st semester				
Pre-requisites (if any):	NA				
Co-requisites (if any) :	NA				
Program in which the course is offered	Bachelor of Pharmacy				
Teaching Language:	English				
Study System :	Semester- based				
Mode of delivery:	Regular				
Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

IV. Course Description:

This introductory physiology course introduces basics concepts in physiology of human body. The course familiarizes students with basic definitions and principles related to physiology. This course helps students to understand body fluid and cellular physiology including the functions of cell components. The course gives an overview on the physiology of autonomic nervous system, structure of nerve, and compositions of blood.

V. Course Aims

1- To introduce and familiarize students with basic definitions and principles related to physiology as a study of the living body at molecular, cellular as well as the level of intact organism.

5- To provide student with a basic knowledge and understanding concerning the fundamental mechanisms of human life as a continuous process.

6- To develop the basic skills and ethical behavior required for scientific research, as well as effective communication and team work attitude.

7- To provide the student with the knowledge about the theoretical principles outlined in the syllabus in relation to ongoing basic sciences.

VI. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

8. Understand the basic concepts of the physiology
9. Define the physiology and their types, the structure and function of the studied systems. 10. Know more informations about units and medical analysis
11. Apply the new techniques in solving problems.
12. Reform hematological analysis related to units.
13. Choose and classify data obtained from physiological experiments.
14. Communicate effectively with students by discussing results obtained from experimental physiological lab.

VII. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents					
First: Theoretical Aspects					
No.	**Course Topics/Units**	**Sub-topics**	**Week Due**	**Contact Hours**	**CILOs**
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2	1-Body fluids, composition, distribution, general functions. 2-Osmosis, tonicity and water balance	Body fluid importance Body fluid compartments Intracellular fluid (ICF) Extracellular fluid (ECF)	3,4	4	a1, b1,b2
3	1-Composition and functions of the blood. 2- RBCs, Formation and general functions.	Blood Composition of blood: Plasma Blood elements Red blood corpuscles Most common types of normal and abnormal hemoglobin Anemia: Types of anemia RBCs functions	5,6	4	a1, a2 b1,b2
4	Midterm	———	7	2	All

5	3- WBCs: structures, classifications and functions 4- Hemostasis and its disorders	White blood cells Types of leucocytes White blood cells functions Platelets Hemostasis and WBCs disorders	8,9	4	a1, a2, b1,b2, c1, c2
6	3- Nerve fibers, structures, classifications, functions and properties of nerves. 4- Resting membrane potentials, action potentials and factors affecting them. 3- Conduction of nerve impulse, neuromuscular transmission.	The neuron (Nerve cell) neuron classification, structure and function Resting and action potential Myelin sheath Neuroglia or glial cells General functions of neuroglia Types of neuroglia cells	10,11	4	a1, a2, b1,b2, c1, c2, d2
7	1-Autonomic nervous system, origin, organization, distribution. 1- Autonomic ganglia, chemical transmitters & functions of ANS.	Autonomic (involuntary or visceral) nervous system (ANS) Types of autonomic nervous system	12,13	4	a1, a2, b1,b2, c1, d2
8	Review		14,15	4	All
9	Final exam		16	2	All
Total number of weeks and hours			**16**	**32**	

VIII. Learning Assessment:

No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment	Aligned CILOs
1	**Homework/Tasks/Assignments**	3, 6, 8, 11	5	5%	a1, a2, b1, b2, d1, d2
2	**Quiz**	4	5	5%	a1, a2
3	**Midterm Exam**	7	20	20%	a1, a2, b1, b2,
5	**Final Exam**	16	70	70%	a1, a2, b1, b2
Total			100	100%	

VI. Teaching Strategies

5- Lectures and presentation

6- Activation

7- micro-report

VII. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing) **Textbooks-not more than 2**

3. Guyton and Hall, (2006), Text book of medical physiology, 11th Ed Mississippi Medical Center, Jackson, Mississippi, USA
4. Laurie Kelly, (2005), Essentials of Human Physiology for Pharmacy, 1st Ed. CRC Press, Pharmacy Education series

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عبدالمغني	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

7. www.csun.edu/science/biology/anatomy/anatomy.html 8. www.cliffsnotes.com 9. www.innerbody.com 10. www.anatomyandphysiology.com/ 11. www.mhhe.com/biosci2/anatomyrevealed 12. www.le.ac.uk/pa/teach/va/anatomy

8- micro- assignments

III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:
6- Strategies for obtaining student feedback on effectiveness of teaching
▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.
▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.
▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
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	- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating**: ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism**: ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Microbiology I

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Microbiology I				
2	**Course Number & Code:**	Ph631				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	2th level /1st semester				
5	**Pre –requisite (if any):**					
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
10	**Prepared by:**	**Prof Hassan Al-Shamahy**				
11	**Date of approval:**					

II. Course description:

The course is designed to learn the students the basic features of general immunology, virology and mycology. The course is designed to learn the students the basic features of immunology virology and mycology. Theoretical part will be taught, in addition to common infections and general and oral diseases of medical importance, and different laboratory steps for method of diagnosis.

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ا.د .حسن الشماحي	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention general concept about bacteriology**,** including classification and structure.
2. Identify the host parasite relationship and microbial pathogens.
3. Describe briefly the physiology of the immune system, its beneficial role.
4. Describe the morphology, culture and antigenic structure of microorganisms of medical importance
5. Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing
6. Mention the most important infectious clinical conditions and outline the diagnosis, treatment, prevention and control of the most likely.
7. Describe the most important methods of decontamination and principles of infection control.
8. Describe the basics of Describe the basics of antimicrobial uses
9. Comprehend microbiological and immunological
10. Categorize a microorganism as a bacterium according to standard taxonomy.
11. Correlate according to evidence the causal relationship of microbes and diseases
12. Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage
13. Carry out experiments of important immunological reactions 14. Practice Viral diagnosis using Specimen
15. Perform ELISA technique for diagnosis Hepatitis viruses
16. Perform hand wash and control of steam sterilization.
17. Display the facts using printable sheets in the field of bacteriology and immunology
18. Complete a full scientific reports in the field of bacteriology and immunology
19. Communicate in groups and team in laboratory experiments
20. Follow the computer-based tools and internet to extract information and knowledge

IV. Intended learning outcomes (ILOs) of the course:

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(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Mention general concept about immunology, virology and mycology including classification and structure.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Identify the host parasite relationship and microbial pathogens
		a3-	Describe briefly the physiology of the immune system, its beneficial role.
		a4-	Describe the morphology, culture and antigenic structure of microorganisms of medical importance.
		a5-	Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing.
		a6-	Mention the most important infectious clinical conditions and outline the diagnosis, treatment, and prevention and control of the most likely organisms causing such diseases
		a7-	Describe the most important methods of decontamination and principles of infection control.

		a8-	Describe the basics of antimicrobial uses

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Mention general concept about immunology and virology including classification and structure.	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes Practical work assignment Attendance
a2-	Identify the host parasite relationship and microbial pathogens		
a3-	Describe briefly the physiology of the immune system, its beneficial role.		
a4-	Describe the morphology, culture and antigenic structure of microorganisms of medical importance.		
a5-	Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing.		
a6-	Mention the most important infectious clinical conditions and outline the diagnosis, treatment, and prevention and control of the most likely organisms causing such diseases		
a7-	Describe the most important methods of decontamination and principles of infection control.		
a8-	Describe the basics of antimicrobial uses		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug	**b1-**	Comprehend microbiological and immunological
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Categorize a microorganism as a virus or fungus according to standard taxonomy.
		b3-	Correlate according to evidence the causal relationship of microbes and diseases
		b4-	Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Comprehend microbiological and immunological	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes Practical work
b2-	Categorize a microorganism as a virus or fungus according to standard taxonomy.		

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b3-	Correlate according to evidence the causal relationship of microbes and diseases		assignment Attendance
b4-	Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c1-**	Carry out experiments of important immunological reactions
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Practice Viral diagnosis using Specimen
		c3-	Perform ELISA technique for diagnosis Hepatitis viruses
		c4-	Perform hand wash and control of steam sterilization.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**	**Teaching strategies/methods to be used**	**Methods of assessment**

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c1-	Carry out experiments of important immunological reactions	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes Practical work assignment Attendance
c2-	Practice Viral diagnosis using Specimen		
c3-	Perform ELISA technique for diagnosis Hepatitis viruses		
c4-	Perform hand wash and control of steam sterilization.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Display the facts using printable sheets in the field of bacteriology and immunology
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Complete a full scientific reports in the field of bacteriology and immunology.
		d3-	Communicate in groups and team in laboratory experiments.
		d4-	Follow the computer-based tools and internet to extract information and knowledge

Teaching And Assessment Methods For Achieving Learning Outcomes:

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Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Display the facts using printable sheets in the field of bacteriology and immunology	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes Practical work assignment Attendance
d2-	Complete a full scientific reports in the field of bacteriology and immunology.		
d3-	Communicate in groups and team in laboratory experiments.		
d4-	Follow the computer-based tools and internet to extract information and knowledge		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	IMMUNOLOGY	a1, a2, a3, a4, b1 c1,c4 d1,d2	Intruduction, Infection and Immunity	1	2
2.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Antigen and antibodies: General structure and the role played in defense mechanism of the body,	1	2

3.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immuno deficiency disorders, Autoimmune disorders and	1	2
4.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immune response and Antigen - Antibody reactions	1	2
5.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immunology of Transplantation and Malignancy	1	2
6.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immunosuppressive Drugs, mechanisms of actions	1	2
7.	**Mid Exam**			1	2
8.	Virology	a1, a2, a3, a4, b1, b2, b3 c2,c3, c4 d1,d2	Introduction: General characteristics and classification, Viral	1	2
9.	Virology	a1, a2, a3, a4, b1, b2, b3 c2,c3, c4 d1,d2	Replication , Viral genetics cultivation of viruses and their laboratory diagnosis,	1	2
10.	Virology	a1, a2, a3, a4, b1,	.A few viruses of	1	2
		b2, b3 c2,c3, c4 d1,d2	a. Herpes Virus b. Hepatitis B,C Virus - brief about other types		
11.	Virology	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	c. (HIV) d. Mumps Virus e. Brief - Measles and Rubella Virus and 3. Bacteriophage - structure and Significance	1	2
12.	Virology	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	Antiviral agents, Pathogenesis of viral infections and Immunity to viral infections	1	2

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13.	Fungi	a1, a2, a3, a4, b1, b2, b3 c4, d1,d2	General Characteristics, Classification, Agents of superficial Infections,	2	4
14.	Review			1	2
15.	**Final Exam**			1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1)	Immunological reactions	a1, a2, a3, a4, b1, b2, b3	4	8
2)	Specimen for Viral diagnosis	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	4	8
3)	Mid-Exam	**c1, c3**	1	2
4)	ELISA technique for diagnosis Hepatitis viruses	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	4	8
5)	Review		2	4
6)	Final Exam	**c1, c3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lecture Lab
seminar

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I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-8,b1-b4, c1-4
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1,a3, a5, b1-4, c1-4, d14
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	9th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	7th	30	20%	a1-8, b1-4
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-8, b1-4
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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III. Learning Resources:

1- Required Textbook(s) (maximum two).

There is a long list of anatomy books present in the faculty library for the student to choose from. Course notes done by teaching staff.

2- Recommended Books and Reference Materials.

Course notes of Department theoretical books and practical manual (lectures and practical) a.
Essentials of microbiology . Oxford Press. By J.Bagg
b. Microbiology at a Glance
c. Immunology at Glance
d. Notes in Medical virology Practical book :

District Laboratory Practice in Tropical Countries Monica Cheesbrough

3- Electronic Materials and Web Sites *etc*.

als and web sites of Microbiology and Immunology http://www.med-ed-online.org/, midline Pubmed & Go

I. Course Policies (To be determined by Faculty Deanship)

Based on university regulations, the following aspects should be figured out:

1.	(Class Attendance) :Class Attendance: - Attendance of students is taken at beginning of lecture time. - The allowed absence percentage is 20% without excuse and 30% with acceptable excuse, - When student has been absent for more than 30% of course lectures without acceptable excuse, the student will be prohibited from entering subject the final exam.
2.	(Tardy) :If the student came late to class for 15 minutes, he/she is registered absent but he/she allowed to enter the hall to listen lecture presentation.
3.	(Exam Attendance/Punctuality) :According to examination roles or policies: - If the student is absent in the year works exams, the decision is referred to the teacher whether to allow or to reject according to the offered excuse. - If the student is absent in the final exam with an acceptable excuse, the student would be attended the re-sit exam as 1st trial. - If the student is absent in the final exam without an acceptable excuse, the student would be attended re-sit exam as 2nd trial.

4.	(Assignments & Projects) :According to examination roles or policies: - The student should be attended the final exam at certain time and according to the accredited exam table. - If the student came late after 15 minutes from the exam beginning, the student would be to attend the exam with oral monition of never repeat. - In case of the repeat, the student prevented from entrance and considered absent.
5.	(Cheating) :According to examination roles or policies: - If the student cheated in the year works exams of the course, the student prohibited from entrance the final exam and given zero degree with prevented him from entrance the re-sit exam of this course. - If the student cheated in the final exam of the course, the student prohibited from the cheated course and the followed course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheated course is the last at the exam table, the student prohibited from the cheated course and the past course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheating is discovered in subsequent time, the cheated student didn't escape from payment and ordinance is referred to precision committee and the final decision is referred to the collage council. - If the cheating is discovered during the correcting the answered books, the corrector has written a report to the chairman of concerned department for taking available procedure. - The faculty council is able to segregate the student for one academic year in 2nd cheating trial and final segregation from the university after accreditation of university council in 3rd cheating trial.
6.	(Plagiarism) :According to examination roles or policies: Plagiarism means a student plagiarizes the personality of another student. Plagiarism for exam purpose: 1- Both students are prohibited from the plagiarized academic year and all results of them are rejected with prohibition of them from entrance the resit exam. 2- If the plagiarized student is from outside the university, the student is referred to the university police. -Plagiarism for other purposes: 1- Both students are warned as segregation. 2- If the plagiarized student is from outside the university, the student is referred to the university police.
7.	(Other policies) :-The student should be followed the instructions for the exam entrance. - The student should be followed all systems & laws of the university.

Course Plan of Pharmaceutical Microbiology I

I. - Information about Faculty Member Responsible for the Course:

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Name of Faculty Member	Prof Hassan AlShamahy	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	**Course Title:**	Pharmaceutical Microbiology I				
2-	**Course Number & Code:**	Ph631				
3-	**Credit hours: 1hrs**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	2th level /1st semester				
5-	**Pre –requisite (if any):**					
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

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III. Course description:

The course is designed to learn the students the basic features of general immunology, virology and mycology. The course is designed to learn the students the basic features of immunology virology and mycology. Theoretical part will be taught, in addition to common infections and general and oral diseases of medical importance, and different laboratory steps for method of diagnosis.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention general concept about bacteriology**,** including classification and structure.
2. Identify the host parasite relationship and microbial pathogens.
3. Describe briefly the physiology of the immune system, its beneficial role.
4. Describe the morphology, culture and antigenic structure of microorganisms of medical importance
5. Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing
6. Mention the most important infectious clinical conditions and outline the diagnosis, treatment, prevention and control of the most likely.
7. Describe the most important methods of decontamination and principles of infection control.
8. Describe the basics of Describe the basics of antimicrobial uses
9. Comprehend microbiological and immunological
10. Categorize a microorganism as a bacterium according to standard taxonomy.
11. Correlate according to evidence the causal relationship of microbes and diseases
12. Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage
13. Carry out experiments of important immunological reactions 14. Practice Viral diagnosis using Specimen
15. Perform ELISA technique for diagnosis Hepatitis viruses
16. Perform hand wash and control of steam sterilization.
17. Display the facts using printable sheets in the field of bacteriology and immunology
18. Complete a full scientific reports in the field of bacteriology and immunology
19. Communicate in groups and team in laboratory experiments
20. Follow the computer-based tools and internet to extract information and knowledge

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
16.	IMMUNOLOGY	a1, a2, a3, a4, b1 c1,c4 d1,d2	Intruduction, Infection and Immunity	1	2
17.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Antigen and antibodies: General structure and the role played in defense mechanism of the body,	2	2
18.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immuno deficiency disorders, Autoimmune disorders and	3	2
19.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immune response and Antigen - Antibody reactions	4	2
20.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immunology of Transplantation and Malignancy	5	2
21.	IMMUNOLOGY	a1, a2, a3, a4, b1, b2, b3 c1,c4 d1,d2	Immunosuppressive Drugs, mechanisms of actions	6	2
22.	**Mid Exam**			7	2

23.	Virology	a1, a2, a3, a4, b1, b2, b3 c2,c3, c4 d1,d2	Introduction: General characteristics and classification, Viral	8	2
24.	Virology	a1, a2, a3, a4, b1, b2, b3 c2,c3, c4 d1,d2	Replication , Viral genetics cultivation of viruses and their laboratory diagnosis,	9	2
25.	Virology	a1, a2, a3, a4, b1, b2, b3 c2,c3, c4 d1,d2	.A few viruses of f. Herpes Virus g. Hepatitis B,C Virus - brief about other types	10	2
26.	Virology	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	h. (HIV) i. Mumps Virus j. Brief - Measles and Rubella Virus and 3. Bacteriophage - structure and Significance	11	2
27.	Virology	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	Antiviral agents, Pathogenesis of viral infections and Immunity to viral infections	12	2
28.	Fungi	a1, a2, a3, a4, b1, b2, b3 c4, d1,d2	General Characteristics, Classification, Agents of superficial Infections,	13,14	4
29.	Review			15,16	2
30.	**Final Exam**			16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect				
Order	**Tasks/ Experiments**	**CILOs (symbols)**	**Week Due**	**Contact Hours**

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7)	Immunological reactions	a1, a2, a3, a4, b1, b2, b3	1-4	8
8)	Specimen for Viral diagnosis	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	5-8	8
9)	Mid-Exam	**c1, c3**	9	2
10)	ELISA technique for diagnosis Hepatitis viruses	a1, a2, a3, a4, b1, b2, b3 c1,c3 d1,d2	10-13	8
11)	Review		14,15	4
12)	Final Exam	**c1, c3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:
Lecture Lab seminar

IV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-8,b1-b4, c1-4
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1,a3, a5, b1-4, c1-4, d14

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10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	9th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	7th	30	20%	a1-8, b1-4
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-8, b1-4
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

V. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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VI. Learning Resources:

1- Required Textbook(s) (maximum two).

There is a long list of anatomy books present in the faculty library for the student to choose from. Course notes done by teaching staff.

2- Recommended Books and Reference Materials.

Course notes of Department theoretical books and practical manual (lectures and practical) a.
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District Laboratory Practice in Tropical Countries Monica Cheesbrough

3- Electronic Materials and Web Sites *etc*.

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II. Course Policies (To be determined by Faculty Deanship)

Based on university regulations, the following aspects should be figured out:

8.	(Class Attendance) :Class Attendance: - Attendance of students is taken at beginning of lecture time. - The allowed absence percentage is 20% without excuse and 30% with acceptable excuse, - When student has been absent for more than 30% of course lectures without acceptable excuse, the student will be prohibited
	from entering subject the final exam.
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11.	(Assignments & Projects) :According to examination roles or policies: - The student should be attended the final exam at certain time and according to the accredited exam table. - If the student came late after 15 minutes from the exam beginning, the student would be to attend the exam with oral monition of never repeat. - In case of the repeat, the student prevented from entrance and considered absent.
12.	(Cheating) :According to examination roles or policies: - If the student cheated in the year works exams of the course, the student prohibited from entrance the final exam and given zero degree with prevented him from entrance the re-sit exam of this course. - If the student cheated in the final exam of the course, the student prohibited from the cheated course and the followed course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheated course is the last at the exam table, the student prohibited from the cheated course and the past course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheating is discovered in subsequent time, the cheated student didn't escape from payment and ordinance is referred to precision committee and the final decision is referred to the collage council. - If the cheating is discovered during the correcting the answered books, the corrector has written a report to the chairman of concerned department for taking available procedure. - The faculty council is able to segregate the student for one academic year in 2nd cheating trial and final segregation from the university after accreditation of university council in 3rd cheating trial.
13.	(Plagiarism) :According to examination roles or policies: Plagiarism means a student plagiarizes the personality of another student. Plagiarism for exam purpose: 1- Both students are prohibited from the plagiarized academic year and all results of them are rejected with prohibition of them from entrance the resit exam. 2- If the plagiarized student is from outside the university, the student is referred to the university police. -Plagiarism for other purposes: 1- Both students are warned as segregation. 2- If the plagiarized student is from outside the university, the student is referred to the university police.
14.	(Other policies) :-The student should be followed the instructions for the exam entrance. - The student should be followed all systems & laws of the university.

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Course Specification of Pharmaceutics I

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutics I					
2	Course Number & Code:	Ph234					
3	Credit hours: 3hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2			3	
4	Study level/ semester at which this course is offered:	Second year/First semester					
5	Pre –requisite (if any):	Physical pharmacy- Pharmaceutical calculatio ıs					
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	**Prof. Dr. Abdulwali Ahmed Saif**					
12	Date of approval:						

II. Course description:

This course aims to provide the students with the basic knowledge of pharmaceutics and different pharmaceutical dosage forms and the route of drug administration. It focused on the advantages and disadvantages, additives methods of formulation and methods of evaluation of solutions and colloids as pharmaceutical liquid dosage forms.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the characteristics of different pharmaceutical dosage forms and routes of drug administration.
2. Describe the advantages and disadvantages of pharmaceutical liquid dosage forms.
3. Recognize the different additives used in manufacturing of pharmaceutical solutions and colloids.
4. Describe methods of preparation of pharmaceutical solutions and colloids.
5. Discuss the method of evaluation of pharmaceutical solutions and colloids.
6. Distinguish pharmaceutical liquid dosage forms.
7. Determine the appropriate methods for preparation of solutions and colloids.
8. Select the suitable method for evaluation of pharmaceutical liquid dosage forms.
9. Propose best approaches to solve the problems encountered in formulation pharmaceutical liquid dosage forms.
10. Select and practice different methods for preparation of pharmaceutical liquid dosage forms.
11. Formulate different pharmaceutical liquid dosage forms.
12. Label the different formulations of pharmaceutical liquid dosage forms.
13. Evaluate the formulations of pharmaceutical liquid dosage forms.
14. Implement writing and presentation skills.
15. Work independently or collaboratively to prepare seminars/ presentations or write reports.
16. Effectively use internet resources to search for up-to-date information to solve emerging problems.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students will be able to:	After completing this course, students will be able to:

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the characteristics of different pharmaceutical dosage forms and routes of drug administration.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship	**a2-**	Describe the advantages and disadvantages of pharmaceutical liquid dosage forms.
	(SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3-**	Recognize the different additives used in manufacturing of pharmaceutical solutions and colloids.
		a4-	Describe methods of preparation of pharmaceutical solutions and colloids.
		a5-	Discuss the method of evaluation of pharmaceutical solutions and colloids.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures, brainstorming and group discussion	Attendance, written exams, reports, project and small projects
a1-	Recognize the characteristics of different pharmaceutical dosage forms and routes of drug administration.		
a2-	Describe the advantages and disadvantages of pharmaceutical liquid dosage form.		
a3-	Recognize the different additives used in manufacturing of pharmaceutical solutions.		
a4-	Describe methods of preparation of pharmaceutical solutions.		
a5-	Discuss the method of evaluation of pharmaceutical solutions.		

(B) Intellectual Skills:

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Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Distinguish pharmaceutical liquid dosage forms.
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Determine the appropriate methods for preparation of solutions and colloids.
		b3-	Select the suitable method for evaluation of pharmaceutical liquid dosage forms.
		b4-	Propose best approaches to solve the problems encountered in formulation pharmaceutical liquid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, solving problem, brainstorming and group discussion	Written and oral exams and small projects
b1-	Distinguish pharmaceutical liquid dosage forms.		
b2-	Determine the appropriate methods for preparation of solutions and colloids.		
b3-	Select the suitable method for evaluation of pharmaceutical liquid dosage forms.		

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b4-	Propose best approaches to solve the problems encountered in formulation pharmaceutical liquid dosage forms.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Select and practice different methods for preparation of pharmaceutical liquid dosage forms.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	Formulate different pharmaceutical liquid dosage forms.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Label the different formulations of pharmaceutical liquid dosage forms.
		c4-	Evaluate the formulations of pharmaceutical liquid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, tutorials, practical, discussion and brain storming	Attendance, homework, written, practical, oral exams, report, project and observation.
c1-	Select and practice different methods for preparation of pharmaceutical liquid dosage forms.		
c2-	Formulate different pharmaceutical liquid dosage forms.		
c3-	Label the different formulations of pharmaceutical liquid dosage forms.		

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c4-	Evaluate the formulations of pharmaceutical liquid dosage forms.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2	Employ proper documentation and filing systems in different pharmaceutical fields.	**d1-**	Implement writing and presentation skills
		d2-	Work independently or collaboratively to prepare seminars/ presentations or write reports.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d3-**	Effectively use internet resources to search for up-todate information to solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1-	Implement writing and presentation skills.		
d2-	Work independently or collaboratively to prepare seminars/ presentations or write reports.		
d3-	Effectively use internet resources to search for up-todate information to solve emerging problems.		

V. Course Content:

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1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmaceutics	**a1, b1, c1, d1-3**	Definition, types	1	2
2	Classification of dosage forms and route of administration	**a1, b1, c1, d1-3**	Excipients	1	2
3	Preformulation studies	**a3, a4, b2, b4, d1-3**	Compatiblity, evaluation	1	2
4	Galenical formulations	**a1, b1, d1-3**	Dosage forms	1	2
5	Types of liquid pharmaceutical dosage forms	**a1, a2, b1, d1-3**	Definition, types, Advantages, disadvantages,	1	2
6	Pharmaceutical solvents and excipients	**a1, a3, b1-2, d1-3**	Definition, types, Advantages, disadvantages,	1	2
7	Mid-term exam	**a1-4, b1, b2, b4**		1	2
8	Pharmaceutical Aqueous Solutions	**a2-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, methods of formulation and methods of evaluation of pharmaceutical aqueous solutions.	2	4
9	Pharmaceutical non-aqueous Solutions (elixirs,)	**a2-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, methods of formulation and methods of evaluation of pharmaceutical non-aqueous solutions.	2	4
10	Pharmaceutical colloids	**a2-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, methods of formulation and methods of evaluation of pharmaceutical colloids.	2	4
11	Final-term exam	**a1-5, b1-4**		1	**2**

Number of Weeks /and Units Per Semester	16	32

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Formulate, practice preparation, label and evaluate topical aqueous solutions.	**c1-4, d1-3**	3	6
2.	Formulate, practice preparation, label and evaluate oral aqueous solutions.	**c1-4, d1-3**	3	6
3.	Mid-term exam	**c1-4**	1	2
4.	Formulate, practice preparation, label and evaluate topical non-aqueous solutions.	**c1-4, d1-3**	3	6
5.	Formulate, practice preparation, label and evaluate oral non-aqueous solutions.	**c1-4, d1-3**	3	6
6.	Formulate, practice preparation, label and evaluate colloidal solutions.	**c1-4, d1-3**	2	4
7.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

I- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-4, d1-3**	Sporadic through the semester	**10**

2	Reports	**c1-4, d1-3**		

II- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a2, a4,b1-2,d1-3
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1, a3, a5 b3-4, d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
5.	**Theoretical mid-semester exam**	7th	30	20%	**a1-4, b1, b2, b4**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

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VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Notes on Pharmaceutics prepared by the department staff.
2. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
3. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
4. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
3. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

I. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

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1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmaceutics I

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I. - Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Prof. Dr. Abdulwali Ahmed Saif	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	Course Title:	Pharmaceutics I				
2-	Course Number & Code:	Ph234				
3-	Credit hours: 3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	1		3
4-	Study level/year at which this course is offered:	Second year/First semester				
5-	Pre –requisite (if any):	Physical Pharmacy				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

VIII. Course description:

This course aims to provide the students with the basic knowledge of pharmaceutics and different pharmaceutical dosage forms and the route of drug administration. It focused on the advantages and disadvantages, additives methods of formulation and methods of evaluation of solutions and colloids as pharmaceutical liquid dosage forms.

IX. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

17. Recognize the characteristics of different pharmaceutical dosage forms and routes of drug administration.
18. Describe the advantages and disadvantages of pharmaceutical liquid dosage forms.
19. Recognize the different additives used in manufacturing of pharmaceutical solutions and colloids.
20. Describe methods of preparation of pharmaceutical solutions and colloids.
21. Discuss the method of evaluation of pharmaceutical solutions and colloids.
22. Distinguish pharmaceutical liquid dosage forms.
23. Determine the appropriate methods for preparation of solutions and colloids.
24. Select the suitable method for evaluation of pharmaceutical liquid dosage forms.
25. Propose best approaches to solve the problems encountered in formulation pharmaceutical liquid dosage forms.
26. Select and practice different methods for preparation of pharmaceutical liquid dosage forms.
27. Formulate different pharmaceutical liquid dosage forms.
28. Label the different formulations of pharmaceutical liquid dosage forms.
29. Evaluate the formulations of pharmaceutical liquid dosage forms.
30. Implement writing and presentation skills.
31. Work independently or collaboratively to prepare seminars/ presentations or write reports.
32. Effectively use internet resources to search for up-to-date information to solve emerging problems.

X. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmaceutics	**a1, b1, c1, d1-3**	Definition, types	1	2
2	Classification of dosage forms and route of administration	**a1, b1, c1, d1-3**	Excipients	1	2
3	Preformulation studies	**a3, a4, b2, b4, d1-3**	Compatiblity, evaluation	1	2

4	Galenical formulations	**a1, b1, d1-3**	Dosage forms	1	2
5	Types of liquid pharmaceutical dosage forms	**a1, a2, b1, d1-3**	Definition, types, Advantages, disadvantages,	1	2
6	Pharmaceutical solvents and excipients	**a1, a3, b1-2, d1-3**	Definition, types, Advantages, disadvantages,	1	2
7	Mid-term exam	**a1-4, b1, b2, b4**		1	2
8	Pharmaceutical Aqueous Solutions	**a2-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, methods of formulation and methods of evaluation of pharmaceutical aqueous solutions.	2	4
9	Pharmaceutical non-aqueous Solutions (elixirs,)	**a2-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, methods of formulation and methods of evaluation of pharmaceutical non-aqueous solutions.	2	4
10	Pharmaceutical colloids	**a2-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, methods of formulation and methods of evaluation of pharmaceutical colloids.	2	4
11	Final-term exam	**a1-5, b1-4**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
8.	Formulate, practice preparation, label and evaluate topical aqueous solutions.	**c1-4, d1-3**	3	6
9.	Formulate, practice preparation, label and evaluate oral aqueous solutions.	**c1-4, d1-3**	3	6
10.	Mid-term exam	**c1-4**	1	2

11.	Formulate, practice preparation, label and evaluate topical non-aqueous solutions.	**c1-4, d1-3**	3	6
12.	Formulate, practice preparation, label and evaluate oral non-aqueous solutions.	**c1-4, d1-3**	3	6
13.	Formulate, practice preparation, label and evaluate colloidal solutions.	**c1-4, d1-3**	2	4
14.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units P r Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a2, a4,b1-2,d1-3

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9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1, a3, a5 b3-4, d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
12.	**Theoretical mid-semester exam**	7th	30	20%	**a1-4, b1, b2, b4**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

X. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

5. Notes on Pharmaceutics prepared by the department staff.
6. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
7. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
8. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

6- Recommended Readings and Reference Materials

4. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
5. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
6. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

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6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others
	will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Medicinal Botany

I. Course Identification and General Information:						
1	Course Title:	Medicinal Botany				
2	Course Number & Code:	Ph331				
3	Credit hours:	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2	2			3
4	Study level/ semester at which this course is offered:	2nd level /1st semester				
5	Pre –requisite (if any):	None				
6	Co –requisite (if any):	None				
7	Program (s) in which the course is offered:	Bachelor of Pharmacy				
8	Language of teaching the course:	English				
9	The department in which the course is offered:	Department of Pharmacognosy				
10	Location of teaching the course:	Faculty of Pharmacy				
11	Prepared by:	Dr. Bushra Moharam				
12	Date of approval:					

II. Course description:

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It is an introduction to the scientific study of plant life. This course is to evaluate and understand plant physiology processes, forms, reproduction, morphology and anatomy and how higher plants named and classified. Students will have a basic information in Botany (e.g. Systematic Botany; Plant Morphology and Anatomy and Plant Physiology) with special attention to the pharmaceutical importance of various organisms belonging to plant kingdom. This course will enable students to learn about the biology of medicinal plants, and gain insight as to what makes them useful in treating diseases.

I. Intended learning outcomes (ILOs) of the course:

1. Describe the characters of plant cell and different tissues and organs and list the differences between their structures.
2. Explain terminology, nomenclature and classification system in general botany.
3. Explain main concepts of taxonomy
4. Describe different macroscopical and microscopical characters of different medicinal plant parts (e.g. roots, stems, leaves, flowers and fruits) with their pharmaceutical importance
5. Draw parts of plant (leave, flower, seeds, fruits…etc)
6. Recognize the different pathways and metabolism present in plant
7. Distinguish different plant cell types, plant tissues and apply acquired knowledge to identify different plant tissues and organs based on anatomical characters.
8. Classify plant samples according to their morphological and anatomical characters.
9. Identify different cells and its function.
10. Assess the relevance and importance of plant morphology characters to plant identification
11. Handle and dispose chemicals safely
12. Manipulate pharmaceutical instruments and equipment safely and efficiently (microscopes, pipettes, slides and cover slips, ……etc.)
13. Integrate different morphological and anatomical aspects to conclude a scientific classification of plants
14. Apply acquired information to describe morphological characters of real life samples.
15. Apply information technology skills to prepare complete and clear scientific report.
16. Work effectively as a part of a team and independently to perform the required tasks.
17. Develop information technology (IT) skills
18. Acquire effective time-management skills

II. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, chemical, social, behavioral, health and tissues and organs and their structures.	**a1-**	Describe the characters of plant cell and different clinical, pharmaceutical sciences. and list the differences between
A4-	Recognize the pharmaceutical dosage form formulations according to GMP and the **a4** Describe different macroscopical and microscopical characters of different medicinal plant parts (e.g. roots, stems, leaves, flowers and fruits) with their pharmaceutical importance	**a2-**	Explain terminology, nomenclature and classification design and the quality control of pharmaceutical system in general botany, ~~concepts of taxonomy pharmacopeial requirements to support~~ pharmaceutical industries and research.
		a5	Draw parts of plant (leave, flower, seeds, fruits…etc)
		a6	Recognize the different pathways and metabolism present in plant

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:			
a1-	Describe the characters of plant cell and	Lectures, Practical work, Tutorial	Quizzes, Written exam, homework, participation

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different tissues and organs and list the and Micro assignment and differences between their structures. report.

a2- Recognize the importance of taxonomy in identification and classification of medicinal plants.

a3- Explain main concepts of taxonomy **a4** Describe different macroscopical and microscopical characters of different medicinal plant parts (e.g. roots, stems, leaves, flowers and fruits) with their pharmaceutical importance **a5** Draw parts of plant (leave, flower, seeds, fruits…etc)

a6 Recognize the different pathways and metabolism present in plant

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Distinguish different plant cell types, plant tissues and apply acquired knowledge to identify different plant tissues and organs based on anatomical characters.
		b2-	Classify plant samples according to their morphological and anatomical characters.
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b3-**	Identify different cells and its function.
		b4	Assess the relevance and importance of plant morphology characters to plant identification

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Discussions, Solving Problem methods	Quizzes, Written exam, homework, participation and report
b1-	Distinguish different plant cell types, plant tissues and apply acquired knowledge to identify different plant tissues and organs based on anatomical characters.		
b2-	Classify plant samples according to their morphological and anatomical characters.		
b3-	Identify different cells and its function.		
b4	Assess the relevance and importance of plant morphology characters to plant identification		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	c1-	Handle and dispose chemicals safely
		c2-	Manipulate pharmaceutical instruments and equipment safely and efficiently (microscopes, pipettes, slides and cover slips, ……etc.)
		c3	Integrate different morphological and anatomical aspects to conclude a scientific classification of plants

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C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c4**	Apply acquired information to describe morphological characters of real life samples.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures ,Laboratory work, independent study and Group assignments.	Practical works, practical reports and presentations based on their experimental work.
c1-	Handle and dispose chemicals safely		
c2-	Manipulate pharmaceutical instruments and equipment safely and efficiently (microscopes, pipettes, slides and cover slips, ……etc.)		
c3	Integrate different morphological and anatomical aspects to conclude a scientific classification of plants		
c4	Apply acquired information to describe morphological characters of real life samples.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Apply information technology skills to prepare complete and clear scientific report.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2**	Work effectively as a part of a team and independently to perform the required tasks.
		d3	Develop information technology (IT) skills

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		d4	Acquire effective time-management skills

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, small group discussions, practical classes and micro assignments	Reports, presentations and communication with the lecturer and his colleagues.
d1-	Apply information technology skills to prepare complete and clear scientific report.		
d2	Work effectively as a part of a team and independently to perform the required tasks.		
d3	Develop information technology (IT) skills		
d4	Acquire effective time-management skills		

III. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

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1	Introduction	a1, d1-4	Introduction to botany Classification of the Plant Kingdom	1	2
2	Plant Morphology	a1,a5, a6, b2, b4, c3, c4, d1-4	- Seed and seed germination. - Full morphological description of roots, stems and leaves; and their modifications.	3	6
3	Histology	a1, a2, a4, a5, a6, b2, b3, d1-4	- Cell and other cell content - Tissue system - Anatomy of root in di and monocotyledons - Anatomy of stem in di and monocotyledons - Anatomy of leaves in di and monocotyledons	3	6
4	Midterm exam	a1-2, a4-6		1	2
5	Plant Physiology	a1,a4, d1-4	- Enzymes, "Plant pigments and photosynthesis. -Respiration, metabolism of carbohydrates, fats and nitrogen (different metabolic pathways). -Secondary metabolites.	4	8
6	Taxonomy of the flowering plants	a1, a3, b1, d1-4	- Principles of Plant systematic and Nomenclature. - Flower, inflorescence, fruits and study the characteristic features of	3	6

			some important families of monocot- and dicotyledonous plants. -Demonstration of some representatives with special reference to their pharmaceutical importance.		
7	Final exam	a1-6		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Morphology -Diversity of plant life -Parts of flowing plants: seed - Stem Leaves-Flowers -Fruits -Root and Rhizomes	c1-4	3	6
2	Histology -Cell and other cell content - Tissue system - Anatomy of root in di and monocotyledons - Anatomy of stem in di and monocotyledons - Anatomy of leaves in di and monocotyledons	c1-4	3	6

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3	Midterm exam	c1-4	1	2
4	Physiology of plants - Nutrition	c1-4	2	
	-Respiration - Photosynthesis - Transpiration -Metabolism			4
5	Taxonomy - Division and general description - Virus - Bacteria - Fungi - Algae - Bryophyte - Betrediophytes - Gymnosperms - Angiosperms - Selected families of dicotyledons - Selected families of monocotyledons	c1-4	4	8
6	Revision	c1-4	2	4
7	Final exam	c1-4	1	2
Number of Weeks /and Units Pr Semester			**16**	**32**

IV. Teaching strategies of the course:

Lectures, Practice session, Small group discussions, Tutorials and Practical classes

-Assessment Methods:

Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations

-

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V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance ,Participation and quizzes, Oral Tests and Homeworkassignments**	**1-16**	**20**	13%	a2,a5,b1,b2
2	**Attendance, Practical Reports and Practical mid-semester exam**	7-16	30	20%	c1-4
3	**Theoretical Mid-semester exam**	**8**	30	20%	a1-6, b1-4
5	**Final Exam (practical)**	**16**	20	13%	c1-4
6	**Final Exam (Theoretical)**	**16**	50	33%	a1-6, b1-4
	Total		**150**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- **Heber Wilkinson Youngken. 2010. Pharmaceutical Botany:** A Text-Book for Students of Pharmacy and Science. Creative Media Partners, LLC.
- James D. Mauseth. 2012. Botany: An introduction to plant biology. 5th ed. Jones & Bartlett Publishers ; USA press.

2- Recommended Readings and Reference Materials

1- Janice Glimn-Lacy, Peter B. Kaufman. 2006. Botany Illustrated: Introduction to Plants, Major Groups Flowering Plant Families. 2nd ed. Springer ; USA 2- Lectures Notes and Practical Manual.

3- Essential References

4- Electronic Materials and Web Sites *etc*.

1. http/www.Phytomania.org.
2. http/www.medicalbotanyintroduction.html.
3. http/www.botanical.com
4. http://www.pubmed.com

Planta Medica, Journal of natural products

5- Other Learning Material:

-

VIII. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

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IX. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three
	weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Medicinal Botany

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Bushra Moharam	Office Hours					
Location & Telephone No.	730010755	SAT	SUN	MON	TUE	WED	THU
E-mail	bushramoharam@yahoo.com	1		1			

II. Course Identification and General Information:			
1-	Course Title:	Medicinal Botany	
2-	Course Number & Code:	Ph331	
3-	Credit hours:	C.H	Total

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		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	2nd level /1st semester				
5-	**Pre –requisite (if any):**	None				
6-	**Co –requisite (if any):**	None				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III. Course Description:

It is an introduction to the scientific study of plant life. This course is to evaluate and understand plant physiology processes, forms, reproduction, morphology and anatomy and how higher plants named and classified. Students will have a basic information in Botany (e.g. Systematic Botany; Plant Morphology and Anatomy and Plant Physiology) with special attention to the pharmaceutical importance of various organisms belonging to plant kingdom. This course will enable students to learn about the biology of medicinal plants, and gain insight as to what makes them useful in treating diseases.

IV. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

1. Describe the characters of plant cell and different tissues and organs and list the differences between their structures.
2. Explain terminology, nomenclature and classification system in general botany.
3. Explain main concepts of taxonomy
4. Describe different macroscopical and microscopical characters of different medicinal plant parts (e.g. roots, stems, leaves, flowers and fruits) with their pharmaceutical importance
5. Draw parts of plant (leave, flower, seeds, fruits…etc)
6. Recognize the different pathways and metabolism present in plant
7. Distinguish different plant cell types, plant tissues and apply acquired knowledge to identify different plant tissues and organs based on anatomical characters.
8. Classify plant samples according to their morphological and anatomical characters.
9. Identify different cells and its function.
10. Assess the relevance and importance of plant morphology characters to plant identification
11. Handle and dispose chemicals safely
12. Manipulate pharmaceutical instruments and equipment safely and efficiently (microscopes, pipettes, slides and cover slips, ……etc.)
13. Integrate different morphological and anatomical aspects to conclude a scientific classification of plants
14. Apply acquired information to describe morphological characters of real life samples.
15. Apply information technology skills to prepare complete and clear scientific report.
16. Work effectively as a part of a team and independently to perform the required tasks.
17. Develop information technology (IT) skills
18. Acquire effective time-management skills

I. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Introduction	a1, d1-4	Introduction to botany Classification of the Plant Kingdom	1	2
2	Plant Morphology	a1,a5, a6, b2, b4, c3, c4, d1-4	- Seed and seed germination. - Full morphological description of roots, stems and leaves; and their modifications.	2-4	6
3	Histology	a1, a2, a4, a5, a6, b2, b3, d1-4	- Cell and other cell content - Tissue system - Anatomy of root in di and monocotyledons - Anatomy of stem in di and monocotyledons - Anatomy of leaves in di and monocotyledons	5-7	6
4	Midterm exam	a1-2, a4-6		8	2
5	Plant Physiology	a1,a4, d1-4	- Enzymes, "Plant pigments and photosynthesis. -Respiration, metabolism of carbohydrates, fats and nitrogen (different metabolic pathways). -Secondary metabolites.	9-12	8

6	Taxonomy of the flowering plants	a1, a3, b1, d1-4	- Principles of Plant systematic and Nomenclature. - Flower, inflorescence, fruits and study the characteristic features of	13-15	6
			some important families of monocot- and dicotyledonous plants. -Demonstration of some representatives with special reference to their pharmaceutical importance.		
7	Final exam	a1-6		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Week Due	Contact hours
1	Morphology -Diversity of plant life -Parts of flowing plants: seed - Stem Leaves-Flowers -Fruits -Root and Rhizomes	c1-4	1-3	6

2	Histology -Cell and other cell content - Tissue system - Anatomy of root in di and monocotyledons - Anatomy of stem in di and monocotyledons - Anatomy of leaves in di and monocotyledons	c1-4	4-6	6
3	Midterm exam	c1-4	7	2
4	Physiology of plants - Nutrition	c1-4	8,9	
	-Respiration - Photosynthesis - Transpiration -Metabolism			4
5	Taxonomy - Division and general description - Virus - Bacteria - Fungi - Algae - Bryophyte - Betrediophytes - Gymnosperms - Angiosperms - Selected families of dicotyledons - Selected families of monocotyledons	c1-4	10-13	8
6	Revision	c1-4	14,15	4
7	Final exam	c1-4	16	2
Number of Weeks /and Units Pr Semester			**16**	**32**

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V. Teaching strategies of the course:

Lectures, Practice session, Small group discussions, Tutorials and Practical classes

VI. Assessment Methods:

Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	**Attendance ,Participation and quizzes, Oral Tests and**	**1-16**	**20**	13%
	Homework-assignments			
2	**Attendance, Practical Reports and Practical mid-semester exam**	7-16	30	20%
3	**Theoretical Mid-semester exam**	**8**	30	20%
5	**Final Exam (practical)**	**16**	20	13%
6	**Final Exam (Theoretical)**	**16**	50	33%
	Total		**150**	**100%**

VII. Learning Resources:

1- Required Textbook(s) (maximum two).

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	Heber Wilkinson Youngken. 2010. Pharmaceutical Botany: A Text-Book for Students of Pharmacy and Science. Creative Media Partners, LLC. James D. Mauseth. 2012. Botany: An introduction to plant biology. 5th ed. Jones & Bartlett Publishers ; USA press.
2- Essential References.	
3- Electronic Materials and Web Sites *etc.*	
	1. http/www.Phytomania.org. 2. http/www.medicalbotanyintroduction.html. 3. http/www.botanical.com 4. http://www.pubmed.com Planta Medica, Journal of natural products

IX. Course Policies:

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Organic Chemistry III

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Organic Chemistry III				
2	**Course Number & Code:**	Ph545				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	2nd Level /2nd semester				
5	**Pre –requisite (if any):**	General Pharmaceutical Chemistry & Pharmaceutical Organic Chemistry I				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy-Sana`a University				
11	**Prepared by:**	Dr. Mokhtar A. Al-Ghorafy				
12	**Date of approval:**					

II. Course description:

This course provides students with the fundamental knowledge of stereochemistry and heterocyclic compounds including the nomenclatures, properties, synthesis, chemical reactions and the pharmaceutical application of these compounds. The practical part includes the preparation of some stereochemical models and synthesis of some heterocyclic compounds.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Understand the basic principles of Stereochemistry of organic compounds.
2. Recognize the nomenclatures and the fundamental concepts of heterocyclic compounds.
3. Understand f the chemical and physical properties of heterocyclic compounds.
4. Outline the synthesis and chemical reactions of some heterocyclic compounds.
5. Recognize the importance and applications of stereochemistry and heterocyclic compounds in pharmacy fields.
6. Differentiate between chiral and non-chiral compounds
7. Suggest the suitable methods for synthesizing heterocyclic compounds of pharmaceutical interest.
8. Correlate the structure of heteroaromatic organic molecules with their effect on the biological activity.
9. Correlate the stereochemistry of pharmaceutical compounds to their importance in activity.
10. Use laboratory reagents adequately and safely
11. Synthesize and purify some heterocyclic compounds as starting material for synthesis of some drugs.
12. Design some models that facilitate the understanding of stereochemistry of organic compounds.
13. Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.
14. Search and evaluate the literature from different sources including the library, internet ….etc.
15. Manage, organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students would be able to:	After participating in the course, students would be able to:

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and	**a1-**	Understand the basic principles of Stereochemistry of organic compounds
	pharmaceutical sciences.	**a2-**	Recognize the nomenclatures and the fundamental concepts of heterocyclic compounds.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a3-**	Understand the chemical and physical properties of heterocyclic compounds.
		a4-	Outline the synthesis and chemical reactions of some heterocyclic compounds.
		a5-	Recognize the importance and applications of Stereochemistry and heterocyclic compounds in pharmacy fields.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Understand the basic principles of Stereochemistry of organic compounds	Lecture method , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Recognize the nomenclatures and the fundamental concepts of heterocyclic compounds.		
a3-	Understand the chemical and physical properties of heterocyclic compounds.		
a4-	Outline the synthesis and chemical reactions of some heterocyclic compounds.		
a5-	Recognize the importance and applications of Stereochemistry and heterocyclic compounds in pharmacy fields.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Differentiate between chiral and non-chiral compounds
		b2-	Suggest the suitable methods for synthesizing heterocyclic compounds of pharmaceutical interest.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Correlate the structure of heteroaromatic organic molecules with their effect on the biological activity.
		b4-	Correlate the stereochemistry of pharmaceutical compounds to their importance in activity.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Differentiate between chiral and non-chiral compounds	Lecture method, Computer based teaching and learning Group Discussion, brainstorming and Problem solving sessions	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Suggest the suitable methods for synthesizing heterocyclic compounds of pharmaceutical interest.		
b3-	Correlate the structure of heteroaromatic organic molecules with their effect on the biological activity.		

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b4-	Correlate the stereochemistry of pharmaceutical compounds to their importance in activity.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	c1-	Use laboratory reagents adequately and safely.
		c2-	Synthesize and purify some heterocyclic compoun starting material for synthesis of some drugs.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	c3-	Design some models that facilitate the understandi stereochemistry of organic compounds.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Use laboratory reagents adequately and safely.	Lecture method, Practical sessions and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Synthesize and purify some heterocyclic compounds a starting material for synthesis of some drugs.		
c3-	Design some models that facilitate the understanding of stereochemistry of organic compounds.		

(D) General / Transferable Skills:

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Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Search and evaluate the literature from different sources including the library, internet ….etc
		d3-	Manage, organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.	Small group discussions, Tutorials and Practical sessions.	Homework, and reports.
d2-	Search and evaluate the literature from different sources including the library, internet ….etc		
d3-	Manage, organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry		

I. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	Stereochemistry	a1, a5,b1,b4, d1-3.	- Definition, aim of study, classification - Chirality - Structural isomerism - Rotational isomerism - Geometrical isomerism - Optical isomerism - Effect of stereochemistry in medicine - Important of chrality in drug design	4	8
2.	Five membered heterocyclic compounds	a2-5, b2-3, d1-3	- Nomenclatures - Properties of Five membered heterocyclic containing One heteroatom (Pyrrole, Furan, Thiophen), Monocyclic five membered Rings Containing two heteroatoms (Imidazole, Oxazole, Thiazole, Pyrazole,…….) - Pharmaceutical importance of heterocyclic compounds	3	6
3.	**Mid Exam**	a1-5, b1-4		1	2

4.	Six membered heterocyclic compounds	a2-5, b2-3, d1-3	- Nomenclatures - Properties of Monocyclic six membered Rings Containing One or More Heteroatoms) Pyrrroline, Pyrrolidine, Pyridine, Pyrimidine,…….) - Nomenclatures - Properties of Six-membered Heterocyclic Compounds with One Oxygen as a Heteroatom (-Pyran, - Pyran, - Pyrone, - Pyrone and Their Derivatives) - Pharmaceutical importance of heterocyclic compounds	3	6
5.	Hetereocyclic compounds containing two or	a2-5, b2-3, d1-3	Nomenclatures of Bicyclic Rings Containing One or More Heteroatoms (Purine, Quinoline, Isoquinoline, Coumarin, Benzimidazole,	3	6
	more rings		acridine,Carbazole,……), The physical and chemical characters -Pharmaceutical importance of heterocyclic compounds		
6.	Seven membered heterocyclic compounds	a2-5, b2-3, d1-3	- Nomenclatures - The physical and chemical characters - Pharmaceutical importance of heterocyclic compounds	1	2
7.	**Final Exam**	a1-5, b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1.	Design stereochemical models for some organic compounds and drugs	**c1,c3,d1-3**	4	8
2.	Synthesis of hexamine	**c1-2,d1-3**	1	2
3.	Synthesis of Quinazolinone from Anthranilic Acid	**c1-2,d1-3**	2	4
4.	Mid-Exam	**c1-3**	1	2

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5.	Synthesis of 1,4- Dihydro Pyridine from Ethyl Acetoacetate	**c1-2,d1-3**	1	2
6.	Synthesis of Antipyrine from Ethylacetoacetate	**c1-2,d1-3**	1	2
7.	Synthesis of Benzimidazole from Ortho-Phenylene Diamine	**c1-2,d1-3**	2	4
8.	Synthesis of 7-Hydroxy- 4-Methyl Coumarin from Resorcinol	**c1-2,d1-3**	2	4
9.	**Revision**	**c1-3**	1	2
10.	Final Exam	**c1-3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VII. a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions**,** tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
	Homework Assignments	a1, a2, a5, b1, b4, d1-3	Sporadic through the semester	**10**
	Reports	c1-3, d1-3		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a2,a3,a5, c1, b2,b3, d1-3

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	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a1, a2, a5, b1, b4, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	20%	c1-3
3	**Theoretical mid-semester exam**	8th	30	20%	a1-5, b1-4
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-4
6	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- A. R. Katritzky and J. M. Lagowski, 2010, 'The text Heterocyclic Chemistry' Third edition. Elsevier, Amsterdam.

2- R. T. Morrison and R. N. Boyd. 2002. Organic Chemistry, 6th edition, Pearson Prentice Hall of India Pvt. Ltd, New Delhi.

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2- Recommended Books and Reference Materials.

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3. John McMurry. 2011, " Fundamentals of Organic Chemistry " Seventh Edition, Brooks/Cole 20 Davis Drive, Belmont.
4. Jerry and March,. 2007,. Advanced Organic Chemistry ; reaction, mechanism and structure, 6th edition, John Wiley & Sons, Inc., Hoboken, New Jersey
5. Janice Gorzynski Smith. 2011,." Organic Chemistry", Third Edition, McGraw-Hill, a business unit of The McGraw-Hill Companies, New York.
6. K.-H. Hellwich · C. D. Siebert, "Stereochemistry Workbook" 2006, Springer-Verlag Berlin Heidelberg , Berlin.

1. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1- http://www.chemaxon/marvin 2-
www.orgsyn.org.
3-

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback
	▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Organic Chemistry III

I- Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Dr. Mokhtar A. Al-Ghorafy						
Location & Telephone No.	770010749	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Alghorafi2030@yahoo.com	2h					

II- Course Identification and General Information:

1-	**Course Title:**	Pharmaceutical Organic Chemistry III				
2-	**Course Number & Code:**	Ph545				
3-	**Credit hours:**	**C.H**				**C.H Th.**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2		**2**		**2**
4-	**Study level/year at which this course is offered:**	2nd Level /2nd semester				
5-	**Pre –requisite (if any):**	General Pharmaceutical Chemistry , Pharmaceutical Organic Chemistry I&II				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				

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9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

This course provides students with the fundamental knowledge of stereochemistry and heterocyclic compounds including the nomenclatures, properties, synthesis, chemical reactions and the pharmaceutical application of these compounds. The practical part includes the preparation of some stereochemical models and synthesis of some heterocyclic compounds.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Understand the basic principles of Stereochemistry of organic compounds.
2. Recognize the nomenclatures and the fundamental concepts of heterocyclic compounds.
3. Understand f the chemical and physical properties of heterocyclic compounds.
4. Outline the synthesis and chemical reactions of some heterocyclic compounds.
5. Recognize the importance and applications of stereochemistry and heterocyclic compounds in pharmacy fields.
6. Differentiate between chiral and non-chiral compounds
7. Suggest the suitable methods for synthesizing heterocyclic compounds of pharmaceutical interest.
8. Correlate the structure of heteroaromatic organic molecules with their effect on the biological activity.
9. Correlate the stereochemistry of pharmaceutical compounds to their importance in activity.
10. Use laboratory reagents adequately and safely
11. Synthesize and purify some heterocyclic compounds as starting material for synthesis of some drugs.
12. Design some models that facilitate the understanding of stereochemistry of organic compounds.
13. Collaborate effectively in groups to solve some problems encountered in pharmaceutical organic chemistry.
14. Search and evaluate the literature from different sources including the library, internet ….etc.
15. Manage, organize the time effectively and implement writing and presentation skills to explore the importance of aromatic compounds in pharmaceutical industry.

V- Course Content:					
1 – Course Topics/Items:					
a – Theoretical Aspect					
Order	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Week Due**	**Contact hours**
1-	Stereochemistry	a1, a5,b1,b4, d13.	- Definition, aim of study, classification - Chirality - Structural isomerism - Rotational isomerism - Geometrical isomerism - Optical isomerism - Effect of stereochemistry in medicine - Important of chrality in drug design	1-4	8
2-	Five membered heterocyclic compounds	a2-5, b2-3, d1-3	- Nomenclatures - Properties of Five membered heterocyclic containing One heteroatom (Pyrrole, Furan, Thiophen), Monocyclic five membered Rings Containing two heteroatoms (Imidazole, Oxazole, Thiazole, Pyrazole,…….) - Pharmaceutical importance of heterocyclic compounds	5-7	6
3-	**Mid Exam**	a1-5, b1-4		8	2

4-	Six membered heterocyclic compounds	a2-5, b2-3, d1-3	- Nomenclatures - Properties of Monocyclic six membered Rings Containing One or More Heteroatoms) Pyrrroline, Pyrrolidine, Pyridine, Pyrimidine,…….) - Nomenclatures - Properties of Six-membered Heterocyclic Compounds with One Oxygen as a Heteroatom (-Pyran, -Pyran, - Pyrone, -Pyrone and Their Derivatives) - Pharmaceutical importance of heterocyclic compounds	9-11	6
5-	Hetereocyclic	a2-5, b2-3, d1-3	Nomenclatures of Bicyclic Rings Containing	12-14	6
	compounds containing two or more rings		One or More Heteroatoms (Purine, Quinoline, Isoquinoline, Coumarin, Benzimidazole, acridine,Carbazole,……), The physical and chemical characters -Pharmaceutical importance of heterocyclic compounds		
6-	Seven membered heterocyclic compounds	a2-5, b2-3, d1-3	- Nomenclatures - The physical and chemical characters - Pharmaceutical importance of heterocyclic compounds	15	2
7-	**Final Exam**	a1-5, b1-4		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
11.	Design stereochemical models for some organic compounds and drugs	**c1,c3,d1-3**	1-4	8
12.	Synthesis of hexamine	**c1-2,d1-3**	5	2
13.	Synthesis of Quinazolinone from Anthranilic Acid	**c1-2,d1-3**	6,7	4
14.	Mid-Exam	**c1-3**	8	2

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15.	Synthesis of 1,4- Dihydro Pyridine from Ethyl Acetoacetate	**c1-2,d1-3**	9	2
16.	Synthesis of Antipyrine from Ethylacetoacetate	**c1-2,d1-3**	10	2
17.	Synthesis of Benzimidazole from Ortho-Phenylene Diamine	**c1-2,d1-3**	11,12	4
18.	Synthesis of 7-Hydroxy- 4-Methyl Coumarin from Resorcinol	**c1-2,d1-3**	13,14	4
19.	**Revision**	**c1-3**	15	2
20.	Final Exam	**c1-3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions**,** tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII- Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
	Homework Assignments	a1, a2, a5, b1, b4, d1-3	Sporadic through the semester	**10**
	Reports	c1-3, d1-3		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a2,a3,a5, c1, b2,b3, d1-3

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	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a1, a2, a5, b1, b4, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	20%	c1-3
3	**Theoretical mid-semester exam**	8th	30	20%	a1-5, b1-4
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-4
6	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X- Learning Resources:

1- Required Textbook(s) (maximum two).

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6- R. T. Morrison and R. N. Boyd. 2002. Organic Chemistry, 6th edition, Pearson Prentice Hall of India Pvt. Ltd, New Delhi.

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8- Michael Heidelberger. 1923. Advanced Laboratory Manual of Organic Chemistry, The chemical catalog company, inc. New York.

2- Recommended Books and Reference Materials.

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2. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

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XI- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII- **Course Improvement Processes:**

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

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9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII- Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Analytical Chemistry II

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Analytical Chemistry II				
2	**Course Number & Code:**	Ph546				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	2nd level / 2nd semester				
5	**Pre –requisite (if any):**	Pharmaceutical Analytical Chemistry I				
6	**Co –requisite (if any):**	-				
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy				
11	**Prepared by:**	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen				

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12	**Date of approval:**	

II. Course description:

The course is concerned with the fundamental knowledge about the basic principles of pharmacopiae and application of statistics in analysis of pharmaceutical substances. The analysis of water, cosmotic, fats and lipids is also demonestrated. The course will also cover the applications of these methods to pharmaceutical compounds.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principle of pharmacopeia and their classification.
2. Describe the different methods of water analysis.
3. Recognize the suitable method for the analysis of cosmetics and samples of an oil or fat fat and examples for gravimetric methods..
4. Identify the required calculations that are used in drugs analysis.
5. Select the different methods for water analysis.
6. Propose the accurate and precise method for the analysis of cosmetics, lipids, fats and examples for gravimetric methods
7. Determine the suitable statistical method for the experimental data
8. Operate different pharmaceutical instrument and equipment in the lab.
9. Practice the analysis of water, cosmetics, lipids, fats and some examples for gravimetric methods.
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Communicate and cooperate effectively with the others as a team work to perform the report on the results of the method of analysis.
12. Apply the information technology skills, such as word processing and internet communication and online searches.
13. Manage the time in an work effectively.

IV. Intended learning outcomes (ILOs) of the course:

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(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral,	a1-	Recognize the basic principle of pharmacopeia and their classification.
	health and pharmaceutical sciences.	a2-	Describe the different methods of water analysis.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a3-	Recognize the suitable method for the analysis of cosmetics and samples of an oil or fat and examples for gravimetric methods.
		a4-	Identify the required calculations that are used in drugs analysis.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the basic principle of pharmacopeia and their classification.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
a2-	Describe the different methods of water analysis.		
a3-	Recognize the suitable method for the analysis of cosmetics and samples of an oil or fat and examples for gravimetric methods.		

a4-	Identify the required calculations that are used in drugs analysis.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the	**b1-**	Select the different methods for water analysis.
	pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.		
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Propose the accurate and precise method for the analysis of cosmetics, lipids, fats and examples for gravimetric methods.
		b3-	Determine the suitable statistical method for the experimental data

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (CILOs) in* Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Select the different method for water analysis.		

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د. يحيى الدخين ا.د. محمود البريهي ا.م.د.توفيق العبيدي د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس د. محمد عباس

b2-	Propose the accurate and precise method for the analysis of cosmetics, lipids,fats and examples for gravimetric methods.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
b3-	Determine the suitable statistical method for the experimental data.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Operate different pharmaceutical instrument and equipment in the lab.
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c2-**	Practice the analysis of water, cosmetics, lipids, fats and some examples for gravimetric methods.
		c3-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.		
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
c1-	Operate different pharmaceutical instrument and equipment in the lab.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short answers and Written exam
c2-	Practice the analysis of water, cosmetics, fats and lipids and some example for gravimetric methods.		
c3-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.		

(D) General / Transferable Skills:			
Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.
D5- Apply information and communication technology and **d2-** Manage the time effectively in a team.			in an work effectively. working
		d3-	Apply the information technology skills, such as word processing and internet
			communication and online searches.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills	Teaching strategies/methods to be used.	Methods of assessment
After participating in the course, students would be able to:		
d1- Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short answers and Written exam
d2- Manage the time in an work effectively.		
d3- Apply the information technology skills, such as word processing and internet communication and online searches.		

V. Course Content:

1 – Course Topics/Items: a

– Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	**Gravimetric methods of drug analysis**	a2, b1, d1-3	-Principles of gravimetry, formation and properties of precipitates, factors affecting precipitation, precipitation from homogenous solution, washing, drying, & ignition of precipitate, organic precipitates -Types of Gravimetric Methods -Pharmaceutical Applications	2	4

2	**Statistics in pharmaceutical analytical chemistry**	a4, b3, d1-3	-Calculation of Accuracy, precision, median, range - Calculation of Correlation coefficient and slope and intercept	2	4
3	**Pharmacopoeia**	a1, d1-3	Official, regional and national pharmacopoeia	2	4
4	**Quality control of water**	a2, b1, d1-3	-Introduction and definitions -Types of water -Methods of water treatment -Water analysis; methods Classification of methods of analysis of water: Physical examination of water: Examination of physical properties of water Chemical examination of water: Analysis of chemical content of water and limits Biological examination of water : Analysis of biological content of water and limits	2	4
5	**Midterm exam**	a1-4		1	2
6	**Analysis of cosmotics**	a3, b2, d1-3	-Types and classification -Methods of analysis of cosmotics	3	6
7	**Analysis of fats, lipids; definitions**	a3, b2, d1-3	Types and classification of fats and lipids Methods of analysis of lipids and fats	3	6
8	**Final Exam**	a1-4, b1, b2		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

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Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	**Examples for Gravimetric analysis**	c1,c2 , c3	1	2
1	**Quality control of water:** a- Physical examination of water: Examination of physical properties of water b- examination of water: Analysis of chemical content of water and limits c- Biological examination of water : Analysis of biological content of water and limits	c1,c3 , c3	4	8
2	**Analysis of cosmetics.**	c1,c2 , c3	3	6
3	Mid-Exam	**c1,c2, c3**	1	2
7	**Chemical Analysis of oils and fats** a- **Determination of Acid Value** b- **Saponification Value** c- **Ester Value** d- **Iodine Value** e- **Thiocyanogen Value** f- **Rancidity of oils and fats**	**c1,c2, c3**	6	12
16	Final Exam	**c1-3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures method, Practice session, Discussions, Small group discussions and Tutorials

VII. Assignments:

- Homework
- Reports

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a2,a4,b1,b3, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a2, a3, b1-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	9th	30	20%	c1-3
3	**Theoretical mid-semester exam**	7th	30	20%	a1-4, b1, b2
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1, b2
6	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004.Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

2- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

1- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,
2- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.
3- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.
4- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.
5- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1. the Analyst;
2. J. Pharm. & Biomed. Anal.
3. J. Assoc. off Anal. Chem.
4. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)
5. The Analytical Forum on ChemWeb (http://analytical.
6. chemweb.com/search/search.exe)

I. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Analytical Chemistry II

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Pharmaceutical Analytical Chemistry II				
2-	Course Number & Code:	Ph546				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	2nd level /2nd semester				
5-	Pre –requisite (if any):	Pharmaceutical Analytical Chemistry I				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				

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11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

The course is concerned with the fundamental knowledge about the basic principles of pharmacopiae and application of statistics in analysis of pharmaceutical substances. The analysis of water, cosmotic, fats and lipids is also demonestrated. The course will also cover the applications of these methods to pharmaceutical compounds.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

14. Recognize the basic principle of pharmacopeia and their classification.
15. Describe the different methods of water analysis.
16. Recognize the suitable method for the analysis of cosmetics and samples of an oil or fat fat and examples for gravimetric methods..
17. Identify the required calculations that are used in drugs analysis.
18. Select the different methods for water analysis.
19. Propose the accurate and precise method for the analysis of cosmetics, lipids, fats and examples for gravimetric methods
20. Determine the suitable statistical method for the experimental data
21. Operate different pharmaceutical instrument and equipment in the lab.
22. Practice the analysis of water, cosmetics, lipids, fats and some examples for gravimetric methods.
23. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
24. Communicate and cooperate effectively with the others as a team work to perform the report on the results of the method of analysis.
25. Apply the information technology skills, such as word processing and internet communication and online searches.
26. Manage the time in an work effectively.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours

1	**Gravimetric methods of drug analysis**	a2, b1, d1-3	-Principles of gravimetry, formation and properties of precipitates, factors affecting precipitation, precipitation from homogenous solution, washing, drying, & ignition of precipitate, organic precipitates -Types of Gravimetric Methods -Pharmaceutical Applications	1,2	4
2	**Statistics in pharmaceutical analytical chemistry**	a4, b3, d1-3	-Calculation of Accuracy, precision, median, range - Calculation of Correlation coefficient and slope and intercept	3,4	4
3	**Pharmacopoeia**	a1, d1-3	Official, regional and national pharmacopoeia	5,6	4
4	**Quality control of water**	a2, b1, d1-3	-Introduction and definitions -Types of water -Methods of water treatment -Water analysis; methods Classification of methods of analysis of water: Physical examination of water: Examination of physical properties of water Chemical examination of water: Analysis of chemical content of water and limits Biological examination of water : Analysis of biological content of water and limits	7,8	4
5	**Midterm exam**	a1-4		9	2
6	**Analysis of cosmotics**	a3, b2, d1-3	-Types and classification -Methods of analysis of cosmotics	10-12	6

7	**Analysis of fats, lipids; definitions**	a3, b2, d1-3	Types and classification of fats and lipids Methods of analysis of lipids and fats	13-15	6
8	**Final Exam**	a1-4, b1, b2		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	**Examples for Gravimetric analysis**	c1,c2 , c3	1	2
1	**Quality control of water:** d- Physical examination of water: Examination of physical properties of water e- examination of water: Analysis of chemical content of water and limits f- Biological examination of water : Analysis of biological content of water and limits	c1,c3 , c3	2,5	8
2	**Analysis of cosmetics.**	c1,c2 , c3	6-8	6
3	Mid-Exam	**c1,c2, c3**	9	2
7	**Chemical Analysis of oils and fats**	**c1,c2, c3**	10-15	12

	g- **Determination of Acid Value** h- **Saponification Value** i- **Ester Value** j- **Iodine Value** k- **Thiocyanogen Value** l- **Rancidity of oils and fats**			
16	Final Exam	**c1-3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- Teaching strategies of the course:

Lectures method, Practice session, Discussions, Small group discussions and Tutorials

VII- Assignments:

- Homework
- Reports

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a2,a4,b1,b3, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	10	7%	a2, a3, b1-3, d1-3

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2	**Attendance, Practical Reports and Practical mid-semester exam**	9th	30	20%	c1-3
3	**Theoretical mid-semester exam**	7th	30	20%	a1-4, b1, b2
5	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1, b2
6	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

U

X- Learning Resources:

1- Required Textbook(s) (maximum two).

3- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004.Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

4- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

6- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,

7- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.

8- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.

9- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.

10- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

7. the Analyst;
8. J. Pharm. & Biomed. Anal.
9. J. Assoc. off Anal. Chem.
10. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPageAsp.cfm)
11. The Analytical Forum on ChemWeb (http://analytical.
12. chemweb.com/search/search.exe)

III. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Physiology II

I. General information about the course :

1.	Course Title:	Physiology II				
2.	Course Code and Number :	Ph444				
3.	Credit Hours :	Lecture	Seminar/Tutorial	Practical	Training	Total
		2	-----	-	----	2
4.	Study Level and Semester:	2nd level, 2nd semester				
5.	Pre-requisites (if any):	Physiology I				
6.	Co-requisites (if any) :	NA				
7.	Program in which the course is offered	Bachelor of Pharmacy				
8.	Teaching Language:	English				
9.	Location of teaching the course:	Faculty of Pharmacy				
10.	Prepared by :	Dr. sadeq abdulmogny				
11.	Approval date :					
12.	Approved by:					

II. Course Description:

Physiology II is a continuation of Physiology. This course examines the function relationships of the cardiovascular system, lymph and lymphatic system, introduction to respiratory system, functional anatomy of the kidneys, functions of kidneys, introduction to reproductive system, menstrual cycle, introduction to central nervous system, physiology of pain.

III. Course Aims

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عبدالمغني	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Upon successful completion of this course, the student will be able to:

1- Describe and identify the major functions of the cardiovascular system and the physiological mechanism of ECG. 2- Describe the function of each organ of the respiratory system and explain how oxygen and carbon dioxide are transported to and from the tissues of the body.

3- Identify the major organs of the urinary system and how the products of kidney are secreted and excreted and how water and electrolyte balance is maintained.

4- Describe and identify the major glands of the endocrine system.

5- Describe the general functions of the male and female reproductive systems and the hormones that control oogenesis and spermatogenesis.

6- Describe the central nervous system, physiology of pain.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.
2. Describe basal metabolism, metabolic rate and factors affecting it, and homeostasis.
3. Distinguish between physiological and pathological performance of body cells.
4. Integrate physiology with other sciences..
5. Discuss the general body composition and function.
6. Choose and classify data obtained from physiological experiments.
7. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day
8. Communicate effectively with students by discussing the obtained results.

VI. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	**After completing this course, students would be able to:**
A1. Recognize the principles of physical, chemical, clinical, social, behavioral, health and Pharmaceutical sciences.	a1- Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.

A2. Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics ,pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	a2- Describe basal metabolism, metabolic rate and factors affecting it, and homeostasis.

Intellectual Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Intellectual Skills PILOs	**Intellectual Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**
B1. Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	b1- Distinguish between physiological and pathological performance of body cells.
B2. Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	b2- Integrate physiology with other sciences..

Professional and Practical Skills	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Professional and Practical Skills PILOs	**Professional and Practical Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**

C1. Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	c1- Discuss the general body composition and function.
C2. Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c2- Choose and classify data obtained from physiological experiments.

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	**Transferable (General) Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**
D1. Practice independent learning needed for continuous professional development	d1- Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day
D2. Employ proper documentation and filing systems in different pharmaceutical fields	d2- Communicate effectively with students by discussing the obtained results.

VII. Alignment of CILOs to Teaching and Assessment Strategies

First: Alignment of Knowledge and Understanding CILOs

Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
a1- Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.	Lectures Presentation	Quizzes
a2- Describe basal metabolism, metabolic rate and factors affecting it, and homeostasis.	Lectures	Quizzes

Second: Alignment of Intellectual Skills CILOs

Intellectual Skills CILOs	Teaching Strategies	Assessment Strategies

b1- Distinguish between physiological and pathological performance of body cells.	Lectures Assignments	Oral examinations Quizzes
b2- Integrate physiology with other sciences..	Lectures Brainstorming session	Quizzes Written examinations

Third: Alignment of Professional and Practical Skills CILOs		
Professional and Practical Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
c1- discuss the general body composition and function.	Brainstorming session	Micro-reports
c2 - Choose and classify data obtained from physiological experiments	Lectures Activation	Problem solving

Fourth: Alignment of Transferable (General) Skills CILOs		
Transferable (General) Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
d1- Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day	Lectures Activation	Micro-reports
d2- Communicate effectively with students by discussing the obtained.	Presentation Activation	Micro-reports

V. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents					
First: Theoretical Aspects					
No.	**Course Topics/Units**	**Sub-topics**	**No. of Weeks**	**Contact Hours**	**CILOs**

1	Introduction to cardiovascular system Heart and its properties Blood pressure	- Physiological anatomy, pulmonary and systemic circulation - Properties of cardiac muscle, introduction to ECG. - Heart sounds, cardiac cycle and cardiac output. - Blood pressure and factor determining and maintaining it.	2	4	a1, a2
2	Lymph system	Lymph and lymphatic: formation and functions.	1	2	a1, b1,b2
3	Introduction to respiratory system.	- Mechanism of respiration and lung compliance. - Exchange and transport of gases, regulation of respiration and hypoxia.	2	4	a1, a2 b1,b2
4	Midterm	———	1	2	all
5	The kidney and its units	Functional anatomy of the kidneys. Mechanisms of urine formation. Renal clearance and glomerular filtration rate (GFR). Regulation of acid-base balance by the kidneys.	2	4	a1, a2, b1,b2, c1, c2
6	Endocrine system	Introduction to endocrine system: endocrine glands and their functions.	2	4	a1, a2, b1,b2, c1, c2, d2
7	Reproductive system	Introduction to reproductive: male and female reproductive system. Menstrual cycle	2	4	a1, a2, b1,c1, c2, d1
	Central nervous system	Introduction to central nervous system. Physiology of pain.	1	2	a1, a2, b1,b2, c1, d1
8	Review		2	4	all

9	Final exam		1	2	all
Total number of weeks and hours			16	32	

VI. Learning Assessment:					
No.	**Assessment Tasks**	**Week due**	**Mark**	**Proportion of Final Assessment**	**Aligned CILOs**
1	**Homework/Tasks/Assignments**	3, 6, 8, 11	5	5%	a1, a2, b1, b2, d1, d2
2	**Quiz**	4	5	5%	a1, a2
3	**Midterm Exam**	7	20	20%	a1, a2, b1, b2,
5	**Final Exam**		70	70%	a1, a2, b1, b2
Total			100	100%	

V. Teaching Strategies
1- Lectures and presentation
2- Activation
3- micro-report
4- micro- assignments

I. Learning Resources :
(Author, (Year), Book Title, Edition, Publisher, Country of publishing)
Textbooks-not more than 2

1. Guyton and Hall, (2006), Text book of medical physiology, 11th Ed Mississippi Medical Center, Jackson, Mississippi, USA
2. Laurie Kelly, (2005), Essentials of Human Physiology for Pharmacy, 1st Ed. CRC Press, Pharmacy Education series

Essential References-not less than 4

1- Stuart Ira Fox, (2011), Textbook: Human Physiology, 13th Ed.
2- Thibodeah & patton (1999), Anatomy & Physiology, 5th Ed, Thieme Stuttgart, New York.
3- Barbara J. Bain and Rajeev Gupta, (2003), A–Z of Haematology 1st Ed. Blackwell Publishing Ltd. London.
4- Fox, (2010), Human Physiology, 10th Ed, McGraw-Hill companies
5- Human Physiology, the basis of medicine, (2006), 3rd Ed, Oxford university press.

Electronic Materials and Web Sites

1. www.csun.edu/science/biology/anatomy/anatomy.html
2. www.cliffsnotes.com
3. www.innerbody.com
4. www.anatomyandphysiology.com/
5. www.mhhe.com/biosci2/anatomyrevealed
6. www.le.ac.uk/pa/teach/va/anatomy

I. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة د .صادق
عبدالمغني	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة د .صادق
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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating**: ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism**: ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Physiology II

II. General information about the course instructor :							
Name	Dr Sadeq Saad Abdulomgny	Office Hours (2 Hours Weekly)					
Location & phone number	773609090	Sat	Sun	Mon	Tue	Wed	Thu
Email	asdhod@yahoo.com						

III. General information about the course :						
1.	Course Title:	Physiology II				
2.	Course Code and Number :	Ph444				
3.	Credit Hours :	Lecture	Seminar/Tutorial	Practical	Training	Total
		2	-----	-	----	2

الموصف عبدالمغني | نائب العميد لشؤون الجودة ا.د. محمود البريهي | رئيس القسم | عميد الكلية د.خالد الشوبة | عميدة مركز التطوير وضمان الجودة ا.م.د. هدى العماد | رئيس الجامعة د .صادق ا.د. القاسم محمد عباس

4.	**Study Level and Semester:**	**2nd level, 2nd semester**
5.	**Pre-requisites (if any):**	**Physiology I**
6.	**Co-requisites (if any)** :	**NA**
7.	**Program in which the course is offered**	**Bachelor of Pharmacy**
8.	**Teaching Language:**	**English**
9.	**System of Study:**	Semesters
10.	**Mode of delivery:**	Regular
11.	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

IV. Course Description:

Physiology II is a continuation of Physiology. This course examines the function relationships of the cardiovascular system, lymph and lymphatic system, introduction to respiratory system, functional anatomy of the kidneys, functions of kidneys, introduction to reproductive system, menstrual cycle, introduction to central nervous system, physiology of pain.

V. Course Aims

Upon successful completion of this course, the student will be able to:

1- Describe and identify the major functions of the cardiovascular system and the physiological mechanism of ECG. 2- Describe the function of each organ of the respiratory system and explain how oxygen and carbon dioxide are transported to and from the tissues of the body.

3- Identify the major organs of the urinary system and how the products of kidney are secreted and excreted and how water and electrolyte balance is maintained.

4- Describe and identify the major glands of the endocrine system.

5- Describe the general functions of the male and female reproductive systems and the hormones that control oogenesis and spermatogenesis.

6- Describe the central nervous system, physiology of pain.

VI. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.
2. Describe basal metabolism, metabolic rate and factors affecting it, and homeostasis.
3. Distinguish between physiological and pathological performance of body cells.
4. Integrate physiology with other sciences..
5. Discuss the general body composition and function.
6. Choose and classify data obtained from physiological experiments.
7. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day
8. Communicate effectively with students by discussing the obtained results.

VII. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents

First: Theoretical Aspects

No.	Course Topics/Units	Sub-topics	Week Due	Contact Hours	CILOs
1	Introduction to cardiovascular system Heart and its properties Blood pressure	- Physiological anatomy, pulmonary and systemic circulation - Properties of cardiac muscle, introduction to ECG. - Heart sounds, cardiac cycle and cardiac output. - Blood pressure and factor determining and maintaining it.	1, 2	4	a1, a2
2	Lymph system	Lymph and lymphatic: formation and functions.	3	2	a1, b1,b2

3	Introduction to respiratory system.	- Mechanism of respiration and lung compliance. - Exchange and transport of gases, regulation of respiration and hypoxia.	4,5	4	a1, a2 b1,b2
4	Midterm	———	6	2	all
5	The kidney and its units	Functional anatomy of the kidneys. Mechanisms of urine formation. Renal clearance and glomerular filtration rate (GFR). Regulation of acid-base balance by the kidneys.	7,8	4	a1, a2, b1,b2, c1, c2
6	Endocrine system	Introduction to endocrine system: endocrine glands and their functions.	9,10	4	a1, a2, b1,b2, c1, c2, d2
7	Reproductive system	Introduction to reproductive: male and female reproductive system. Menstrual cycle	11,12	4	a1, a2, b1,c1, c2, d1
	Central nervous system	Introduction to central nervous system. Physiology of pain.	13	2	a1, a2, b1,b2, c1, d1
8	Review		14	2	all
9	Final exam		15,16	4	all
Total number of weeks and hours			16	32	

VIII. Learning Assessment:

No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment	Aligned CILOs
1	**Homework/Tasks/Assignments**	3, 6, 8, 11	5	5%	a1, a2, b1, b2, d1, d2
2	**Quiz**	4	5	5%	a1, a2
3	**Midterm Exam**	7	20	20%	a1, a2, b1, b2,
5	**Final Exam**		70	70%	a1, a2, b1, b2
Total			100	100%	

VI. Teaching Strategies

- Lectures and presentation
- Activation
- micro-report
- micro- assignments

IX. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

3. Guyton and Hall, (2006), Text book of medical physiology, 11th Ed Mississippi Medical Center, Jackson, Mississippi, USA
4. Laurie Kelly, (2005), Essentials of Human Physiology for Pharmacy, 1st Ed. CRC Press, Pharmacy Education series

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11. www.mhhe.com/biosci2/anatomyrevealed
12. www.le.ac.uk/pa/teach/va/anatomy

III. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.

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عبدالمغني	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating**: ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism**: ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Microbiology II

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Microbiology II				
2	**Course Number & Code:**	Ph642				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	2th level /2th semester				
5	**Pre –requisite (if any):**					
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
10	**Prepared by:**	**Prof Hassan Al-Shamahy**				
11	**Date of approval:**					

II. Course description:

The course is designed to learn the students the basic features of general bacteriology. The course is designed to learn the students the basic features of bacteriology. Theoretical part will be taught, in addition to common infections and general and oral diseases of medical importance, and different laboratory steps for method of diagnosis.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention general concept about bacteriology**,** including classification and structure.
2. Identify the host parasite relationship and microbial pathogens
3. Describe the morphology, culture and antigenic structure of microorganisms of medical importance
4. Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing
5. Mention the most important infectious clinical conditions and outline the diagnosis, treatment, prevention and control of the most likely.
6. Describe the most important methods of decontamination and principles of infection control.
7. Describe the basics of Describe the basics of antimicrobial uses
8. Comprehend microbiological and immunological
9. Categorize a microorganism as a bacterium according to standard taxonomy.
10. Correlate according to evidence the causal relationship of microbes and diseases
11. Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage
12. Carry out examination of important bacteria
13. Perform a Gram stain and Ziehl- Neelsen stain and identify microorganism according to morphology and characteristics, stained preparations
14. Examine culture media commonly used for bacterial identification and distinguish positive and negative results
15. Perform hand wash and control of steam sterilization
16. Display the facts using printable sheets in the field of bacteriology and immunology
17. Complete a full scientific reports in the field of bacteriology and immunology
18. Communicate in groups and team in laboratory experiments
19. Follow the computer-based tools and internet to extract information and knowledge

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in:	Course Intended Learning Outcomes (CILOs) in:

Knowledge and Understanding		Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Mention general concept about bacteriology, including classification and structure.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	a2-	Identify the host parasite relationship and microbial pathogens
		a3-	Describe the morphology, culture and antigenic structure of microorganisms of medical importance.
		a4-	Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing.
		a5-	Mention the most important infectious clinical conditions and outline the diagnosis, treatment,, prevention and control of the most likely organisms causing such diseases
		a6-	Describe the most important methods of decontamination and principles of infection control.
		a7-	Describe the basics of Describe the basics of antimicrobial uses

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:	Teaching strategies/methods to be used	Methods of assessment

a1-	Mention general concept about bacteriology, including classification and structure.	Lecture Lab	Written Mid &final theoretical exams
a2-	Identify the host parasite relationship and microbial pathogens	seminar	Mid & final practical exams Quizzes Practical work assignment Attendance
a3-	Describe the morphology, culture and antigenic structure of microorganisms of medical importance.		
a4-	Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing.		
a5-	Mention the most important infectious clinical conditions and outline the diagnosis, treatment, and prevention and control of the most likely organisms causing such diseases		
a6-	Describe the most important methods of decontamination and principles of infection control.		
a7-	Describe the basics of antimicrobial uses		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug	**b1-**	Comprehend microbiological and immunological
B5-	Interpret the prescriptions, patient and	**b2-**	Categorize a microorganism as a bacterium according to standard taxonomy.
	clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b3-**	Correlate according to evidence the causal relationship of microbes and diseases
		b4-	Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Comprehend microbiological and immunological	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes Practical work assignment Attendance
b2-	Categorize a microorganism as a bacterium, according to standard taxonomy.		
b3-	Correlate according to evidence the causal relationship of microbes and diseases		
b4-	Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c1-**	Carry out examination of important bacteria
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Perform a Gram stain and Ziehl- Neelsen stain and identify microorganism according to morphology and characteristics, stained preparations
		c3-	Examine culture media commonly used for bacterial identification and distinguish positive and negative results.
		c4-	Perform hand wash and control of steam sterilization.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Carry out examination of important bacteria	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes Practical work assignment Attendance
c2-	Perform a Gram stain and Ziehl- Neelsen stain and identify microorganism according to morphology and characteristics, stained preparations		
c3-	Examine culture media commonly used for bacterial identification and distinguish positive and negative results.		

c4-	Perform hand wash and control of steam sterilization.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in		Course Intended Learning Outcomes	
General / Transferable skills		**(CILOs) in General / Transferable skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Display the facts using printable sheets in the field of bacteriology and immunology
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Complete a full scientific reports in the field of bacteriology and immunology.
		d3-	Communicate in groups and team in laboratory experiments.
		d4-	Follow the computer-based tools and internet to extract information and knowledge

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		Teaching strategies/methods to be used.	Methods of assessment
d1-	Display the facts using printable sheets in the field of bacteriology and immunology	Lecture Lab seminar	Written Mid &final theoretical exams Mid & final practical exams Quizzes
d2-	Complete a full scientific reports in the field of bacteriology and immunology.		

d3-	Communicate in groups and team in laboratory experiments.		Practical work assignment Attendance
d4-	Follow the computer-based tools and internet to extract information and knowledge		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	Bacteriology	a1, b1, b2, b3, d1,d2	Introduction, Morphology, Cell Structure and classification of bacteria, Growth and death of bacteria	1	2
2.	Bacteriology	a1-7, b1, b1-4, d1-4	Introduction, Bacterial genetics and Brief account of Culture media and Culture techniques.	1	2
3.	Bacteriology	a1-7, b1, b1-4, d1-4	Basic knowledge of selection, collection, transport, processing of clinical, Specimens and identification of bacteria, Control of microorganisms by sterilization and disinfection and Antimicrobial Agents	1	2

4.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram- Positive Cocci (brief account of each coccus - detailed account of mode of spread, laboratory diagnosis) and Gram– Negative Cocci (Neisseria, Moraxella)	1	2
5.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram- Positive Bacilli (Bacillus, Corynebacteria; mode of spread, important clinical feature, Laboratory diagnosis) and Gram– Negative Bacilli – Enteric Bacteria, Gram–Negative Bacilli -Nonfermenting	1	2
			Organisms		
6.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram–Negative Bacilli Nonfermenting Organisms (Pseudomonas spp, Acinetobacter spp. Aeromonas spp., Vibrio chloerae) and Gram-	1	2
7.	**Mid Exam**	a1-7, b1, b1-4, d1-4		1	2
8.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram- Positive Bacilli (Bacillus, Corynebacteria; mode of spread, important clinical feature, Laboratory diagnosis) and Gram– Negative Bacilli – Enteric Bacteria, Gram–Negative Bacilli -Nonfermenting Organisms	1	2

9.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram–Negative Bacilli Nonfermenting Organisms (Pseudomonas spp, Acinetobacter spp. Aeromonas spp., Vibrio chloerae) and Gram-	1	2
10.	Bacteriology	a1-7, b1, b1-4, d1-4	Non-sporing Anaerobes - in brief about classification and morphology, in detail about pathogens - mechanism of disease production and prevention.	1	2
11.	Bacteriology	a1-7, b1, b1-4, d1-4	Mycobacteria - Tuberculosis and Leprosy,	1	2
12.	Bacteriology	a1-7, b1, b1-4, d1-4	Spirochetes(Treponema pallidum - detailed account of Oral Lesions of syphilis, Borrelia, vincentii.), Chlamydia, Mycoplasma,	1	2
			Legionella & Rickettsiae.		
13.	Bacteriology	a1-7, b1, b1-4, d1-4	Bacterial drug resistance	1	2
14.	Review	a1-7, b1, b1-4, d1-4		2	4
15.	**Final Exam**	a1-7, b1, b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1)	Introduction to Microbiology laboratory techniques and safety rules	c1-4	2	4

2)	And Introduction to Microscopy Types of Microscopes.	c1-4	2	4
3)	Examination of Stained Smear and Wet Preparation.	c1-4	2	4
4)	Mid-Exam	c1-4	1	2
5)	Microscopic examination of Eukaryotic microorganisms.	c1-4	2	4
6)	Staining of Bacterial Cells (simple staining)	c1-4	2	4
7)	Bacterial Culture Techniques	c1-4	2	4
8)	Review	c1-4	2	4
9)	Final Exam	c1-4	1	2
Number of Weeks /and Units Per Semest :r			**16**	**32**

VI. Teaching strategies of the course:

Lecture, Lab seminar

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-7,b1-b4
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1,a3, a5, b1-4
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4

4.	**Practical mid-semester exam**	7th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	7th	30	20%	a1-7, b1-4
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-7, b1-4
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

o

There is a long list of anatomy books present in the faculty library for the student to choose from. Course notes done by teaching staff.

2- Recommended Books and Reference Materials.

Course notes of Department theoretical books and practical manual (lectures and practical) a.
Essentials of microbiology . Oxford Press. By J.Bagg
b. Microbiology at a Glance
c. Immunology at Glance
d. Notes in Medical virology Practical book :

District Laboratory Practice in Tropical Countries Monica Cheesbrough

3- Electronic Materials and Web Sites *etc*.

als and web sites of Microbiology and Immunology http://www.med-ed-online.org/, midline Pubmed & Go

I. Course Policies (To be determined by Faculty Deanship)

Based on university regulations, the following aspects should be figured out:

1.	(Class Attendance) :Class Attendance: - Attendance of students is taken at beginning of lecture time. - The allowed absence percentage is 20% without excuse and 30% with acceptable excuse, - When student has been absent for more than 30% of course lectures without acceptable excuse, the student will be prohibited from entering subject the final exam.
2.	(Tardy) :If the student came late to class for 15 minutes, he/she is registered absent but he/she allowed to enter the hall to listen lecture presentation.
3.	(Exam Attendance/Punctuality) :According to examination roles or policies: - If the student is absent in the year works exams, the decision is referred to the teacher whether to allow or to reject according to the offered excuse. - If the student is absent in the final exam with an acceptable excuse, the student would be attended the re-sit exam as 1st trial. - If the student is absent in the final exam without an acceptable excuse, the student would be attended re-sit exam as 2nd trial.
4.	(Assignments & Projects) :According to examination roles or policies: - The student should be attended the final exam at certain time and according to the accredited exam table. - If the student came late after 15 minutes from the exam beginning, the student would be to attend the exam with oral monition of never repeat. - In case of the repeat, the student prevented from entrance and considered absent.

5.	(Cheating) :According to examination roles or policies: - If the student cheated in the year works exams of the course, the student prohibited from entrance the final exam and given zero degree with prevented him from entrance the re-sit exam of this course. - If the student cheated in the final exam of the course, the student prohibited from the cheated course and the followed course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheated course is the last at the exam table, the student prohibited from the cheated course and the past course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheating is discovered in subsequent time, the cheated student didn't escape from payment and ordinance is referred to precision committee and the final decision is referred to the collage council. - If the cheating is discovered during the correcting the answered books, the corrector has written a report to the chairman of concerned department for taking available procedure. - The faculty council is able to segregate the student for one academic year in 2nd cheating trial and final segregation from the university after accreditation of university council in 3rd cheating trial.
6.	(Plagiarism) :According to examination roles or policies: Plagiarism means a student plagiarizes the personality of another student. Plagiarism for exam purpose: 1- Both students are prohibited from the plagiarized academic year and all results of them are rejected with prohibition of them from entrance the resit exam. 2- If the plagiarized student is from outside the university, the student is referred to the university police. -Plagiarism for other purposes: 1- Both students are warned as segregation. 2- If the plagiarized student is from outside the university, the student is referred to the university police.
7.	(Other policies) :-The student should be followed the instructions for the exam entrance. - The student should be followed all systems & laws of the university.

Course Plan of Pharmaceutical Microbiology II

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof Hassan AlShamahy	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:							
1-	Course Title:	Pharmaceutical Microbiology II					
2-	Course Number & Code:	Ph642					
3-	Credit hours: 1hrs	C.H				Total	
		Th.	Seminar	Pr.	F. Tr.		
		2	-	2		3	
4-	Study level/year at which this course is offered:	2th level /2th semester					
5-	Pre –requisite (if any):						
6-	Co –requisite (if any):						
7-	Program (s) in which the course is offered	Bachelor of Pharmacy					
8-	Language of teaching the course:	English					
9-	System of Study:	Semesters					
10-	Mode of delivery:	Regular					
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					

III. Course description:

The course is designed to learn the students the basic features of general bacteriology. The course is designed to learn the students the basic features of bacteriology. Theoretical part will be taught, in addition to common infections and general and oral diseases of medical importance, and different laboratory steps for method of diagnosis.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention general concept about bacteriology**,** including classification and structure.
2. Identify the host parasite relationship and microbial pathogens
3. Describe the morphology, culture and antigenic structure of microorganisms of medical importance
4. Describe briefly methods of diagnosis of infections including; specimen selection, handling and processing
5. Mention the most important infectious clinical conditions and outline the diagnosis, treatment, prevention and control of the most likely.
6. Describe the most important methods of decontamination and principles of infection control.
7. Describe the basics of Describe the basics of antimicrobial uses
8. Comprehend microbiological and immunological
9. Categorize a microorganism as a bacterium according to standard taxonomy.
10. Correlate according to evidence the causal relationship of microbes and diseases
11. Predict the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage
12. Carry out examination of important bacteria
13. Perform a Gram stain and Ziehl- Neelsen stain and identify microorganism according to morphology and characteristics, stained preparations
14. Examine culture media commonly used for bacterial identification and distinguish positive and negative results
15. Perform hand wash and control of steam sterilization
16. Display the facts using printable sheets in the field of bacteriology and immunology
17. Complete a full scientific reports in the field of bacteriology and immunology
18. Communicate in groups and team in laboratory experiments
19. Follow the computer-based tools and internet to extract information and knowledge

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
16.	Bacteriology	a1, b1, b2, b3, d1,d2	Introduction, Morphology, Cell Structure and classification of bacteria, Growth and death of bacteria	1	2
17.	Bacteriology	a1-7, b1, b1-4, d1-4	Introduction, Bacterial genetics and Brief account of Culture media and Culture techniques.	2	2
18.	Bacteriology	a1-7, b1, b1-4, d1-4	Basic knowledge of selection, collection, transport, processing of clinical, Specimens and identification of bacteria, Control of microorganisms by sterilization and disinfection and Antimicrobial Agents	3	2
19.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram- Positive Cocci (brief account of each coccus - detailed account of mode of spread, laboratory diagnosis) and Gram– Negative Cocci (Neisseria, Moraxella)	4	2
20.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram- Positive Bacilli (Bacillus, Corynebacteria;	5	2

			mode of spread, important clinical feature, Laboratory diagnosis) and Gram– Negative Bacilli – Enteric Bacteria, Gram–Negative Bacilli -Nonfermenting Organisms		
21.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram–Negative Bacilli Nonfermenting Organisms (Pseudomonas spp, Acinetobacter spp. Aeromonas spp., Vibrio chloerae) and Gram-	6	2
22.	**Mid Exam**	a1-7, b1, b1-4, d1-4		7	2
23.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram- Positive Bacilli (Bacillus, Corynebacteria; mode of spread, important clinical feature, Laboratory diagnosis) and Gram– Negative Bacilli – Enteric Bacteria, Gram–Negative Bacilli -Nonfermenting Organisms	8	2
24.	Bacteriology	a1-7, b1, b1-4, d1-4	Gram–Negative Bacilli Nonfermenting Organisms (Pseudomonas spp, Acinetobacter spp. Aeromonas spp., Vibrio chloerae) and Gram-	9	2
25.	Bacteriology	a1-7, b1, b1-4, d1-4	Non-sporing Anaerobes - in brief about classification and morphology, in detail about pathogens - mechanism of disease production and prevention.	10	2

26.	Bacteriology	a1-7, b1, b1-4, d1-4	Mycobacteria - Tuberculosis and Leprosy,	1`1	2
27.	Bacteriology	a1-7, b1, b1-4, d1-4	Spirochetes(Treponema pallidum - detailed account of Oral Lesions of syphilis, Borrelia, vincentii.), Chlamydia, Mycoplasma, Legionella & Rickettsiae.	12	2
28.	Bacteriology	a1-7, b1, b1-4, d1-4	Bacterial drug resistance	13	2
29.	Review	a1-7, b1, b1-4, d1-4		14,15	4
30.	**Final Exam**	a1-7, b1, b1-4		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
10)	Introduction to Microbiology laboratory techniques and safety rules	c1-4	1,2	4
11)	And Introduction to Microscopy Types of Microscopes.	c1-4	3,4	4
12)	Examination of Stained Smear and Wet Preparation.	c1-4	5,6	4
13)	Mid-Exam	c1-4	7	2
14)	Microscopic examination of Eukaryotic microorganisms.	c1-4	8,9	4
15)	Staining of Bacterial Cells (simple staining)	c1-4	10,11	4
16)	Bacterial Culture Techniques	c1-4	12,13	4
17)	Review	c1-4	14,15	4
18)	Final Exam	c1-4	16	2
Number of Weeks /and Units Per Semest :r			**16**	**32**

VI. Teaching strategies of the course:
Lecture Lab seminar

IV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-7,b1-b4
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1,a3, a5, b1-4
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	7th	30	20%	a1-7, b1-4
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-7, b1-4
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

V. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VI. Learning Resources:

1- Required Textbook(s) (maximum two).

There is a long list of anatomy books present in the faculty library for the student to choose from.
Course notes done by teaching staff.

2- Recommended Books and Reference Materials.

Course notes of Department theoretical books and practical manual (lectures and practical) a.
Essentials of microbiology . Oxford Press. By J.Bagg
b. Microbiology at a Glance
c. Immunology at Glance
d. Notes in Medical virology Practical book :

District Laboratory Practice in Tropical Countries Monica Cheesbrough

o **3- Electronic Materials and Web Sites *etc*.**

als and web sites of Microbiology and Immunology http://www.med-ed-online.org/, midline Pubmed & Go

II. Course Policies (To be determined by Faculty Deanship)

Based on university regulations, the following aspects should be figured out:

8.	(Class Attendance) : Class Attendance: - Attendance of students is taken at beginning of lecture time. - The allowed absence percentage is 20% without excuse and 30% with acceptable excuse, - When student has been absent for more than 30% of course lectures without acceptable excuse, the student will be prohibited from entering subject the final exam.
9.	(Tardy) :If the student came late to class for 15 minutes, he/she is registered absent but he/she allowed to enter the hall to listen lecture presentation.
10.	(Exam Attendance/Punctuality) :According to examination roles or policies: - If the student is absent in the year works exams, the decision is referred to the teacher whether to allow or to reject according to the offered excuse. - If the student is absent in the final exam with an acceptable excuse, the student would be attended the re-sit exam as 1st trial. - If the student is absent in the final exam without an acceptable excuse, the student would be attended re-sit exam as 2nd trial.

11.	(Assignments & Projects) :According to examination roles or policies: - The student should be attended the final exam at certain time and according to the accredited exam table. - If the student came late after 15 minutes from the exam beginning, the student would be to attend the exam with oral monition of never repeat. - In case of the repeat, the student prevented from entrance and considered absent.
12.	(Cheating) :According to examination roles or policies: - If the student cheated in the year works exams of the course, the student prohibited from entrance the final exam and given zero degree with prevented him from entrance the re-sit exam of this course. - If the student cheated in the final exam of the course, the student prohibited from the cheated course and the followed course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheated course is the last at the exam table, the student prohibited from the cheated course and the past course and given zero degree in both courses, and prevented him from entrance the re-sit exams of them. - If the cheating is discovered in subsequent time, the cheated student didn't escape from payment and ordinance is referred to precision committee and the final decision is referred to the collage council. - If the cheating is discovered during the correcting the answered books, the corrector has written a report to the chairman of concerned department for taking available procedure. - The faculty council is able to segregate the student for one academic year in 2nd cheating trial and final segregation from the university after accreditation of university council in 3rd cheating trial.
13.	(Plagiarism) :According to examination roles or policies: Plagiarism means a student plagiarizes the personality of another student. Plagiarism for exam purpose: 1- Both students are prohibited from the plagiarized academic year and all results of them are rejected with prohibition of them from entrance the resit exam. 2- If the plagiarized student is from outside the university, the student is referred to the university police. -Plagiarism for other purposes: 1- Both students are warned as segregation. 2- If the plagiarized student is from outside the university, the student is referred to the university police.
14.	(Other policies) :-The student should be followed the instructions for the exam entrance. - The student should be followed all systems & laws of the university.

Course Specification of Pharmaceutics II

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutics II					
2	Course Number & Code:	Ph245					
3	Credit hours: 3hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2			3	
4	Study level/ semester at which this course is offered:	Second year/ Second semester					
5	Pre –requisite (if any):	Physical pharmacy- Pharmaceutical calculations- Pharmaceutics I					
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof. Dr. Abdulwali Ahmed Saif					
12	Date of approval:						

II. Course description:

This course aims to provide the students with basic principles of pharmaceutical dispersed systems. It focused on the advantages and disadvantages, additives additives, methods of formulation and methods of evaluation of dispersed system as pharmaceutical liquid dosage forms.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. عبدالولي أحمد سيف	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the characteristics of pharmaceutical dispersed systems.
2. Describe the advantages and disadvantages of pharmaceutical dispersed systems.
3. Recognize the different additives used in manufacturing of pharmaceutical dispersed systems.
4. Describe methods of formulation of pharmaceutical dispersed systems. 5. Discuss the method of evaluation of pharmaceutical dispersed system 6. Distinguish between pharmaceutical dispersed systems.
7. Determine the appropriate methods for formulation of pharmaceutical dispersed systems.
8. Select the suitable method for evaluation of of pharmaceutical dispersed systems.
9. Propose best approaches to solve the problems encountered in of pharmaceutical dispersed systems.
10. Select and practice different methods for preparation of pharmaceutical dispersed systems.
11. Formulate different pharmaceutical dispersed systems.
12. Label the different formulations of pharmaceutical dispersed systems.
13. Evaluate the formulations of pharmaceutical dispersed systems.
14. Implement writing and presentation skills
15. Work independently or collaboratively to prepare seminars/ presentations or write reports.
16. Effectively use internet resources to search for up-to-date information to solve emerging problems..

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the characteristics of pharmaceutical dispersed systems.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of	**a2-**	Describe the advantages and disadvantages of pharmaceutical dispersed systems.

	analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3-**	Recognize the different additives used in manufacturing of pharmaceutical dispersed systems.
		a4-	Describe methods of formulation of pharmaceutical dispersed systems.
		a5-	Discuss the method of evaluation of pharmaceutical dispersed systems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures solving problem, and group discussion	Attendance, Written, oral exams, project and small projects
a1-	Recognize the characteristics of pharmaceutical dispersed systems.		
a2-	Describe the advantages and disadvantages of pharmaceutical dispersed systems.		
a3-	Recognize the different additives used in manufacturing of pharmaceutical dispersed systems.		
a4-	Describe methods of formulation of pharmaceutical dispersed systems.		
a5-	Discuss the method of evaluation of pharmaceutical dispersed systems.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and	**b1-**	Distinguish between pharmaceutical dispersed systems.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. عبدالولي أحمد سيف	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	pharmacodynamic profiles of the drug.		
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Determine the appropriate methods for formulation of pharmaceutical dispersed systems.
		b3-	Select the suitable method for evaluation of of pharmaceutical dispersed systems.
		b4-	Propose best approaches to solve the problems encountered in of pharmaceutical dispersed systems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams and small projects
b1-	Distinguish between pharmaceutical dispersed systems.		
b2-	Determine the appropriate methods for formulation of pharmaceutical dispersed systems.		
b3-	Select the suitable method for evaluation of of pharmaceutical dispersed systems.		
b4-	Propose best approaches to solve the problems encountered in of pharmaceutical dispersed systems.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging,	**c1-**	Select and practice different methods for preparation of pharmaceutical dispersed systems.

	storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.		
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	Formulate different pharmaceutical dispersed systems.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Label the different formulations of pharmaceutical dispersed systems.
		c4-	Evaluate the formulations of pharmaceutical dispersed systems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, tutorials, practical, discussion and brain storming	Attendance, homework, Written, practical, oral exams, report, project and observation.
c1-	Select and practice different methods for preparation of pharmaceutical dispersed systems.		
c2-	Formulate different pharmaceutical dispersed systems.		
c3-	Label the different formulations of pharmaceutical dispersed systems.		
c4-	Evaluate the formulations of pharmaceutical dispersed systems.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2	Employ proper documentation and filing systems in different pharmaceutical fields.	**d1-**	Implement writing and presentation skills
		d2-	Work independently or collaboratively to prepare seminars/ presentations or write reports.

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D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d3-**	Effectively use internet resources to search for up-todate information to solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1-	Implement writing and presentation skills		
d2-	Work independently or collaboratively to prepare seminars/ presentations or write reports.		
d3-	Effectively use internet resources to search for up-todate information to solve emerging problems.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Pharmaceutical dispersed systems (Suspensions)	**a1-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, method of formulation, stability and Quality control tests of Pharmaceutical suspensions	6	12
2	Mid-term exam	**a1-5, b1-4**		1	2
3	Pharmaceutical dispersed systems (Emulsions)	**a1-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents,	4	

			excipients, method of formulation, stability and Quality control tests of Pharmaceutical Emulsion		8
4	Pharmaceutical dispersed systems (microemulsions)	**a1-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, method of formulation, stability and Quality control tests of Pharmaceutical microemulsions	1	2
5	Ophthalmic preparations	**a1-5, b1-4, d1-3**	Definition, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Ophthalmic preparation	1	2
6	Parenteral preparations	**a1-5, b1-4, d1-3**	Definition, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Parenteral preparation	1	2
7	Aerosols	**a1-5, b1-4, d1-3**	Definition, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Aerosols	1	2
8	Final-term exam	**a1-5, b1-4**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Formulate, practice preparation, label and evaluate topical Pharmaceutical suspensions	**c1-4, d1-3**	3	6
2.	Formulate, practice preparation, label and evaluate oral Pharmaceutical suspensions	**c1-4, d1-3**	4	8
3.	Mid-term exam	**c1-4**	1	2
4.	Formulate, practice preparation, label and evaluate topical Pharmaceutical emulsions	**c1-4, d1-3**	3	6
5.	Formulate, practice preparation, label and evaluate oral Pharmaceutical emulsions	**c1-4, d1-3**	4	8
6.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-3, b3-4**, d1-3**
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2-4,b1-2**, d1-3**
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	**c2-4**
5.	**Theoretical mid-semester exam**	7th	30	20%	**a1-5, b1-4**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Notes on Pharmaceutics prepared by the department staff.
2. Jones, D., 2008, "FASTtrack Pharmaceutics dosage forms design" 1st edition, Pharmaceutica Press, London.

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3. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
4. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.
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2- Recommended Readings and Reference Materials

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
3. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.
Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.
Further information on proprietary products can be found in: The Data Sheet Compendium, Datapharm Publications Ltd (published annually).
The Monthly Index of Medical Specialities (MIMS), Medical Publications Ltd.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmaceutics II

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Abdulwali Ahmed Saif	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:						
1-	Course Title:	Pharmaceutics II				
2-	Course Number & Code:	Ph245				
3-	Credit hours: 3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	1		3
4-	Study level/year at which this course is offered:	Second year/ Second semester				
5-	Pre –requisite (if any):	Physical pharmacy- Pharmaceutical calculations- Pharmaceutics I				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

III. Course description:

This course aims to provide the students with basic principles of pharmaceutical dispersed systems. It focused on the advantages and disadvantages, additives additives, methods of formulation and methods of evaluation of dispersed system as pharmaceutical liquid dosage forms.

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IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the characteristics of pharmaceutical dispersed systems.
2. Describe the advantages and disadvantages of pharmaceutical dispersed systems.
3. Recognize the different additives used in manufacturing of pharmaceutical dispersed systems.
4. Describe methods of formulation of pharmaceutical dispersed systems. 5. Discuss the method of evaluation of pharmaceutical dispersed system 6. Distinguish between pharmaceutical dispersed systems.
7. Determine the appropriate methods for formulation of pharmaceutical dispersed systems.
8. Select the suitable method for evaluation of of pharmaceutical dispersed systems.
9. Propose best approaches to solve the problems encountered in of pharmaceutical dispersed systems.
10. Select and practice different methods for preparation of pharmaceutical dispersed systems.
11. Formulate different pharmaceutical dispersed systems.
12. Label the different formulations of pharmaceutical dispersed systems.
13. Evaluate the formulations of pharmaceutical dispersed systems.
14. Implement writing and presentation skills
15. Work independently or collaboratively to prepare seminars/ presentations or write reports.
16. Effectively use internet resources to search for up-to-date information to solve emerging problems..

17. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Pharmaceutical dispersed systems (Suspensions)	**a1-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, method of formulation, stability and Quality control tests of Pharmaceutical suspensions	6	12
2	Mid-term exam	**a1-5, b1-4**		1	2

3	Pharmaceutical dispersed systems (Emulsions)	**a1-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Emulsion	4	8
4	Pharmaceutical dispersed systems (microemulsions)	**a1-5, b1-4, d1-3**	Definition, types, Advantages, disadvantages, solvents, excipients, method of formulation, stability and Quality control tests of Pharmaceutical microemulsions	1	2
5	Ophthalmic preparations	**a1-5, b1-4, d1-3**	Definition, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Ophthalmic preparation	1	2
6	Parenteral preparations	**a1-5, b1-4, d1-3**	Definition, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Parenteral preparation	1	2
7	Aerosols	**a1-5, b1-4, d1-3**	Definition, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Aerosols	1	2
8	Final-term exam	**a1-5, b1-4**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours

7.	Formulate, practice preparation, label and evaluate topical Pharmaceutical suspensions	**c1-4, d1-3**	3	6
8.	Formulate, practice preparation, label and evaluate oral Pharmaceutical suspensions	**c1-4, d1-3**	4	8
9.	Mid-term exam	**c1-4**	1	2
10.	Formulate, practice preparation, label and evaluate topical Pharmaceutical emulsions	**c1-4, d1-3**	3	6
11.	Formulate, practice preparation, label and evaluate oral Pharmaceutical emulsions	**c1-4, d1-3**	4	8
12.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

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8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-3, b3-4**, d1-3**
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2-4,b1-2**, d1-3**
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	**c2-4**
12.	**Theoretical mid-semester exam**	7th	30	20%	**a1-5, b1-4**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4, d1-3**
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

l	5. Notes on Pharmaceutics prepared by the department staff. 6. Jones, D., 2008, "FASTtrack Pharmaceutics dosage forms design" 1st edition, Pharmaceutica Press, London.

7. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
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6- Recommended Readings and Reference Materials

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5. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
6. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
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British Pharmacopoeia (latest edition), HMSO. London.
Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.
Further information on proprietary products can be found in: The Data Sheet Compendium, Datapharm Publications Ltd (published annually).
The Monthly Index of Medical Specialities (MIMS), Medical Publications Ltd.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. عبدالولي أحمد سيف	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Course Specification For Pharmaceutical Biochemistry (I)

I. Course Identification and General Information:						
1	Course Title:	Pharmaceutical Biochemistry (I)				
2	Course Number & Code:	Ph741				
3	Credit hours:	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2	2	-	-	3
4	Study level/ semester at which this course is offered:	2nd semester of 2nd Level				
5	Pre –requisite (if any):	General Pharmaceutical Chemistry, Pharmaceutical Organic Chemistry & Pharmaceutical Analytical Chemistry				
6	Co –requisite (if any):	Physiology II				
7	Program (s) in which the course is offered:	Bachelor of Pharmacy				
8	Language of teaching the course:	English				
9	Location of teaching the course:	Faculty of Pharmacy - Sana`a University.				
10	Prepared by:	*Assoc. Prof. Badria A. Shamsan*				
11	Date of approval:					

II. Course description:

The course is designed to provide candidate with good knowledge about structure and function of carbohydrates, lipids and proteins. It also provides candidate with a basic knowledge in modern biochemistry and molecular biology necessary for an understanding of the life sciences at the molecular level, in addition to help students to become familiar with the biochemical knowledge and skills necessary to understand other related subjects.

I. Intended learning outcomes (ILOs) of the course:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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At the end of this course the students should be able to:

1. Define the types, structures, classification, physical, chemical properties, & functions, of different types of carbohydrates, and their derivative compounds resulted, illustrating the relationship between their structure and function.
2. Define the types, structures, classification, physical, chemical properties, & functions, of different types biological molecules of lipids and the relationship between their structure and function.
3. Describe the classes of amino acids & their structures, functions, and the effective biological compounds produced from them.
4. Explain types of protein classifications, structures, function and denaturation & re-naturation processes and their relation-ship in health and diseases .
5. Define the types, structures& classification, of different types of enzymes, and their isozymes, illustrating their function in the diagnosis of diseases.
6. Describe the sources, types, structures, classification, & functions, of vitamines, and their derivative compounds, illustrating their function and deficiency diseases resulted or hypervitaminosis.
7. Discuss the types, structures, properties of nucleic acids (DNA & RNA), and mechanisms of flow of genetic information, and protein synthesis, (the replications, transcriptions, and translations processes).
8. Point-out the different types of biological molecules, e.g. (sugars, amino acids, proteins & fatty acids), and differentiate between the essential, and the non-essential ones.
9. Summarize and categorize some enzymes & isoenzymes reactions, with their clinical & diagnostic significance.
10. Interpret symptoms, signs and biochemical lab. findings (deficiency diseases), of some macro and trace elements, as some plasma proteins, enzymes, vitamins, and minerals as (Ca^{++}, Na^{+}, K^{+}, Iron, etc.)
11. Consolidate & illustrating the different types of mutations, to construct the normal and abnormal (mutant) samples, as sickle cell anemia
12. Identify of many genetic diseases due to deficiency of certain biological molecules.
13. Identify the physical & chemical properties of carbohydrates and to differentiate between the reducing substances present in urine in health & disease.
14. Identify the physical & chemical properties of different types of amino acids and proteins, using different methods (electrophoresis, chromatography, ppt. methods etc.).
15. Perform the physical and chemical tests to study the properties of lipids, fatty acids, triglycerides, cholesterol, and lipoproteins
16. Practice the qualitative determinations of macromolecules and write a small report to discuss the result or themethod.
17. Dialogue and discuss medical conditions of patients depending on biochemical lab investigations.
18. Deal & cooperative with information technology, and utilize the resources of biomedical information including the available electronic facilities to update knowledge and solve emerging problems.
19. Adopt the principles of lifelong and communicate effectively with a group in lab. or during preparation of seminars.
20. Work independently, or collaboratively as a medical teamwork member, during certain community crisis.
21. Write reports or proposals.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Define the types, structures, classification, physical, chemical properties, & functions, of different types of carbohydrates, and their derivative compounds resulted, illustrating the relationship between their structure and function.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Define the types, structures, classification, physical, chemical properties, & functions, of different types biological molecules of lipids and the relationship between their structure and function.
		a3-	Describe the classes of amino acids & their structures, functions, and the effective biological compounds produced from them.
		a4-	Explain types of protein classifications, structures, function and denaturation & re-naturation processes and their relation-ship in health and diseases .
		a5-	Define the types, structures& classification, of different types of enzymes, and their isozymes, illustrating their function in the diagnosis of diseases.
		a6-	Describe the sources, types, structures, classification, & functions, of vitamines, and their derivative compounds, illustrating their function and deficiency diseases resulted or hypervitaminosis.
		a7-	Discuss the types, structures, properties of nucleic acids (DNA & RNA), and mechanisms of flow of genetic information, and protein synthesis, (the replications, transcriptions, and translations processes).

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

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ا.د.م.بدرية شمسان	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lecture methods ▪ Brain storming. ▪ Discussion during lectures. ▪ Periodical Exam. ▪ Quizzes. ▪ Oral evaluation. ▪ Homework.	▪
a1-	Define the types, structures, classification, physical, chemical properties, & functions, of different types of carbohydrates, and their derivative compounds resulted, illustrating the relationship between their structure and function.		
a2-	Define the types, structures, classification, physical, chemical properties, & functions, of different types of lipids and the relationship between their structure and function.		
a3-	Describe the classes of amino acids & their structures, functions, and the effective biological compounds produced from them.		
a4-	Explain types of protein classifications, structures, function and denaturation & renaturation processes, and their relation-ship in health and diseases .		
a5-	Define the types, structures& classification, of different types of enzymes, and their isozymes, illustrating their function in the diagnosis of diseases.		
a6-	Describe the sources, types, structures, classification, & functions, of vitamines, and their derivative compounds, illustrating their		
	function and deficiency diseases resulted or hypervitaminosis.		
a7-	Discuss the types, structures, properties of nucleic acids (DNA & RNA), and mechanisms of flow of genetic information, and protein synthesis, (the replications, transcriptions, and translations processes).		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Point-out the different types of biological molecules, e.g. (sugars, amino acids, proteins & fatty acids), and differentiate between the essential, and the non-essential ones.
		b2-	Summarize and categorize of some enzymes & isoenzymes reactions, with their clinical & diagnostic significance.
		b3-	Interpret symptoms, signs and biochemical lab. findings (deficiency diseases), of some macro and trace elements, as some plasma proteins, enzymes, vitamins, and minerals as (Ca^{++}, Na^{+}, K^{+}, Iron, etc.).
		b4-	Consolidate & illustrating the different types of mutations, to construct the normal and abnormal (mutant) samples, as sickle cell anemia.
		b5-	Identify of many genetic diseases due to deficiency of certain biological molecules.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:			
b1-	Point-out the different types of biological molecules, e.g. (sugars, amino acids, proteins & fatty acids), and differentiate between the essential, and the non-essential ones.	▪ Lecture lectures ▪ Problem solving ▪ Brain storming.	▪ Oral evaluations. ▪ Observation ▪ Drop quizzes.
b2-	Summarize and categorize of some enzymes & isoenzymes reactions, with their clinical & diagnostic significance.		

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b3-	Interpret symptoms, signs and biochemical lab. findings (deficiency diseases), of some macro and trace elements, as some plasma proteins, enzymes, vitamins, and minerals as (Ca^{++}, Na^{+}, K^{+}, Iron, … etc.).		
b4-	Consolidate the replications, transcriptions, and translations processes, illustrating the different types of mutations, to construct the normal and abnormal (mutant) samples, as sickle cell anemia.		
b5-	Identify of many genetic diseases due to deficiency of certain biological molecules.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Identify the physical & chemical properties of carbohydrates and to differentiate between the reducing substances present in urine in health & disease.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radio-pharmaceuticals safely and effectively.	**c2-**	Identify the physical & chemical properties of different types of amino acids and proteins, using different methods (electrophoresis, chromatography, ppt. methods etc….).
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Perform the physical and chemical tests to study the properties of lipids, fatty acids, triglycerides, cholesterol and lipoproteins.
		c4-	Practice the qualitative determinations of macromolecules and write a small report to discuss the result or the method.

		c5-	Dialogue and discuss medical conditions of patients depending on biochemical lab investigations.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		▪ Lecture methods. ▪ Practical session. ▪ Brain storming. ▪ Group discussion.	▪ Practical works. ▪ Observation. ▪ Oral evaluation. ▪ Reports. ▪ Quizzes.
c1-	Identify the physical & chemical properties of carbohydrates and to differentiate between the reducing substances present in urine in health & disease.		
c2-	Identify the physical & chemical properties of different types of amino acids and proteins, using different methods (electrophoresis, chromatography, ppt. methods etc.).		
c3-	Perform the physical and chemical tests to study the properties of lipids, fatty acids, triglycerides, cholesterol, and lipoproteins.		
c4-	Practice the qualitative determinations of macromolecules and write a small report to discuss the result or the method.		
c5-	Dialogue and discuss medical conditions of patients depending on biochemical lab investigations.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Deal & cooperative with information technology, and utilize the resources of biomedical information including the available electronic facilities to update knowledge and solve emerging problems.

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D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2-**	Adopt the principles of lifelong and communicate effectively with a group in lab. or during preparation of seminars.
D5-	Apply information and communication technology and working effectively in a team.	**d3-**	Work independently, or collaboratively as a medical teamwork member, during certain community crisis.
		d4-	Write reports or proposals.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		▪ Group work. ▪ Practical session. ▪ Oral presentations. ▪ Research proposal.	▪ Observation. ▪ Homework. ▪ Reports.
d1-	Deal & cooperative with information technology, and utilize the resources of biomedical information including the available electronic facilities to update knowledge and solve emerging problems.		
d2-	Adopt the principles of lifelong and communicate effectively with a group in lab. or during preparation of seminars.		
d3-	Work independently, or collaboratively as a medical teamwork member, during certain community crisis.		
d4-	Write reports or proposals.		

IV. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Carbohydrate Chemistry, Classification, types & their biological importance.	a1, b1, c1, c4, c5, d1, d3.	- Monosaccharides, - Disaccharides, - Oligosaccharides. - Polysaccharides, Physical & chemical properties, their functions & resulted diseases.	**2**	**4**
2	Lipid Chemistry, Types, their biological importance.	a2, b1, c3, c4, c5, d1	- Triglycerides. - Phospholipids & lipoprot- -eins, their chemical , physical properties & types, with their clinical importance - Cholesterol, advantage, disadvantage & resulted diseases as (Atherosclerosis).	**3**	**6**
3	Amino Acids & proteins Chemistry.	a3, a4, b1, b3, c2, c4, c5, d1	-Classifications, Physical, chemical properties & their biological importance.	**2**	**4**
4	Midterm exam			**1**	**2**
5	Heamoglobin	a7, b3, b4, b5, c2, c5, d1	-Structures, Types, Function & resulted disorders.	**1**	**2**
6	Enzymes	a4, a5, b2, b3, b5,	-Classifications, Function,	**2**	**4**
		c2, c4, c5, d1	Mod of actions, Factors affecting their activities & their clinical applications in diagnostic aspect.		
7	Vitamins	a2, a6, b3, c5, d1	-Classifications, derivatives, sources, daily requirements, functions, deficiency diseases and toxicity.	**2**	**4**
8	Nucleic Acids Chemistry , DNA replication & Protein Synthesis.	a7, b4, b5, c4, c5, d1	- Types, Structures, Functions. -Replication -Trascription -Translation (Protein synthesis) -PCR & c-DNA.	**2**	**4**
9	Final exam			**1**	**2**

Number of Weeks /and Units Per Semester	**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Identification of Carbohydrates, lipids & proteins.	a1, a2, a3, a4, b1, b3, c1, c2, c3, c4, c5, d1	**4**	**8**
2	Chromatographical analysis for amino acids.	c2, c3, c5	**2**	**4**
3	Osazone tests to differentiate between urine sugars.	c1	**1**	**2**
4	Mid term exam	c1-5	**1**	**2**
5	Precipitate of different proteins by different methods.	a4, c2, c4	**3**	**6**
6	Differentiate between types of proteins (Albumin, Benz-Jones protein), for diagnostic purpose.	a4, c2, c4, c5	**3**	**6**
7	Review	c1-5	**1**	**2**
8	Final exam	c1-5	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

V. Teaching strategies of the course:

- **Lectures**
- Discussion sessions ▪ Lab sessions.
- Assignment and reports.
- Self – learning.
- Practical session.
- Brain storming.

-Assessment Methods:

- Mid term written exam to assess Knowledge and understanding skills and Intellectual skills. ▪ Final written exam to assess Knowledge and understanding skills and Intellectual skills.
- Observation.
- Oral evaluation.
- Reports.
- Quizzes.

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**10**	**7%**	a1- a7, b1 – b5, c1 – c5, d1
2	**Assignments**	**4-12**	**10**	**7%**	c1-c5, d1- d4
3	**Attendance, reports and mid practical exam**	**ALL**	**30**	**20%**	c1-c5
4	**Mid-semester exam**	**8**	**30**	**20%**	a1- a4, b1-b5, c1-c5, d1-d4
5	**Final Exam (theoretical)**	**16**	**50**	**33%**	a1- a7, b1-b5, c1-c5, d1-d4
6	**Final Practical Exam**	**13-14**	**20**	**13%**	a1- a4, b1-b5, c1-c5, d1-d4
	Total		**150**	**10%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
- 2 hr./ week	By social media (Face-book) or Whatsapp.

VIII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Murray RK, Granner DK, Mayes PA, Rodwell VW, (2003), Harper's Illustrated Biochemistry, 26th edition, McGraw-Hill companies New York.
- Champe PC, Harvey RA. Ferrier DR, (2007), Lippincott's Reviews of Biochemistry, 3rd edition Lippincott William & Wilkins London,.
- David L. Nelson and Michael M, (2012), Lehninger Principles of Biochemistry, Cox. 6th edition, W.H. Freeman.

2- Recommended Readings and Reference Materials

	• Pankaja Naik, 2010, Biochemistry, 3rd Edition. • Stryer B. L, 2011. Biochemistry 2nd edition, (Short course).
3- Essential References	
	Devlin T. M, (2010), Textbook of Biochemistry with Clinical Correlations, 7th edition, New York,
4- Electronic Materials and Web Sites *etc*.	
	• Periodical Book Website • http://www.kumc.edu/biochemistry/resource.htm • http://www.medlib.iupui.edu/ref/biochem.htm
5- Other Learning Material:	
	Hand out (if possible) prepare by the lecturer.

X.	Course Policies:
1	**Class Attendance:** ▪ **Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.**
2	**Tardiness:** **- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.**
3	**Exam Attendance/Punctuality:** ▪ **Exam attendance is obligatory unless being excused by the department and faculty.** ▪ **Absence from assignments or exams will be dealt with according to the general policy of the university.**
4	**Assignments & Projects:** ▪ **Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.** ▪ **Projects: Not applicable.**
5	**Cheating:** ▪ **Punishment of cheating will be according to the general policy of the university in this respect.**
6	**Plagiarism:** ▪ **Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.**
7	**Other policies:** ▪ **General policies of the Students' Affairs of the University and the Quality Assurance Unit.**

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Course Plan of Pharmaceutical Biochemistry (I)

I. - Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Assoc. Proff. / Badria A. Shamsan	Office Hours					
Location & Telephone No.	775010533	SAT	SUN	MON	TUE	WED	THU
E-mail	Biobadria@hotmail.com				10-12		

II. Course Identification and General Information:

1-	Course Title:	Pharmaceutical Biochemistry (I)				
2-	Course Number & Code:	**Ph741**				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	2nd semester of 2nd Level				
5-	Pre –requisite (if any):	General Pharmaceutical Chemistry, Pharmaceutical Organic Chemistry & Pharmaceutical Analytical Chemistry				
6-	Co –requisite (if any):	Physiology II				
7-	Program (s) in which the course is offered	Bachelor of pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				

10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III. Course description:

The course is designed to provide candidate with good knowledge about structure and function of carbohydrates, lipids and proteins. It also provides candidate with a basic knowledge in modern biochemistry and molecular biology necessary for an understanding of the life sciences at the molecular level, in addition to help students to become familiar with the biochemical knowledge and skills necessary to understand other related subjects.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

22. Define the types, structures, classification, physical, chemical properties, & functions, of different types of carbohydrates, and their derivative compounds resulted, illustrating the relationship between their structure and function.
23. Define the types, structures, classification, physical, chemical properties, & functions, of different types biological molecules of lipids and the relationship between their structure and function.
24. Describe the classes of amino acids & their structures, functions, and the effective biological compounds produced from them.
25. Explain types of protein classifications, structures, function and denaturation & re-naturation processes and their relation-ship in health and diseases .
26. Define the types, structures& classification, of different types of enzymes, and their isozymes, illustrating their function in the diagnosis of diseases.
27. Describe the sources, types, structures, classification, & functions, of vitamines, and their derivative compounds, illustrating their function and deficiency diseases resulted or hypervitaminosis.
28. Discuss the types, structures, properties of nucleic acids (DNA & RNA), and mechanisms of flow of genetic information, and protein synthesis, (the replications, transcriptions, and translations processes).
29. Point-out the different types of biological molecules, e.g. (sugars, amino acids, proteins & fatty acids), and differentiate between the essential, and the non-essential ones.
30. Summarize and categorize some enzymes & isoenzymes reactions, with their clinical & diagnostic significance.
31. Interpret symptoms, signs and biochemical lab. findings (deficiency diseases), of some macro and trace elements, as some plasma proteins, enzymes, vitamins, and minerals as (Ca^{++}, Na^{+}, K^{+}, Iron, etc.)
32. Consolidate & illustrating the different types of mutations, to construct the normal and abnormal (mutant) samples, as sickle cell anemia
33. Identify of many genetic diseases due to deficiency of certain biological molecules.
34. Identify the physical & chemical properties of carbohydrates and to differentiate between the reducing substances present in urine in health & disease.
35. Identify the physical & chemical properties of different types of amino acids and proteins, using different methods (electrophoresis, chromatography, ppt. methods etc.).
36. Perform the physical and chemical tests to study the properties of lipids, fatty acids, triglycerides, cholesterol, and lipoproteins
37. Practice the qualitative determinations of macromolecules and write a small report to discuss the result or themethod.
38. Dialogue and discuss medical conditions of patients depending on biochemical lab investigations.
39. Deal & cooperative with information technology, and utilize the resources of biomedical information including the available electronic facilities to update knowledge and solve emerging problems.
40. Adopt the principles of lifelong and communicate effectively with a group in lab. or during preparation of seminars.
41. Work independently, or collaboratively as a medical teamwork member, during certain community crisis.
42. Write reports or proposals.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect					
Order	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Week Due**	**Contact hours**
1	Carbohydrate Chemistry, Classification, types & their biological importance.	a1, b1, c1, c4, c5, d1, d3.	- Monosaccharides, - Disaccharides, - Oligosaccharides. - Polysaccharides, Physical & chemical properties, their functions & resulted diseases.	**1,2**	**4**
2	Lipid Chemistry, Types, their biological importance.	a2, b1, c3, c4, c5, d1	- Triglycerides. - Phospholipids & lipoprot- -eins, their chemical , physical properties & types, with their clinical importance - Cholesterol, advantage, disadvantage & resulted diseases as (Atherosclerosis).	**3-5**	**6**
3	Amino Acids & proteins Chemistry.	a3, a4, b1, b3, c2, c4, c5, d1	-Classifications, Physical, chemical properties & their biological importance.	**6,7**	**4**
4	Midterm exam			**8**	**2**
5	Heamoglobin	a7, b3, b4, b5, c2, c5, d1	-Structures, Types, Function & resulted disorders.	**9**	**2**
6	Enzymes	a4, a5, b2, b3, b5, c2, c4, c5, d1	-Classifications, Function, Mod of actions, Factors affecting their activities & their clinical applications in diagnostic aspect.	**10,11**	**4**
7	Vitamins	a2, a6, b3, c5, d1	-Classifications, derivatives, sources, daily requirements, functions, deficiency diseases and toxicity.	**12,13**	**4**

8	Nucleic Acids Chemistry , DNA replication & Protein Synthesis.	a7, b4, b5, c4, c5, d1	- Types, Structures, Functions. -Replication -Trascription -Translation (Protein synthesis) -PCR & c-DNA.	**14,15**	**4**
9	Final exam			**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Week Due	Contact hours
1	Identification of Carbohydrates, lipids & proteins.	a1, a2, a3, a4, b1, b3, c1, c2, c3, c4, c5, d1	**1-4**	**8**
2	Chromatographical analysis for amino acids.	c2, c3, c5	**5,6**	**4**
3	Osazone tests to differentiate between urine sugars.	c1	**7**	**2**
4	Mid term exam	c1-5	**8**	**2**
5	Precipitate of different proteins by different methods.	a4, c2, c4	**9-11**	**6**
6	Differentiate between types of proteins (Albumin, Benz-Jones protein), for diagnostic purpose.	a4, c2, c4, c5	**12-14**	**6**
7	Review	c1-5	**15**	**2**
8	Final exam	c1-5	**16**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

- **Lectures**
- Discussion sessions ▪ Lab sessions.
- Assignment and reports.
- Self – learning.
- Practical session.
- Brain storming.

-Assessment Methods:

- Mid term written exam to assess Knowledge and understanding skills and Intellectual skills. ▪ Final written exam to assess Knowledge and understanding skills and Intellectual skills.
- Observation.
- Oral evaluation.
- Reports.
- Quizzes.

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**10**	**7%**	a1- a7, b1 – b5, c1 – c5, d1
2	**Assignments**	**4-12**	**10**	**7%**	c1-c5, d1- d4
3	**Attendance, reports and mid practical exam**	**ALL**	**30**	**20%**	c1-c5
5	**Mid-semester exam**	**8**	**30**	**20%**	a1- a4, b1-b5, c1-c5, d1-d4
6	**Final Exam (theoretical)**	**16**	**50**	**33%**	a1- a7, b1-b5, c1-c5, d1-d4
7	**Final Practical Exam**	**13-14**	**20**	**13%**	a1- a4, b1-b5, c1-c5, d1-d4
	Total		**150**	**10%**	

VIII. Students' Support:

Office Hours/week	Other Procedures (if any)

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- 2 hr./ week	By social media (Face-book) or Whatsapp.

IX. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

- Murray RK, Granner DK, Mayes PA, Rodwell VW, (2003), Harper's Illustrated Biochemistry: 26th edition, McGraw-Hill companies New York,.
- Champe PC, Harvey RA. Ferrier DR, (2007), Lippincott's Reviews of Biochemistry, 3rd edition Lippincott William & Wilkins London,.
- David L. Nelson and Michael M, (2012), Lehninger Principles of Biochemistry, Cox. 6th edition, W.H. Freeman.

7- Recommended Readings and Reference Materials

- Pankaja Naik , , 2010, Biochemistry, 3rd Edition.
- Stryer B. L, 2011. Biochemistry 2nd edition, (Short course).

8- Essential References

- Devlin T. M, (2010), Textbook of Biochemistry with Clinical Correlations, 7th edition, New York,

9- Electronic Materials and Web Sites *etc*.

- Periodical Book Website
- http://www.kumc.edu/biochemistry/resource.htm
- http://www.medlib.iupui.edu/ref/biochem.htm

10- Other Learning Material:

- Hand out (if possible) prepare by the lecturer.

XI. Course Policies:

1 Class Attendance:

- **Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.**

2	**Tardiness:** **- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.**
3	**Exam Attendance/Punctuality:** ▪ **Exam attendance is obligatory unless being excused by the department and faculty.** ▪ **Absence from assignments or exams will be dealt with according to the general policy of the university.**
4	**Assignments & Projects:** ▪ **Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.** ▪ **Projects: Not applicable.**
5	**Cheating:** ▪ **Punishment of cheating will be according to the general policy of the university in this respect.**
6	**Plagiarism:** ▪ **Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.**
7	**Other policies:** ▪ **General policies of the Students' Affairs of the University and the Quality Assurance Unit.**

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Course Specification of Pharmacology I

I. Course Identification and General Information:

1.	**Course Title**	Pharmacology I				
2.	**Course Number & Code:**	Ph455				
3.	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4.	**Study level/ semester at which this course is offered:**	3rd level /1st semester				
5.	**Pre –requisite (if any):**	Anatomy and histology Physiology I, II				
6.	**Co –requisite (if any):**	-				
7.	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8.	**Language of teaching the course:**	English				
9.	**The department in which the course is offered:**	-				
10.	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
11.	**Prepared by:**	Associate Prof. Fahmy M. Al-Wasei				
12.	**Date of approval:**					

II. Course description:

This course is an essential topic for pharmacy, which provide students with the basic principles of the science of pharmacology and familiarizes them with the necessary terminology. This module has a reflective, interactive and analytical contextual focus. However, it deals with concept of drug receptor interaction, the mode o action of drugs, the modifying responses and adverse effects, the dose-response relationship, drug toxicity ,drug absorption, distribution, protein binding, metabolism, and excretion. It also includes detailed information about drugs acting on the autonomic nervous system and drugs acting on CNS as well as the histaminaregic and serotonergic drugs. The module also covers drug abuse.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Explicit the various types of pharmacokinetics (pharmacodynamics), mechanisms of action (MAO) , adverse effects , doses (effective, lethal), therapeutic index and drug interactions of drugs.
2. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug posology of drugs affecting autonomic nervous system, skeletal muscles.
3. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs affecting autonomic nervous system, skeletal muscles.
4. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
5. Classify drugs used for disorders of drugs affecting autonomic nervous system, skeletal muscles.
6. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
7. Relate drug indications to MAO of drugs.
8. Predict drug limitations on the basis of Drug MOA.
9. Select an appropriate drug for patients based on drug benefits and limitation.
10. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
11. Carry out appropriate techniques and measurements in experimental pharmacology.
12. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
13. Prepare critical, scientific and referenced reports 14. Share successfully in team-work.
15. Show respect to life.
16. Demonstrate time management and self-learning during performing practical and professional works and assignments.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a1-**	Explicit the various types of pharmacokinetics (pharmacodynamics), mechanisms of action (MAO) , adverse effects , doses (effective, lethal), therapeutic index and drug interactions of drugs.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.	**a2-**	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug posology of drugs affecting autonomic nervous system, skeletal muscles.
		a3-	Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs affecting autonomic nervous system, skeletal muscles.
		a4-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
a1-	Explicit the various types of pharmacokinetics (pharmacodynamics), mechanisms of action (MAO) , adverse effects , doses (effective, lethal), therapeutic index and drug interactions of drugs.	Lectures methods , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug posology of drugs affecting autonomic nervous system, skeletal muscles.		
a3-	Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs affecting autonomic nervous system, skeletal muscles.		
a4-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.		

(B) Intellectual Skills:	
Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills	
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**

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After completing this program, students would be able to:		After participating in the course, students would be able to:	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Classify drugs used for disorders of drugs affecting autonomic nervous system, skeletal muscles.
		b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Relate drug indications to MAO of drugs.
		b4-	Predict drug limitations on the basis of Drug MOA.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b5-**	Select an appropriate drug for patients based on drug benefits and limitation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Classify drugs used for disorders of drugs affecting autonomic nervous system, skeletal muscles.	Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency)and drug limitations.		
b3-	Relate drug indications to MAO of drugs.		

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b4-	Predict drug limitations on the basis of Drug MOA.		
b5-	Select an appropriate drug for patients based on drug benefits and limitation.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
		c2-	Carry out appropriate techniques and measurements in experimental pharmacology.
		c3-	Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c4-**	Prepare critical, scientific and referenced reports

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C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.	Lectures methods, practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Carry out appropriate techniques and measurements		
	in experimental pharmacology.		
c3-	Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.		
c4-	Prepare critical, scientific and referenced reports		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	Course Intended Learning Outcomes (CILOs) in General / Transferable skills
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

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D1-	Practice independent learning needed for continuous professional development	**d1-**	Share successfully in team-work.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Show respect to life.
		d3-	Demonstrate time management and selflearning during performing practical and professional works and assignments.

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Share successfully in team-work.	Small group discussions, Tutorials and Practical session	Homework and reports.
d2-	Show respect to life.		
d3-	Demonstrate time management and self-learning during performing practical and professional works and assignments.		

v. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1.	**Introduction to pharmacology** **(General pharmacology)**	a1-4, b25,d2	Definition, brief history Divisions of pharmacology (pharmacokinetics, pharmacodynamics : definitions, field of concern) Dose-Response curve Types of dose (effective, lethal), therapeutic index Drug efficacy and drug potency Mechanisms of drug action : drug targets (receptors, enzymes, ion channels, etc). receptor theory , types of receptors, affinity, specificity, selectivity, agonist, antagonist, competitive and noncompetitive , reversible and irreversible. Enzymes as drug targets : types, examples, mechanisms Ion channels as drug target : types, xamples, mechanisms Neurotransmitters and	4	8

			autacoids: physiopathologic roles Types of drug adverse effects with examples Types of drug interactions effects with examples Pharmacokinetics (in brief) : drug absorption, distribution, metabolism, excretion		
2.	**Drugs acting on the autonomics nervous system**	a2-4, b1-5 d1,d2	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of : Indirectly sympathomimetics Direct symapthomimetics: adrenergic agonists Indirectly sympatholytic drugs Directly sympatholytic drugs : adrenergic blocking agents	3	6
3.	**Midterm exam**	a2-4, b1-5		1	2

4.	**Drugs acting on the autonomics nervous system**	a2-4, b1-5 d1,d2	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action,	2	4
			indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of : Indirectly parasympathomimetics Direct parasympathomimetics : cholinergic agonists Indirectly parasympatholytic drugs Directly sympatholytic drugs : cholinergic blocking agents Drugs affecting autonomic ganglia: ganglia stimulants , ganglia blockers		

5.	**Drugs affecting skeletal muscles**	a2-4, b1-5 d1,d3	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of : Neuromuscular blocking agents Central muscles relaxants.	1	2
6.	**Autacoids**	a2-4, b1-5	Histamine and	3	6
		d1,d3	Antihistamines. Prostaglandine. Serotonin and Serotonin antagonist. Kinins and other peptides.		
7.	**Course Review**	a1-4, b15,d1-3	Review of the course topics by discussion session.	1	2
8.	**Final Exam**	a1-5, b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect				
Order	**Tasks/ Experiments**	**CILOs (symbols)**	**Number of Weeks**	**Contact Hours**

1	Study of the common laboratory animals used in experimental pharmacology and their handling.	c1-c4, d1-d3	1	2
2.	Study of the dosage forms and the routes of administration of drugs in mice/rats.	c1-c4, d1-d3	1	2
3	Study of the effect of hepatic microsomal enzyme inhibitors and induction on the duration of action of pentobarbitone in mice/rat.	c1-c4, d1-d3	1	2
4	Study of the effect of neuromuscular blockers and anticholinesterase on the skeletal muscles.	c1-c4, d1-d3	1	2
5	Effect of cholinergic agents on rabbit eye	c1-c4, d1-d3	1	2
6	Effect of anticholinergic agents on rabbit eye	c1-c4, d1-d3	1	2
7	Study of agonistic and antagonistic effects of drugs, using isolated rat/mice intestine.	c1-c4, d1-d3	2	4
8	Mid-Exam	c1-c4, d1-d3	1	2
9	Record the effect of physostigmine on the concentration response curve of acetylcholine using isolated rectus abdominis muscle preparation of frog.	c1-c4, d1-d3	1	2
10	To study the Analgesic activity of some drugs on tail flick apparatus in rats.	c1-c4, d1-d3	1	2
11		c1-c4, d1-d3	1	2
12	To study the anti-inflammatory activity of ibuprofen in rats.	c1-c4, d1-d3	1	2
13	Use of computer simulated CDs or Video cassettes for pharmacology practical whenever possible.	c1-c4, d1-d3	2	4
14	Final Exam	c1-c4	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

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Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation, reports**	**All**	10	7%	a1-4,b1-5, d1-3
	and quizzes	**Weeks**			
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-5, b1-3, d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	c1-4

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5.	**Theoretical mid-semester exam**	8th	30	20%	a1, a2, a3, b1, b3
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill

2- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

1. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
2. Udaykumar. Text book of medical pharmacology

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	3. Lectures Notes and Practical Manual.
3- Electronic Materials and Web Sites *etc.*	
	www.en.wikipedia.org/

IV. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.

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	▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmacology I

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Fahmy M. Al-Wasei	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail			4h				

II- Course Identification and General Information:

1-	Course Title:	Pharmacology I				
2-	Course Number & Code:	Ph455				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	3rd level /1st semester				
5-	Pre –requisite (if any):	Anatomy and histology Physiology I, II				
6-	Co –requisite (if any):	-				

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7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy
8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

This course is an essential topic for pharmacy, which provide students with the basic principles of the science of pharmacology and familiarizes them with the necessary terminology. This module has a reflective, interactive and analytical contextual focus. However, it deals with concept of drug receptor interaction, the mode o action of drugs, the modifying responses and adverse effects, the dose-response relationship, drug toxicity ,drug absorption, distribution, protein binding, metabolism, and excretion. It also includes detailed information about drugs acting on the autonomic nervous system and drugs acting on CNS as well as the histaminaregic and serotonergic drugs. The module also covers drug abuse.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Explicit the various types of pharmacokinetics (pharmacodynamics), mechanisms of action (MAO) , adverse effects , doses (effective, lethal), therapeutic index and drug interactions of drugs.
2. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug posology of drugs affecting autonomic nervous system, skeletal muscles.
3. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs affecting autonomic nervous system, skeletal muscles.
4. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
5. Classify drugs used for disorders of drugs affecting autonomic nervous system, skeletal muscles.
6. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
7. Relate drug indications to MAO of drugs.
8. Predict drug limitations on the basis of Drug MOA.
9. Select an appropriate drug for patients based on drug benefits and limitation.
10. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
11. Carry out appropriate techniques and measurements in experimental pharmacology.
12. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
13. Prepare critical, scientific and referenced reports 14. Share successfully in team-work.
15. Show respect to life.
16. Demonstrate time management and self-learning during performing practical and professional works and assignments.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1.	**Introduction to pharmacology** **(General pharmacology)**	a1-4, b25,d2	Definition, brief history Divisions of pharmacology (pharmacokinetics, pharmacodynamics : definitions, field of concern) Dose-Response curve Types of dose (effective, lethal), therapeutic index Drug efficacy and drug potency Mechanisms of drug action : drug targets (receptors, enzymes, ion channels, etc). receptor theory , types of receptors, affinity, specificity, selectivity, agonist, antagonist, competitive and noncompetitive , reversible and irreversible. Enzymes as drug targets : types, examples, mechanisms Ion channels as drug target : types,	1-4	8

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			xamples, mechanisms Neurotransmitters and autacoids: physiopathologic roles Types of drug adverse effects with examples Types of drug interactions effects with examples Pharmacokinetics (in brief) : drug absorption, distribution, metabolism, excretion		
2.	**Drugs acting on the autonomics nervous system**	a2-4, b1-5 d1,d2	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of : Indirectly sympathomimetics Direct symapthomimetics: adrenergic agonists Indirectly sympatholytic drugs Directly sympatholytic drugs : adrenergic blocking agents	5-7	6
3.	**Midterm exam**	a2-4, b1-5		8	2

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4.	**Drugs acting on the**	a2-4, b1-5	Pharmacokinetics, Pharmacodynamics [	9,10	4
	autonomics nervous system	d1,d2	drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of : Indirectly parasympathomimetics Direct parasympathomimetics : cholinergic agonists Indirectly parasympatholytic drugs Directly sympatholytic drugs : cholinergic blocking agents Drugs affecting autonomic ganglia: ganglia stimulants , ganglia blockers		

5.	**Drugs affecting skeletal muscles**	a2-4, b1-5 d1,d3	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of : Neuromuscular blocking agents Central muscles relaxants.	11	2
6.	**Autacoids**	a2-4, b1-5 d1,d3	Histamine and Antihistamines. Prostaglandine. Serotonin and Serotonin antagonist. Kinins and other peptides.	12-14	6
7.	**Course Review**	a1-4, b15,d1-3	Review of the course topics by discussion session.	15	2
8.	**Final Exam**	a1-5, b1-4		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect				
Order	**Tasks/ Experiments**	**CILOs (symbols)**	**Week Due**	**Contact Hours**

1	Study of the common laboratory animals used in experimental pharmacology and their handling.	c1-c4, d1-d3	1	2
2.	Study of the dosage forms and the routes of administration of drugs in mice/rats.	c1-c4, d1-d3	2	2
3	Study of the effect of hepatic microsomal enzyme inhibitors and induction on the duration of action of pentobarbitone in mice/rat.	c1-c4, d1-d3	3	2
4	Study of the effect of neuromuscular blockers and anticholinesterase on the skeletal muscles.	c1-c4, d1-d3	4	2
5	Effect of cholinergic agents on rabbit eye	c1-c4, d1-d3	5	2
6	Effect of anticholinergic agents on rabbit eye	c1-c4, d1-d3	6	2
7	Study of agonistic and antagonistic effects of drugs, using isolated rat/mice intestine.	c1-c4, d1-d3	7,8	4
8	Mid-Exam	c1-c4, d1-d3	9	2
9	Record the effect of physostigmine on the concentration response curve of acetylcholine using isolated rectus	c1-c4, d1-d3	10	2
	abdominis muscle preparation of frog.			
10	To study the Analgesic activity of some drugs on tail flick apparatus in rats.	c1-c4, d1-d3	11	2
11		c1-c4, d1-d3	12	2
12	To study the anti-inflammatory activity of ibuprofen in rats.	c1-c4, d1-d3	13	2
13	Use of computer simulated CDs or Video cassettes for pharmacology practical whenever possible.	c1-c4, d1-d3	14,15	4
14	Final Exam	c1-c4	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-4,b1-5, d1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-5, b1-3, d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	c1-4

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12.	**Theoretical mid-semester exam**	8th	30	20%	a1, a2, a3, b1, b3
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill

4- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

4. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
5. Udaykumar. Text book of medical pharmacology

	6. Lectures Notes and Practical Manual.
3- Electronic Materials and Web Sites *etc.*	
	www.en.wikipedia.org/

IX. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

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8- Processes for improvement of teaching.

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- Checking of a sample of students' work by an independent faculty member.

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	▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutical Biochemistry (II)					
2	Course Number & Code:	Ph752					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2	-	-	3	
4	Study level/ semester at which this course is offered:	1st semester of 3rd Level.					
5	Pre –requisite (if any):	General Pharmaceutical Chemistry, Pharmaceutical Organic Chemistry & Pharmaceutical Analytical Chemistry					
6	Co –requisite (if any):	Physiology & Pathology					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	Location of teaching the course:	Faculty of Pharmacy- Sana`a University.					
10	Prepared by:	*Assoc. Proff. Badria A. Shamsan*					
11	Date of approval:						

II. Course description:

The course is designed to provide the student with an appropriate exposure to the medical biochemistry discipline, which will assist students in understanding biochemical events at the cellular level to the physiological process occurring in human body, and explain the biochemical alteration in health and disease. Also to enable the students to be oriented with concepts of molecular biology, and how this field gave them a new perspective and new technology used in the diagnosis, treatment and new drugs design.

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I. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Describe carbohydrates, proteins & amino acids digestion, absorption & transportation.
2. Explore the general digestion, absorption & transported processes, synthesis, metabolism and fate of dietary lipids and cholesterol.
3. Describe (fatty acid oxidation & synthesis), (triglyceride, phospholipid, & lipoproteins metabolism)
4. llustrate the need for energy in the human body, and list the phases of energy transformation, and be familiar with the different bioenergetics terms
5. Define the metabolic pathways as (glycolysis & gluconeogenesis, glycogenesis, glycogenolysis, uronic acid pathway & pentose phosphate pathway, (reactions, regulation, & significance), illustrating the integration process inside the human body.
6. Describe protein and amino acids metabolism: (deamination & transamination reactions, urea formation), regulation, significance & disorders.
7. Explain the effect of (cation & anion) as: Ca^{2+}, Na^{+}, K^{+}, and HCO3-, Cl-, etc…, their roles in maintenance of gastric pH & blood pH, in health and disease state. (reaction, regulation, significance & disorders).
8. Discuss blood glucose, lipids (cholesterol & lipoproteins), proteins, amino acids levels & their regulations, biological importance, and usefulness in diagnostic values.
9. Differentiate between various biomolecules metabolic pathways.
10. Calculate energy (produced & requirements) for different pathways, (anabolic & catabolic reactions) in health and diseases.
11. Interpret symptoms, signs, and biochemical laboratory findings of some macro & trace elements (deficiency disease).
12. Summarize the clinical significance and some enzymes reactions & kinetics.
13. Point-out the application of molecular biology in basic & clinical sciences.
14. Interpret some plasma proteins electrophoresis.
15. Perform chemical tests (analysis) to study the properties of carbohydrate, lipids & proteins).
16. Estimate glucose in the blood & urine.
17. Estimation of lipid profile as (cholesterol, triglyceride, LDL & HDL).
18. Estimate total proteins, bilirubin, albumin, urea , creatinine, certain enzymes & hormones.
19. Apply different methods for separation processes & expression of concentration and calculation of the dilution, & pH of solutions.
20. Deal with information technology& electronic forms.
21. Collaborate with colleagues in team work inside the lab & as well as solving problems
22. Implement writing and presentation skills through creation of research proposal group discussions & oral presentations.
23. Manage time effectively.

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III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Describe carbohydrates, proteins & amino acids digestion, absorption & transportation.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Explore the general digestion, absorption & transported processes, synthesis, metabolism and fate of dietary lipids and cholesterol.
		a3-	Describe (fatty acid oxidation & synthesis), (triglyceride, phospholipid, & lipoproteins metabolism).
		a4-	Illustrate the need for energy in the human body, and list the phases of energy transformation, and be familiar with the different bioenergetics terms.
		a5-	Define the metabolic pathways as (glycolysis & gluconeogenesis, glycogenesis, glycogenolysis, uronic acid pathway & pentose phosphate pathway, (reactions, regulation, & significance), illustrating the integration process inside the human body.
		a6-	Describe protein and amino acids metabolism: (deamination & transamination reactions, urea formation), regulation, significance & disorders.

		a7-	Explain the effect of (cation & anion) as: Ca^{2+}, Na^{+}, K^{+}, and HCO3-, Cl-, etc…, their roles in maintenance of gastric pH & blood pH, in health and disease state. (reaction, regulation, significance & disorders).
		a8-	~~Discuss blood glucose, lipids (cholesterol & lipoproteins), proteins, amino acids levels & their regulations, biological importance, and usefulness in~~ diagnostic values.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding	Understanding to Teaching and Teaching strategies/methods to be used	Assessment Methods: Methods of assessment
completing this course, students will be able to: **a1-** Describe carbohydrates, proteins & amino acids digestion, absorption & transportation. **a2-** Explore the general digestion, absorption & ~~transported~~ processes, synthesis, metabolism and fate of dietary lipids and cholesterol. **a3-** Describe (fatty acid oxidation & synthesis), (triglyceride, phospholipid, & lipoproteins metabolism). **a4-** Illustrate the need for energy in the human body, and list the phases of energy transformation, and be familiar with the different bioenergetics terms. **a5-** Define the metabolic pathways as (glycolysis & gluconeogenesis, glycogenesis, glycogenolysis, uronic acid pathway & pentose phosphate pathway, (reactions, regulation, & significance), illustrating the integration process inside the human body. **a6-** Describe protein and ~~amino acids metabolism: (deamination & transamination~~ reactions, urea formation), regulation, significance & disorders. ~~**a7-** Explain the effect of (cation & anion) as: Ca^{2+}, Na^{+},~~ K^{+}, and HCO3-, Cl-, etc…, their roles in maintenance of gastric pH & blood pH, in health and disease state. (reaction, regulation, significance & disorders).	▪ **Brain storming** ▪ **Written Exam** ▪ **Lecture** ▪ **Practical competence assessment & practical Exam.** ▪ **Oral evaluation.**	

a8-	Discuss blood glucose, lipids (cholesterol & lipoproteins), proteins, amino acids levels & their regulations, biological importance, and usefulness in diagnostic values.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Differentiate between various biomolecules metabolic pathways.
		b2-	Calculate energy (produced & requirements) for different pathways, (anabolic & catabolic reactions) in health and diseases.
		b3-	Interpret symptoms, signs, and biochemical laboratory findings of some macro & trace elements (deficiency disease).
		b4-	Summarize the clinical significance and some enzymes reactions & kinetics.
		b5-	Point-out the application of molecular biology in basic & clinical sciences.
		b6-	Interpret some plasma proteins electrophoresis.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.	Teaching strategies/methods to be used	Methods of assessment

After completing this course, students will be able to:		▪ Brain Storming ▪ Lectures ▪ Discussions	▪ **Written Exam** ▪ **Practical competence assessment & Report** ▪ **practical Exam.** ▪ **Oral evaluation**
b1-	Differentiate between various biomolecules metabolic pathways.		
b2-	Calculate energy (produced & requirements) for different pathways, (anabolic & catabolic reactions) in health and diseases.		
b3-	Interpret symptoms, signs, and biochemical laboratory findings of some macro & trace elements (deficiency disease).		
b4-	Summarize the clinical significance and some enzymes reactions & kinetics.		
b5-	Point-out the application of molecular biology in basic & clinical sciences.		
b6-	Interpret some plasma proteins electrophoresis.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Perform chemical tests (analysis) to study the properties of carbohydrate, lipids & proteins).

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د.م.بدرية شمسان	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

C2-	Handle and dispose chemicals and pharmaceutical preparations including radio-pharmaceuticals safely and effectively.	**c2-**	Estimate glucose in the blood & urine.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Estimation of lipid profile as (cholesterol, triglyceride, LDL & HDL).
		c4-	Estimate of , total proteins, bilirubin, albumin, urea , creatinine, certain enzymes & hormones.
		c5-	Apply different methods for separation processes & expression of concentration and calculation of the dilution, & pH of solutions.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		▪ **Practical Lectures** ▪ **Group discussions**	▪ **Observations.** ▪ **Oral evaluation** ▪ **Drop quizzes.** ▪ **Reports**
c1-	Perform chemical tests (analysis) to study the properties of carbohydrate, lipids & proteins).		
c2-	Estimate glucose in the blood & urine.		
c3-	Estimation of lipid profile as (cholesterol, triglyceride, LDL & HDL).		
c4-	Estimate of , total proteins, albumin, bilirubin, urea , creatinine, certain enzymes & hormones.		
c5-	Apply different methods for separation processes & expression of concentration and calculation of the dilution, & pH of solutions.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Deal with information technology& electronic forms.
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d2	Collaborate with colleagues in team work inside the lab & as well as solving problems
D5-	Apply information and communication technology and working effectively in a team.	d3-	Implement writing and presentation skills through creation of research proposal group discussions & oral presentations.
		d4-	Manage time effectively.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		▪ Group work. ▪ Practical session. ▪ Oral presentations. ▪ Research proposal.	▪ Observation. ▪ Homework. ▪ Reports.
d1-	Deal with information technology& electronic forms.		
d2-	Collaborate with colleagues in team work inside the lab & as well as solving problems		
d3-	Implement writing and presentation skills through creation of research proposal group discussions & oral presentations.		

d4-	Manage time effectively.		

IV. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Carbohydrate digestion & metabolism:	a1, a4, a5, a8, b1, b2, b3, b4, c1, c2, d2, d3	-Glycolysis -Gluconeogenesis -Glycogenesis -Glycogenolysis -Glucouronic pathway -Pentose Phosphate Pathway -Mono saccharides interconvert able -Resulted of metabolic diseases (diabetes mellitus, …etc,)	**4**	**8**
2	Dietary lipid digestion & absorption.	a2, d2, d3	- metabolism of lipoproteins, (Chylomicron, Low Density Lipoprotein, High Density Lipoprotein, & the resulted metabolic diseases.	**1**	**2**

3	Fatty acids & triglycerides metabolism (synthesis & oxidation "degradation")	a2, a3, a8, b1, b2, b3, b4, c1, c3, d3, d2	-β-Oxidation of fatty acids & energy production. -Fatty acid synthesis & elongations.	**3**	**6**
4	Midterm exam			**1**	**2**
5	Complex lipid metabolism	a2, a3, a8, b1, b3, b4, c1, c3, d2, d3	-Phospholipids, -Glycolipids, Cerebroside and Ganglioside degradations.	**1**	**2**
6	Cholesterol metabolism	a2, a8, b1, b3, c3, d2, d3	-Cholesterol synthesis & degradation -Accumulation (atherosclerosis), -Cholesterol Ester,	**1**	**2**
7	Protein digestion & absorption mechanisms.	a1, a6, a8, b1, b3, b5, b6, c4, c5, d2, d3	- Gastric juice composition. - Formation of Hcl & HCO_3^-. -Simple diffusion -Active transport -Carrier transport	**1**	**2**
8	Amino acids metabolism (degradation & synthesis)	a1, a5, a6, a8, b1, b2, b3, c5, d2, d3	-Transamination & deamination reactions. - Shuttles to transfer the reducing agents produed. - Ammonia production, its fates. -Urea cycle.	**2**	**4**
9	Conversion of amino acids to specializes products.	a8, b1, b3, c4, d2, d3	-Special products from different amino acids & their biological importance.	**1**	**2**
10	Final exam			**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	-Define the principles of lab. safety & how to deal with the equipments and glass ware.	c1- c5, d1, d2	1	2
2	Differentiate between serum & plasma. Assay of bilirubin (direct & indirect).	c4, d2, d3	1	2
3	Assay of blood glucose. GGT-test.	a8, c2, d2, d4	2	4
4	Assay of blood triglyceride & cholesterol	a2, a8, c3, d2, d3	1	2
5	Assay of LDL & HDL	a1, a2, a3, a8, c3, d2, d4	1	2
6	Practical Mid-Term Exam	b1-b4, c1-c3, d2, d4	1	2
7	Assay of blood total proteins &Albumin	b3, b6, c1, c4, c5, d2, d4	1	2
8	Assay of LDH, GPT, GOT, Amylase, Lipase enzymes.	b3, b4, c4, d2, d4	2	4
9	Urine analysis: - using urine-strip to test all biochemical parametres as: glucose, proteins, sp.gravity, ….etc.(normal & abnormal urine samples).	c2, d2, d4	1	2
10	-Isolations of amino acid in urine sample by chromatography.	c5, d2, d4	2	4
11	Review	c1-5	1	2
12	Practical Final Exam	b1, b3, b4, b6, c1-c5, d1-d4	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

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ا.د.م.بدرية شمسان	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

V. Teaching strategies of the course:

- **Lectures**
- Discussion sessions ▪ Lab sessions.
- Assignment and reports.
- Self – learning.
- Practical session.
- Brain storming.

-Assessment Methods:

- Mid term written exam to assess Knowledge and understanding skills and Intellectual skills.
- Final written exam to assess Knowledge and understanding skills and Intellectual skills. ▪ Observation.
- Oral evaluation.
- Reports.
- Quizzes.

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**10**	**7%**	a1-a8, b1-b6
2	**Assignments**	**4-12**	**10**	**7%**	c1- c5
3	**Attendance, reports and mid practical exam**	**ALL**	**30**	**20%**	c1-c5
4	**Mid-semester exam**	**9**	**30**	**20%**	a1-a8, b1-b6, c1-c5, d1-d3
5	**Final theoretical Exam**	**16**	**50**	**33%**	a1-a8, b1-b6, c1-c5, d1-d4
6	**Final practical Exam**	**13-14**	**20**	**13%**	c1-c5

	Total	**150**	**10%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
- 2 hr./ week	By social media (Face-book) or Whatsapp.

VIII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Murray RK, Granner DK, Mayes PA, Rodwell VW, (2003), Harper's Illustrated Biochemistry: 26th edition, McGraw-Hill companies New York,.
- Champe PC, Harvey RA. Ferrier DR, (2007), Lippincott's Reviews of Biochemistry, 3rd edition Lippincott William & Wilkins London,.
- David L. Nelson and Michael M, (2012), Lehninger Principles of Biochemistry, Cox. 6th edition, W.H. Freeman.

2- Recommended Readings and Reference Materials

- Pankaja Naik , , 2010, Biochemistry, 3rd Edition.
- Stryer B. L, 2011. Biochemistry 2nd edition, (Short course).

3- Essential References

- Devlin T. M, (2010), Textbook of Biochemistry with Clinical Correlations, 7th edition, New York,

4- Electronic Materials and Web Sites *etc*.

	• Periodical Book Website • http://www.kumc.edu/biochemistry/resource.htm • http://www.medlib.iupui.edu/ref/biochem.htm
5- Other Learning Material:	
	Hand out (if possible) prepare by the lecturer.

X.	**Course Policies:**
1	**Class Attendance:** ▪ **Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.**
2	**Tardiness:** **- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.**
3	**Exam Attendance/Punctuality:** ▪ **Exam attendance is obligatory unless being excused by the department and faculty.** ▪ **Absence from assignments or exams will be dealt with according to the general policy of the university.**
4	**Assignments & Projects:** ▪ **Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.** ▪ **Projects: Not applicable.**
5	**Cheating:** ▪ **Punishment of cheating will be according to the general policy of the university in this respect.**
6	**Plagiarism:** ▪ **Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.**
7	**Other policies:** ▪ **General policies of the Students' Affairs of the University and the Quality Assurance Unit.**

Course Plan of Pharmaceutical Biochemistry (II)

I. - Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Badria A. Shamsan Al-Nedhari						
Location & Telephone No.	775010533	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Biobadria@hotmail.com				**10-12**		

II. Course Identification and General Information:

1-	**Course Title:**	**Pharmaceutical Biochemistry (II)**				
2-	**Course Number & Code:**	**Ph 752**				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	**-**	**2**	**-**	**3**
4-	**Study level/year at which this course is offered:**	1st semester of 3rd Level.				
5-	**Pre –requisite (if any):**	General Pharmaceutical Chemistry, Pharmaceutical Organic Chemistry & Pharmaceutical Analytical Chemistry				
6-	**Co –requisite (if any):**	Physiology & Pathology				
7-	**Program (s) in which the course is offered**	Bachelor degree of Pharmacy				

8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III. Course description:

The course is designed to provide the student with an appropriate exposure to the medical biochemistry discipline, which will assist students in understanding biochemical events at the cellular level to the physiological process occurring in human body, and explain the biochemical alteration in health and disease. Also to enable the students to be oriented with concepts of molecular biology, and how this field gave them a new perspective and new technology used in the diagnosis, treatment and new drugs design.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Describe carbohydrates, proteins & amino acids digestion, absorption & transportation.
2. Explore the general digestion, absorption & transported processes, synthesis, metabolism and fate of dietary lipids and cholesterol.
3. Describe (fatty acid oxidation & synthesis), (triglyceride, phospholipid, & lipoproteins metabolism)
4. llustrate the need for energy in the human body, and list the phases of energy transformation, and be familiar with the different bioenergetics terms
5. Define the metabolic pathways as (glycolysis & gluconeogenesis, glycogenesis, glycogenolysis, uronic acid pathway & pentose phosphate pathway, (reactions, regulation, & significance), illustrating the integration process inside the human body.
6. Describe protein and amino acids metabolism: (deamination & transamination reactions, urea formation), regulation, significance & disorders.
7. Explain the effect of (cation & anion) as: Ca^{2+}, Na^{+}, K^{+}, and HCO3-, Cl-, etc…, their roles in maintenance of gastric pH & blood pH, in health and disease state. (reaction, regulation, significance & disorders).
8. Discuss blood glucose, lipids (cholesterol & lipoproteins), proteins, amino acids levels & their regulations, biological importance, and usefulness in diagnostic values.
9. Differentiate between various biomolecules metabolic pathways.
10. Calculate energy (produced & requirements) for different pathways, (anabolic & catabolic reactions) in health and diseases.
11. Interpret symptoms, signs, and biochemical laboratory findings of some macro & trace elements (deficiency disease).
12. Summarize the clinical significance and some enzymes reactions & kinetics.
13. Point-out the application of molecular biology in basic & clinical sciences.
14. Interpret some plasma proteins electrophoresis.
15. Perform chemical tests (analysis) to study the properties of carbohydrate, lipids & proteins).
16. Estimate glucose in the blood & urine.
17. Estimation of lipid profile as (cholesterol, triglyceride, LDL & HDL).
18. Estimate total proteins, bilirubin, albumin, urea , creatinine, certain enzymes & hormones.
19. Apply different methods for separation processes & expression of concentration and calculation of the dilution, & pH of solutions.
20. Deal with information technology& electronic forms.
21. Collaborate with colleagues in team work inside the lab & as well as solving problems
22. Implement writing and presentation skills through creation of research proposal group discussions & oral presentations.
23. Manage time effectively.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Carbohydrate digestion & metabolism:	a1, a4, a5, a8, b1, b2, b3, b4, c1, c2, d2, d3	-Glycolysis -Gluconeogenesis -Glycogenesis -Glycogenolysis -Glucouronic pathway -Pentose Phosphate Pathway -Mono saccharides interconvert able -Resulted of metabolic diseases (diabetes mellitus, …etc,)	**1-4**	**8**
2	Dietary lipid digestion & absorption.	a2, d2, d3	- metabolism of lipoproteins, (Chylomicron, Low Density Lipoprotein, High Density Lipoprotein, & the resulted metabolic diseases.	**5**	**2**
3	Fatty acids & triglycerides metabolism (synthesis & oxidation "degradation")	a2, a3, a8, b1, b2, b3, b4, c1, c3, d3, d2	-β-Oxidation of fatty acids & energy production. -Fatty acid synthesis & elongations.	**6-8**	**6**
4	Midterm exam			**9**	**2**

5	Complex lipid metabolism	a2, a3, a8, b1, b3, b4, c1, c3, d2, d3	-Phospholipids, -Glycolipids, Cerebroside and Ganglioside degradations.	**10**	**2**
6	Cholesterol metabolism	a2, a8, b1, b3, c3, d2, d3	-Cholesterol synthesis & degradation -Accumulation (atherosclerosis), -Cholesterol Ester,	**11**	**2**
7	Protein digestion & absorption mechanisms.	a1, a6, a8, b1, b3, b5, b6, c4, c5, d2, d3	- Gastric juice composition. - Formation of Hcl & HCO_3^-. -Simple diffusion -Active transport -Carrier transport	**12**	**2**
8	Amino acids metabolism (degradation & synthesis)	a1, a5, a6, a8, b1, b2, b3, c5, d2, d3	-Transamination & deamination reactions. - Shuttles to transfer the reducing agents produed. - Ammonia production, its fates. -Urea cycle.	**13,14**	**4**
9	Conversion of amino acids to specializes products.	a8, b1, b3, c4, d2, d3	-Special products from different amino acids & their biological importance.	**15**	**2**
10	Final exam			**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Week Due	Contact hours

1	-Define the principles of lab. safety & how to deal with the equipments and glass ware.	c1- c5, d1, d2	**1**	**2**
2	Differentiate between serum & plasma. Assay of bilirubin (direct & indirect).	c4, d2, d3	**2**	**2**
3	Assay of blood glucose.	a8, c2, d2, d4	**3,4**	**4**
	GGT-test.			
4	Assay of blood triglyceride & cholesterol	a2, a8, c3, d2, d3	**5**	**2**
5	Assay of LDL & HDL	a1, a2, a3, a8, c3, d2, d4	**6**	**2**
6	Practical Mid-Term Exam	b1-b4, c1-c3, d2, d4	**7**	
7	Assay of blood total proteins &Albumin	b3, b6, c1, c4, c5, d2, d4	**8**	**2**
8	Assay of LDH, GPT, GOT, Amylase, Lipase enzymes.	b3, b4, c4, d2, d4	**9,10**	**4**
9	Urine analysis: - using urine-strip to test all biochemical parametres as: glucose, proteins, sp.gravity, ….etc.(normal & abnormal urine samples).	c2, d2, d4	**11,12**	**2**
10	-Isolations of amino acid in urine sample by chromatography.	c5, d2, d4	**13,14**	**4**
11	Review	c1-5	**15**	**2**
12	Practical Final Exam	b1, b3, b4, b6, c1-c5, d1-d4	**16**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د.م.بدرية شمسان	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

- **Lectures**
- Discussion sessions ▪ Lab sessions.
- Assignment and reports.
- Self – learning.
- Practical session.
- Brain storming.

-Assessment Methods:

- Mid term written exam to assess Knowledge and understanding skills and Intellectual skills.
- Final written exam to assess Knowledge and understanding skills and Intellectual skills. ▪ Observation.
- Oral evaluation.
- Reports.
- Quizzes.

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**10**	**7%**	a1-a8, b1-b6
2	**Assignments**	**4-12**	**10**	**7%**	c1- c5
3	**Attendance, reports and mid practical exam**	**ALL**	**30**	**20%**	c1-c5
4	**Mid-semester exam**	**9**	**30**	**20%**	a1-a8, b1-b6, c1-c5, d1-d3
5	**Final theoretical Exam**	**16**	**50**	**33%**	a1-a8, b1-b6, c1-c5, d1-d4
6	**Final practical Exam**	**13-14**	**20**	**13%**	c1-c5
	Total		**150**	**10%**	

VIII. Students' Support:

Office Hours/week	Other Procedures (if any)
- 2 hr./ week	By social media (Face-book) or Whatsapp.

IX. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

- Murray RK, Granner DK, Mayes PA, Rodwell VW, (2003), Harper's Illustrated Biochemistry: 26th edition, McGraw-Hill companies New York,.
- Champe PC, Harvey RA. Ferrier DR, (2007), Lippincott's Reviews of Biochemistry, 3rd edition Lippincott William & Wilkins London,.
- David L. Nelson and Michael M, (2012), Lehninger Principles of Biochemistry, Cox. 6th edition, W.H. Freeman.

7- Recommended Readings and Reference Materials

- Pankaja Naik , , 2010, Biochemistry, 3rd Edition.
- Stryer B. L, 2011. Biochemistry 2nd edition, (Short course).

8- Essential References

- Devlin T. M, (2010), Textbook of Biochemistry with Clinical Correlations, 7th edition, New York,

9- Electronic Materials and Web Sites *etc*.

- Periodical Book Website
- http://www.kumc.edu/biochemistry/resource.htm
- http://www.medlib.iupui.edu/ref/biochem.htm

10- Other Learning Material:

	Hand out (if possible) prepare by the lecturer.

XI.	Course Policies:
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Care (I)

I. Course Identification and General Information:						
1	**Course Title:**	**Pharmaceutical Care (1)**				
2	**Course Number & Code:**	Ph256				
3	**Credit hours: 2hrs**	**C.H**				**Total**
		Theoretical	**Practical**	**Training**	**Seminar**	
		1	2	-	-	2
4	**Study level/ semester at which this course is offered:**	Third year, First Semester				
5	**Pre –requisite (if any):**					
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Department (s) in which the course is offered:**	Pharmaceutics and Industrial Pharmacy				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University				
10	**Prepared by:**	Prof. Dr. Ahmed Mohamed Sabati				
11	**Date of approval:**					

I. Course Description:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.احمد
سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

This course aims to provide the students with the fundamental aspects of pharmaceutical care and its processes and plans. It focus on role of pharmacists and patients, medication review, medication reconciliation, patient interview and communication as well as interprofessional communication and drug-related problems and their roles in of pharmaceutical care. The quality control and pharmaceutical care around the World are demonstrated.

At the end of this course, the students will be able to:

1. Describe the fundamental aspect and objectives of pharmaceutical care as well as the role of pharmacists in improving health outcomes.
2. Demonstrate the professionalism of the Pharmacists in pharmacy practice and their role in identification and prevention or resolving of drug-related problems
3. Recognize the different skills for patient interview and communication.
4. Describe the role of the patient in the pharmaceutical care process to develop person-centered pharmaceutical care through patient counseling, instructing and increasing health literacy.
5. Describe the process of documentation, medication review, medication reconciliation and quality control in pharmaceutical care in reference to pharmaceutical care in some countries.
6. Focus on medication reconciliation, review and interprofessional communication as an essential part of pharmaceutical care
7. Discuss the quality control in pharmaceutical care including the development and validation of guidelines and protocols used in practice.
8. Differentiate and apply different skills for patient interview and communication.
9. Explore the pharmaceutical care processes and strategies to optimize medicines use and improve health outcomes.
10. Provide patient-oriented pharmaceutical care with other health care practitioner.
11. Practice the plan of pharmaceutical care to optimize medicines use and improve health outcomes.
12. Employ the relevance and practical utility needed for the implementation of pharmaceutical care at various levels and within different health care systems.
13. Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.
14. Implement patient interview by applying the communication skills as a part of pharmaceutical care practice.

15. Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.
16. Explore and use internet resources to search for up-to-date information in the areas of pharmaceutical care researches to solve emerging problems.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of social, behavioral, health and, pharmaceutical sciences.	**a1-**	Describe the fundamental aspect and objectives of pharmaceutical care as well as the role of pharmacists in improving health outcomes.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs	**a2-**	Demonstrate the professionalism of the Pharmacists in pharmacy practice and their role in identification and prevention or resolving of drug-related problems.
A5	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.	**a3-**	Recognize the different skills for patient interview and communication.
		a4-	Describe the role of the patient in the pharmaceutical care process to develop person-centered pharmaceutical care through patient counseling, instructing and increasing health literacy.
		a5-	Describe the process of documentation, medication review, medication reconciliation and quality control in pharmaceutical care in reference to pharmaceutical care in some countries.

Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		**Teaching strategies/methods to be used**	**Methods of assessment**
completing this course, students will be able to:		Lectures methods , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports,
a1-	Describe the fundamental aspect and objectives of pharmaceutical care as well as the role of pharmacists in improving health outcomes.		
a2-	Demonstrate the professionalism of the Pharmacists in pharmacy practice and their role in identification and prevention or resolving of drugrelated problems		homework, and Written exam.
a3-	Recognize the different skills for patient interview and communication.		
a4-	Describe the role of the patient in the pharmaceutical care process to develop personcentered pharmaceutical care through patient counseling, instructing and increasing health literacy.		
a5-	Describe the process of documentation, medication review, medication reconciliation and quality control in pharmaceutical care in reference to pharmaceutical care in some countries.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills	
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**
After completing this program, students will be able to:	**After completing this course, students will be able to:**

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B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b1-**	Explore the pharmaceutical care processes and strategies to optimize medicines use and improve health outcomes.
		b2-	Differentiate and apply different skills for patient interview and communication.
		b3-	Discuss the quality control in pharmaceutical care including the development and validation of guidelines and protocols used in practice.
		b4-	Focus on medication reconciliation, review and interprofessional communication as an essential part of pharmaceutical care

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving	Oral Exam, Quizzes,
b1-	Explore the pharmaceutical care processes		
	and strategies to optimize medicines use and improve health outcomes.	sessions, brainstorming and Computer based teaching and learning	Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Differentiate and apply different skills for patient interview and communication.		
b3-	Discuss the quality control in pharmaceutical care including the development and validation of guidelines and protocols used in practice.		
b4-	Focus on medication reconciliation, review and interprofessional communication as an essential part of pharmaceutical care		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Professional and Practical Skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Provide patient-oriented pharmaceutical care with other health care practitioner.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Practice the plan of pharmaceutical care to optimize medicines use and improve health outcomes.
		c3-	Employ the relevance and practical utility needed for the implementation of pharmaceutical care at various levels and within different health care systems.
		c4-	Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c1-	Provide patient-oriented pharmaceutical care with other health care practitioner.		
c2-	Practice the plan of pharmaceutical care to optimize medicines use and improve health outcomes.		

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c3-	Employ the relevance and practical utility needed for the implementation of pharmaceutical care at various levels and within different health care systems.		
c4-	Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Implement patient interview by applying the communication skills as a part of pharmaceutical care practice.
		d2	Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.
D4	Take responsibility for adaptation to change needs in pharmacy practice.		
D5-	Apply information and communication technology and working effectively in a team.	**d3**	Explore and use internet resources to search for up-todate information in the areas of pharmaceutical care researches to solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills	Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Homework and reports.

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d1-	Implement patient interview by applying the communication skills as a part of pharmaceutical care practice.	Small group discussions, Tutorials and Practical session	
d2	Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.		
d3	Explore and use internet resources to search for up-todate information in the areas of pharmaceutical care researches to solve emerging problems.		

IV. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	No. of /week	No. of Hours
1	Definition of Pharmaceutical Care and Related Concepts	a1, b1, d2-3	1	1
2	Pharmaceutical Care and the Role of Drug-Related Problems, Professionalism of the Pharmacists	a2, b2, d2-3	1	1
3	Pharmaceutical Care Processes, The general role of the pharmacist Pharmaceutical Care and the Role of the Patient	a1, a4, b1-3, d23	1	1
4	Pharmaceutical Care and Patient Counseling	a4, b1-3, d1-3	1	1
5	Patient interview and communication skills	a3, b2, d1-3	1	1
6	The Role of Inter professional Communication in Pharmaceutical Care	a3, b4, d1-3	1	1
7	Mid Term Exam	a1-4, b1-4	1	
8	Medication Review and Medication Reconciliation, Data collection , Problem History analysis	a5, b4, d1-3	1	1
9	Documenting Pharmaceutical Care, Patient information analysis	a5, b2, d1-3	1	1
10	Quality Control in Pharmaceutical Care: Guidelines and Protocols	a5, b3, d1-3	1	1
11	The Role of Core Outcome Sets for Pharmaceutical Care Research	a1, b3, d1-3	1	1
12	Pharmaceutical Care Around the World	a5, b3, d1-3	4	4
13	Final Term Exam	a1-5, b1-b4,	1	1

Number of Weeks /and Units Per Semester	16	16

I. Course Content:

1 – Course Topics/Items:

b – Practical Aspect

Order	Practical Task	CILOs (symbols)	No. of /week	No. of Hours
1	Introduction to care planning, observation, discussion and reflection on pharmaceutical care practice	c1-c4,d1-d3	1	2
2	Report: Care planning, observation, discussion, and reflection on the role of Drug-Related Problems in pharmaceutical care practice.	c1-c4,d1-d3	1	2
3	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice Pharmaceutical Care and the Role of the Patient	c1-c2,d1-d3	1	2
4	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice Pharmaceutical Care and Patient Counseling	c1-c4,d1-d3	1	2
5	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -The Role	c1-c4,d1-d3	1	2

	of Adherence in Pharmaceutical Care			
6	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -The Role of Interprofessional Communication in Pharmaceutical Care	c1-c4,d1-d3	1	2
7	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice - Medication Review and Medication Reconciliation	c1-c4,d1-d3	1	2
8	Mid Term Exam	c1-c4,d1-d3	1	2
9	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice - Documenting Pharmaceutical Care	c1-c4,d1-d3	1	2
10	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -Quality Control in Pharmaceutical Care: Guidelines and Protocols	c1-c4,d1-d3	1	2
11	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -The Role of Core Outcome Sets for Pharmaceutical Care Research	c1-c4,d1-d3	1	2
12	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice Pharmaceutical Care Around the World	c1-c4,d1-d3	4	8

13	Final Term Exam	c1-c4,d1-d3	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

I- Teaching strategies of the course:

Lectures using data show video animation, brainstorming, case study, Practice session, Discussions, Small group discussions, Tutorials and Practical classes

II- Assignments:

- Homework
- Reports

III- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3 ,b1,b4, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, a5, b1-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	30%	c1-4, d1-3

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3	**Theoretical mid-semester exam**	7th	20	20%	a1-3, b1, b2
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-5, b1-4
6	**Final Exam (practical)**	**16th**	20	20%	c1-4, d1-3
	Total		**100**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours	-

III. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

Filipa Alves da Costa, J. W. Foppe Van Mil and Aldo Alvarez-Risco, (2019), The Pharmacist Guide to Implementing Pharmaceutical Care, Springer, Switzerland.

2- Recommended Readings and Reference Materials

Cipolle RJ, Strand LM, Morley PC (2007), Pharmaceutical care practice: the clinician`s guide, 2nd edition, McGraw-Hill, New York.

3- Essential References

Course notes (lecture notes and practical notes) prepared by teacher of the subject.

4- Electronic Materials and Web Sites *etc*.

Websites in international network (internet

5- Other Learning Material:

IV- Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V- **Course Improvement Processes:**	
1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback
	▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VI- Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of

	the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.

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4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** ▪ Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. ▪ Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course
	policies.

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7	**Other policies:** ▪ - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Plan of Pharmaceutical Care (I)

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Ahmed Mohamed Sabati	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Pharmaceutical Care (I)				
2-	Course Number & Code:	Ph256				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	2		2
4-	Study level/year at which this course is offered:	Third year, First Semester				
5-	Pre –requisite (if any):					
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				

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8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course Description:

This course aims to provide the students with the fundamental aspects of pharmaceutical care and its processes and plans. It focus on role of pharmacists and patients, medication review, medication reconciliation, patient interview and communication as well as interprofessional communication and drug-related problems and their roles in of pharmaceutical care. The quality control and pharmaceutical care around the World are demonstrated.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the fundamental aspect and objectives of pharmaceutical care as well as the role of pharmacists in improving health outcomes.
2. Demonstrate the professionalism of the Pharmacists in pharmacy practice and their role in identification and prevention or resolving of drug-related problems
3. Recognize the different skills for patient interview and communication.
4. Describe the role of the patient in the pharmaceutical care process to develop person-centered pharmaceutical care through patient counseling, instructing and increasing health literacy.
5. Describe the process of documentation, medication review, medication reconciliation and quality control in pharmaceutical care in reference to pharmaceutical care in some countries.
6. Focus on medication reconciliation, review and interprofessional communication as an essential part of pharmaceutical care
7. Discuss the quality control in pharmaceutical care including the development and validation of guidelines and protocols used in practice.
8. Differentiate and apply different skills for patient interview and communication.
9. Explore the pharmaceutical care processes and strategies to optimize medicines use and improve health outcomes.
10. Provide patient-oriented pharmaceutical care with other health care practitioner.
11. Practice the plan of pharmaceutical care to optimize medicines use and improve health outcomes.
12. Employ the relevance and practical utility needed for the implementation of pharmaceutical care at various levels and within different health care systems.
13. Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.
14. Implement patient interview by applying the communication skills as a part of pharmaceutical care practice.
15. Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.
16. Explore and use internet resources to search for up-to-date information in the areas of pharmaceutical care researches to solve emerging problems.

IV. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	No. of Hours
1	Definition of Pharmaceutical Care and Related Concepts	a1, b1, d2-3	1	1
2	Pharmaceutical Care and the Role of Drug-Related Problems, Professionalism of the Pharmacists	a2, b2, d2-3	2	1
3	Pharmaceutical Care Processes, The general role of the pharmacist Pharmaceutical Care and the Role of the Patient	a1, a4, b1-3, d23	3	1
4	Pharmaceutical Care and Patient Counseling	a4, b1-3, d1-3	4	1
5	Patient interview and communication skills	a3, b2, d1-3	5	1
6	The Role of Inter professional Communication in Pharmaceutical Care	a3, b4, d1-3	6	1
7	Mid Term Exam	a1-4, b1-4	7	
8	Medication Review and Medication Reconciliation, Data collection , Problem History analysis	a5, b4, d1-3	8	1
9	Documenting Pharmaceutical Care, Patient information analysis	a5, b2, d1-3	9	1
10	Quality Control in Pharmaceutical Care: Guidelines and Protocols	a5, b3, d1-3	10	1

11	The Role of Core Outcome Sets for Pharmaceutical Care Research	a1, b3, d1-3	11	1
12	Pharmaceutical Care Around the World	a5, b3, d1-3	12-15	4
13	Final Term Exam	a1-5, b1-b4,	16	1
Number of Weeks /and Units Per Semester			**16**	**16**

V. Course Content:

1 – Course Topics/Items:

b – Practical Aspect

Order	Practical Task	CILOs (symbols)	Week Due	No. of Hours
1	Introduction to care planning, observation, discussion and reflection on pharmaceutical care practice	c1-c4,d1-d3	1	2
2	Report: Care planning, observation, discussion, and reflection on the role of Drug-Related Problems in pharmaceutical care practice.	c1-c4,d1-d3	2	2
3	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice Pharmaceutical Care and the Role of the Patient	c1-c2,d1-d3	3	2

4	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice Pharmaceutical Care and Patient Counseling	c1-c4,d1-d3	4	2
5	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -The Role	c1-c4,d1-d3	5	2
	of Adherence in Pharmaceutical Care			
6	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -The Role of Interprofessional Communication in Pharmaceutical Care	c1-c4,d1-d3	6	2
7	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice - Medication Review and Medication Reconciliation	c1-c4,d1-d3	7	2
8	Mid Term Exam	c1-c4,d1-d3	8	2
9	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice - Documenting Pharmaceutical Care	c1-c4,d1-d3	9	2
10	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -Quality Control in Pharmaceutical Care: Guidelines and Protocols	c1-c4,d1-d3	10	2

11	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice -The Role of Core Outcome Sets for Pharmaceutical Care Research	c1-c4,d1-d3	11	2
12	Report: Care planning, observation, discussion, and reflection on pharmaceutical care practice Pharmaceutical Care Around the World	c1-c4,d1-d3	12-15	8
13	Final Term Exam	c1-c4,d1-d3	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures using data show video animation, brainstorming, case study, Practice session, Discussions, Small group discussions, Tutorials and Practical classes

VII. Assignments:

- Homework
- Reports

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3 ,b1,b4, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, a5, b1-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	30%	c1-4, d1-3
3	**Theoretical mid-semester exam**	7th	20	20%	a1-3, b1, b2
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-5, b1-4
6	**Final Exam (practical)**	**16th**	20	20%	c1-4, d1-3
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours	-

X. Learning Resource (MLA style or APA style)s:

6- Required Textbook(s) (maximum two)

	Filipa Alves da Costa, J. W. Foppe Van Mil and Aldo Alvarez-Risco, (2019), The Pharmacist Guide to Implementing Pharmaceutical Care, Springer, Switzerland.

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7- Recommended Readings and Reference Materials	
	Cipolle RJ, Strand LM, Morley PC (2007), Pharmaceutical care practice: the clinician`s guide, 2nd edition, McGraw-Hill, New York.
8- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
9- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
10- Other Learning Material:	

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination

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	and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.
4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.

6	**Plagiarism:** ▪ Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. ▪ Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.
7	**Other policies:** ▪ - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Specification of Pharmacognosy – I

I. Course Identification and General Information:							
1	**Course Title:**	**Pharmacognosy – I**					
2	**Course Number & Code:**	Ph352					
3	**Credit hours:**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		2	2			3	
4	**Study level/ semester at which this course is offered:**	3rd level /1st semester					
5	**Pre –requisite (if any):**	Pharmaceutical Organic Chemistry and Medicinal Botany					
6	**Co –requisite (if any):**	None					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy					
8	**Language of teaching the course:**	English					
	The department in which the course is offered:	Department of Pharmacognosy					
9	**Location of teaching the course:**	Faculty of Pharmacy					
10	**Prepared by:**	Dr. Bushra Moharam					
11	**Date of approval:**						

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. Course description:

This course involves of basic principles of pharmacognosy, including introduction and definitions, scope of pharmacognosy, historical review of medicinal plants and natural products. It concerns about medicinal plants classification, geographical distribution, cultivation, collection and preparation, drying, processing and storage, standardization, adulteration of crude drugs.
The course including identification of major active constituents and use of medicinal plants.

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Also includes the macro- and micro-morphological characteristics of different plant organs (morphological and histological examination, and chemical identification, leaves, flowers, seeds, barks and woods).
- at the end of this course, the students should have the knowledge and skills related to drugs of plant sources from different organs including leaves, barks, root and rhizomes and herbs, which are known to be used in traditional medicine and have curative values.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. know the modern concept and scope of Pharmacognosy
2. Enumerate the factors affecting cultivation of medicinal plants
3. Recognize botanical aspects, nomenclature, and classification of crude drugs
4. Recognize the morphology and anatomy of different plant organs
5. Identify the active constituents using chemical tests
6. Differentiate the different types of plant tissues.
7. Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.
8. Investigate the morphology and anatomy of different plant organs.
9. Analyse herbal drugs to identify the adulteration of herbal drugs.
10. Identify different classes of natural compounds chemically
11. Handle and dispose chemicals and broken glasses safely and effectively
12. Work effectively in team and independently to perform the required tasks
13. Demonstrate written and oral communication skills 14. Use technology in collecting data and information
15. Acquire effective time-management skills.

. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	know the modern concept and scope of Pharmacognosy
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a2-**	Enumerate the factors affecting cultivation of medicinal plants
		a3-	Recognize botanical aspects, nomenclature, and classification of crude drugs
		a4-	Recognize the morphology and anatomy of different plant organs

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures, group discussion	Written exam, homework, Quizzes, and participation.
a1-	know the modern concept and scope of Pharmacognosy		
a2-	Enumerate the factors affecting cultivation of medicinal plants		
a3-	Recognize botanical aspects, nomenclature, and classification of crude drugs		
a4-	Recognize the morphology and anatomy of different plant organs		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub- PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	b1-	Identify the active constituents using chemical tests
		b2-	Differentiate the different types of plant tissues.
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing.	b3-	Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.
		b4-	Investigate the morphology and anatomy of different plant organs.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Discussions, Solving Problem methods	Oral presentation, Written and Practical examination for assessment
b1-	Identify the active constituents using chemical tests		
b2-	Differentiate the different types of plant tissues.		
b3-	Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.		
b4-	Investigate the morphology and anatomy of different plant organs.		

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(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	c1-	Analyse herbal drugs to identify the adulteration of herbal drugs.
		c2-	Identify different classes of natural compounds chemically
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c3-	Handle and dispose chemicals and broken glasses safely and effectively

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures ,Laboratory work, .	practical reports, Practical works and presentations based on their experimental work.
c1-	Analyse herbal drugs to identify the adulteration of herbal drugs.		
c2-	Identify different classes of natural compounds chemically		
c3-	Handle and dispose chemicals and broken glasses safely and effectively		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **General and Transferable skills**			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Work effectively in team and independently to perform the required tasks
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2-**	Demonstrate written and oral communication skills.
		d3-	Use technology in collecting data and information
		d4-	Acquire effective time-management skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, practical classes. Discussions in groups	Reports, presentations and communication with the lecturer and his colleagues.
d1-	Work effectively in team and independently to perform the required tasks		
d2-	Demonstrate written and oral communication skills.		
d3-	Use technology in collecting data and information		
d4-	Acquire effective time-management skills.		

Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmacognosy	a1-3,d2-3	History of pharmacognosy, Scope of pharmacognosy and modern aspects. Classification of crude drugs.	**2**	**4**
2	Drugs preparation:	a3,b3,c1-3,d1-3	cultivation of medicinal plants, factors affecting plant growth and production of drug, Adultration of drugs, Chemistry of the active constituent	**2**	**4**
3	**Leaves**	a2,a4, b1-4 , c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of **Digitalis, Senna, belladonna, stramonium, hyoscyamus, jaborandi and boldo, tea, Bucho, Coca leaves**	**2**	**4**
4	**Midterm exam**	a1-4, b1-2		**1**	**2**
5	**Barks**	a2,a4, b1-4, c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of	**3**	**6**

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			Cinnamon, cassia, Cinchona, Frangula, cascara quillaia, Pomegranate, Hamamelis and galls barks		
6	**Root and rhizomes;**	a2,a4, b1-4, c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of aconite, jalap, liquorice, ipecacuanha, rhubarb, rauwolfia, ginger, ginseng, curcuma, podophylum,	**2**	**4**
7	**Herbs**	a2,a4, b1-4, c2-3, d2-3	History, collection, characters, constituent, uses of **Ergot, Indian hemp, Catharanthus, Lobelia, peppermint, thyme herps**	**2**	**4**
8	Revision	a2,a4, b1-4 , c2-3, d2-3		**1**	**2**
9	**Final exam**	a1-4, b1-2		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Introduction, Laboratory safety measures - The use of light microscope.	**c1,d1,d2,d4**	**1**	**2**
2	Morphology - microscopical identification of henna, datura, Digitalis, senna, leaves	**a2,a4,b1-4, c1-3,d1-4**	**3**	**6**
3	Morphology - microscopical identification of bark; Cinchona, Cinnamon, pomegranate	**a2,a4,b1-4, c1-3,d1-4**	**3**	**6**
4	Midterm exam	c1-3	**1**	**2**
5	Morphology - microscopical identification of liquorice, rhubarb, ginger, turmeric	**a2,a4,b1-4, c1-3,d1-4**	**3**	**6**

6	Morphology - microscopical examination of medicinal herbs; mentha, thyme, cannabis, hyoscyamus,	**a2,a4,b1-4, c1-3,d1-4**	**3**	**6**
7	Revision	**a2,a4,b1-4, c1-3,d1-4**	**1**	**2**
8	Final exam	c1-3	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

. a- Teaching strategies of the course:

- Lectures, Practice session, solving problem, Small group discussions, Tutorials and Practical classes

b-Assessment Methods:

Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations

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. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance ,Participation and quizzes**	**1-16**	20	13%	a1,a4,b3-4
2	**Attendance, Practical Reports and Practical mid-semester exam**	8-16	30	20%	c1,c2,c3
3	**Theoretical Mid-semester exam**	**8**	30	20%	a1-4, b1, b2
5	**Final Exam (practical)**	**16**	20	13%	c1-3
6	**Final Exam (Theoretical)**	**16**	50	33%	a1-4, b1, b2
	Total		150	100%	

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. Students' Support:	
Office Hours/week	**Other Procedures (if any)**
Two contact hours per week	None

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Learning Resources (MLA style or APA style):

1- Required Textbook(s) (maximum two)

1- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi
2- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevier, New York

2- Recommended Readings and Reference Materials

1- Steven M. Colegate and Russell J. Molyneux. (2008); "Bioactive natural products : detection, isolation, and structural determination" 2nd ed,.
2- Cordell G.A. (2002); "The alkaloids: Chemistry and Biology" Volume 59, Elsevier, New York 3- Lectures Notes and Practical Manual.

3- Essential References

4- Electronic Materials and Web Sites *etc*.

1. http/www.Phytomania.org.
2. http/www.medicalbotanyintroduction.html.
3. http/www.botanical.com

5- Other Learning Material:

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Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

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	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmacognosy – I

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Bushra Moharam	Office Hours					
Location & Telephone No.	730010755	SAT	SUN	MON	TUE	WED	THU
E-mail	bushramoharam@yahoo.com.	1		1			

II. Course Identification and General Information:						
1-	Course Title:	Pharmacognosy I				
2-	Course Number & Code:	Ph352				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	3rd level / 1st semester				
5-	Pre –requisite (if any):	Medicinal Botany				
6-	Co –requisite (if any):	None				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.م.د.بشرى ا.د. القاسم محمد عباس

III. Course Description:

This course involves of basic principles of pharmacognosy, including introduction and definitions, scope of pharmacognosy, historical review of medicinal plants and natural products. It concerns about medicinal plants classification, geographical distribution, cultivation, collection and preparation, drying, processing and storage, standardization, adulteration of crude drugs.

The course including identification of major active constituents and use of medicinal plants.
Also includes the macro- and micro-morphological characteristics of different plant organs (morphological and histological examination, and chemical identification, leaves, flowers, seeds, barks and woods).
- at the end of this course, the students should have the knowledge and skills related to drugs of plant sources from different organs including leaves, barks, root and rhizomes and herbs, which are known to be used in traditional medicine and have curative values.

IV. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

1. know the modern concept and scope of Pharmacognosy
2. Enumerate the factors affecting cultivation of medicinal plants
3. Recognize botanical aspects, nomenclature, and classification of crude drugs
4. Recognize the morphology and anatomy of different plant organs
5. Identify the active constituents using chemical tests
6. Differentiate the different types of plant tissues.
7. Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.
8. Investigate the morphology and anatomy of different plant organs.
9. Analyse herbal drugs to identify the adulteration of herbal drugs.
10. Identify different classes of natural compounds chemically
11. Handle and dispose chemicals and broken glasses safely and effectively
12. Work effectively in team and independently to perform the required tasks
13. Demonstrate written and oral communication skills
14. Use technology in collecting data and information
15. Acquire effective time-management skills.

Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Introduction to pharmacognosy	a1-3,d2-3	History of pharmacognosy, Scope of pharmacognosy and modern aspects. Classification of crude drugs.	**1,2**	**4**
2	Drugs preparation:	a3,b3,c1-3,d1-3	cultivation of medicinal plants, factors affecting plant growth and production of drug, Adultration of drugs, Chemistry of the active constituent	**3,4**	**4**
3	**Leaves**	a2,a4, b1-4 , c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of **Digitalis, Senna, belladonna, stramonium, hyoscyamus, jaborandi and boldo, tea, Bucho, Coca leaves**	**5,6**	**4**
4	**Midterm exam**	a1-4, b1-2		**7**	**2**
5	**Barks**	a2,a4, b1-4, c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of Cinnamon, cassia, Cinchona, Frangula, cascara quillaia, Pomegranate, Hamamelis and galls barks	**8-10**	**6**

6	**Root and rhizomes;**	a2,a4, b1-4, c2-3,	Introduction, Morphology and anatomy, active constituents, chemical test,	**11,12**	**4**

I

		d2-3	uses of aconite, jalap, liquorice, ipecacuanha, rhubarb, rauwolfia, ginger, ginseng, curcuma, podophylum,		
7	**Herbs**	a2,a4, b1-4, c2-3, d2-3	History, collection, characters, constituent, uses of **Ergot, Indian hemp, Catharanthus, Lobelia, peppermint, thyme herps**	**13,14**	**4**
8	Revision	a2,a4, b1-4 , c2-3, d2-3		**15**	**2**
9	**Final exam**	a1-4, b1-2		**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Week Due	Contact hours
1	Introduction, Laboratory safety measures - The use of light microscope.	**c1,d1,d2,d4**	**1**	**2**
2	Morphology - microscopical identification of henna, datura, Digitalis, senna, leaves	**a2,a4,b1-4, c1-3,d1-4**	**2-4**	**6**
3	Morphology - microscopical identification of bark; Cinchona, Cinnamon, pomegranate	**a2,a4,b1-4, c1-3,d1-4**	**5-7**	**6**
4	Midterm exam	c1-3	**8**	**2**
5	Morphology - microscopical identification of liquorice, rhubarb, ginger, turmeric	**a2,a4,b1-4, c1-3,d1-4**	**9-11**	**6**
6	Morphology - microscopical examination of medicinal herbs; mentha, thyme, cannabis, hyoscyamus,	**a2,a4,b1-4, c1-3,d1-4**	**12-14**	**6**
7	Revision	**a2,a4,b1-4, c1-3,d1-4**	**15**	**2**
8	Final exam	c1-3	**16**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

V. Teaching strategies of the course:

Lectures, Practice session, solving problem, Small group discussions, Tutorials and Practical classes

VI. Assessment Methods:

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	**Attendance ,Participation and quizzes**	**All**	20	13%
2	**Attendance, Practical Reports and Practical mid-semester exam**	All	30	20%
3	**Theoretical Mid-semester exam**	**8th**	30	20%
4	**Final Exam (practical)**	**16th**	20	13%
5	**Final Exam (Theoretical)**	**16th**	50	33%
	Total		**150**	**100%**

e

VII. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi

2- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevi New York

2- Essential References.

3- Electronic Materials and Web Sites *etc.*

1. http/www.Phytomania.org.
2. http/www.medicalbotanyintroduction.html.
3. http/www.botanical.com

VIII. Course Policies:

1	**Class Attendance:** ▪ **Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.**
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ **Absence from assignments or exams will be dealt with according to the general policy of the university.**
4	**Assignments & Projects**: ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ **Projects: Not applicable.**

5	**Cheating:** ▪ **Punishment of cheating will be according to the general policy of the university in this respect**
6	**Plagiarism:** ▪ **Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.**
7	**Other policies:** **General policies of the Students' Affairs of the University and the Quality Assurance Unit.**

Course Specification of General Pathology

I. Course Identification and General Information:

1	**Course Title:**	General Pathology				
2	**Course Number & Code:**	*Ph456*				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar**	
		2		**----**	**----**	**2**
4	**Study level/ semester at which this course is offered:**	3rd Year/ 1st semester				
5	**Pre –requisite (if any):**	None				
6	**Co –requisite (if any):**	None				
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
10	**Prepared by:**	Dr.				
11	**Date of approval:**					

II. Course description:

This course provides students with the basic knowledge, facts, concepts, theories and terms in the field of pathology as well as understanding the of disease processes affecting the different systems, with particular reference to mechanisms and natural history of disease to help in the prevention, diagnosis, treatment and prognosis of diseases.

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic principles of pathology.
2. Recognize different types and functions of cells and describe different types of tissues and organs
3. Explain the concept of cell adaptation and death
4. Discuss the etiology and mechanism of diseases
5. Integrate the causes of disease to minimize the risk factors to human.
6. Relate the disease with the mechanism especially that related to environment.
7. Differentiate between the grade and stages of tumor.
8. Discuss the carcinogenesis and the tumor marker
9. Apply information about blood disorders in form of cases.
10. Perform duties in relation to diseases and infection
11. Demonstrate time management and self-learning during performing practical and professional works and assignments.
12. Work independently and as a team member to prepare seminars and presentations.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Demonstrate the basic knowledge and understanding about pathologic basis, etiology and mechanism of diseases.	**a1-**	Recognize the basic principles of pathology.
		a2-	Recognize different types and functions of cells and describe different types of tissues and organs
		a3-	Explain the concept of cell adaptation and death
		a4-	Discuss the etiology and mechanism of diseases

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		**Teaching strategies/ methods to be used**	**Methods of assessment**
After participating in the course, students would be able to:		Lectures and group discussion	Attendance, Written, oral exams and small projects
a1-	Recognize the basic principles of pathology.		
a2-	Recognize different types and functions of cells and describe different types of tissues and organs		
a3-	Explain the concept of cell adaptation and death		
a4-	Discuss the etiology and mechanism of diseases		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to		**After participating in the course, students would be able to:**	
B1-	Integrate pathological concepts to interpret reasons of disesea.	**b1-**	Integrate the causes of disease to minimize the risk factors to human.
		b2-	Relate the disease with the mechanism especially that related to environment.
		b3-	Differentiate between the grade and stages of tumor.
		b4-	Discuss the carcinogenesis and the tumor marker

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:		
***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.**	**Teaching strategies/methods to be used.**	***Methods of assessment***
After participating in the course, students would be able to:		

b1-	Integrate the causes of disease to minimize the risk factors to human.	Lectures, brainstorming and group discussion	Written, oral exams project, and small projects
b2-	Relate the disease with the mechanism especially that related to environment.		
b3-	Differentiate between the grade and stages of tumor.		
b4-	Discuss the carcinogenesis and the tumor marker		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Apply information about different diseases in form of cases.	**c1-**	Perform duties in relation to diseases and infection
		c2-	Apply information about blood disorders in form of cases.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After participating in the course, students would be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
c1-	Perform duties in relation to diseases and infection		
c2-	Apply information about blood disorders in form of cases.		

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(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D1-	Use technology efficiently to gather, analyze and interpret information in the learning process.	**d1-**	Demonstrate time management and selflearning during performing practical and professional works and assignments.
D2-	Assess problems and solve them and make suitable decisions.	**d2-**	Work independently and as a team member to prepare seminars and presentations.
D3-	Manage time efficiently and communicate effectively with others		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used.	Methods of assessment
After participating in the course, students would be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
d1-	Demonstrate time management and selflearning during performing practical and professional works and assignments.		
d2-	Work independently and as a team member to prepare seminars and presentations.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

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Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction	a1, a2, b1,b2; d1-d3	Definitions and its related disciplines	1	2
2	Necrosis (cell death)	a2,a3, b2, d1	• Definition • Types • Examples • Apoptosis	1	2
3	Inflammation	a1, a4, b2,d1-3	• Acute and Chronic • Chemical Mediators • Fibrosis • Healing and Repai • Granulomatous Inflam ation	2	4
4	Infection	a4,b1, c1, d1-2	• Bacteria • Parasite • Viral • Fungi	1	2
5	Infection Skin	a2, b2, c1, d1-2	• Bacterial: impetigo cellulitis • Fugal infection and viral • Drug induce skin eruption	1	2
6	Bone Infection	a4, b1, c1, d1-2	Osteomylitis and spread of infection	1	2
7	Cancer (Neoplasia)	a1,a4, b1, b3, b4, d1-2	• Types (Benign and Malignant) • Risk Factors • Carcinogenesis • Spread • Grades • Stages • Markers • Examples	1	2
8	Mid Term Exam			1	2

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9	Anemia1	a1, a2, a3, b1, c2,d1-2	• Causes • Types • Risk Factors • IDA and Megaloblastic Anemia	1	2
10	Hemolytic anemia	a1, a2, a3, b1, c2, d1-2	Hemolytic anemia (S.C.A and thalassemia	1	2
11	Coagulation disorder	a1, a4, b2, b1, c2, d1-2	• Cascade • Coagulation Factors • Diseases • Platelate Disorders	1	2
12	Immunological disease	a1, a2, b2, d2	• Definitions • Types	1	2
13	Thrombosis and embolism	a1,a4,b1,b2, c2, d2	Definitions and its related disciplines	1	2
14	Final review			1	2
15	Final Exam			1	2
Number of Weeks /and Units Per Semester				**16**	**32**

I. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

II. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

1	**Participation, quizzes, report and homework**	Sporadic through the semester	15	15%	a1-a4; b1,b2; d1-d2
2	**Theoretical mid-semester exam**	8th	15	15%	a1-a4; b1,b2; d1-d2
3	**Final Exam (theoretical)**	16 th	70	70%	a1-a4; b1,b2; c1-2
	Total		**100**	**100%**	

III. Students' Support:

Office Hours/week	Other Procedures (if any)
Two hours per week	None

IV. Learning Resources:

1- Required Textbook(s) (maximum two)

Robin E MD and Farber Jl,1999:Pathology,3th ed, Lippincott Williams and Wilikins, Philadelphia.

2- Recommended Readings and Reference Materials

1- Robbins Basic Pathology,7 th edition, 2002. 2- Lectures Notes.

3- Electronic Materials and Web Sites *etc*.

1- www.pathologyoutlines.com

I. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and

their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of General Pathology

I. - Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Prof Dr						
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	Course Title:	General Pathology				
2-	Course Number & Code:	*Ph456*				
3-	Credit hours: 1hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	3rd Year/ 1st semester				
5-	Pre –requisite (if any):	None				
6-	Co –requisite (if any):	None				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University

III. Course description:

This course provides students with the basic knowledge, facts, concepts, theories and terms in the field of pathology as well as understanding the of disease processes affecting the different systems, with particular reference to mechanisms and natural history of disease to help in the prevention, diagnosis, treatment and prognosis of diseases.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic principles of pathology.
2. Recognize different types and functions of cells and describe different types of tissues and organs
3. Explain the concept of cell adaptation and death
4. Discuss the etiology and mechanism of diseases
5. Integrate the causes of disease to minimize the risk factors to human.
6. Relate the disease with the mechanism especially that related to environment.
7. Differentiate between the grade and stages of tumor.
8. Discuss the carcinogenesis and the tumor marker
9. Apply information about blood disorders in form of cases.
10. Perform duties in relation to diseases and infection
11. Demonstrate time management and self-learning during performing practical and professional works and assignments.
12. Work independently and as a team member to prepare seminars and presentations.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Weeks Due	Contact hours
1	Introduction	a1, a2, b1,b2; d1-d3	Definitions and its related disciplines	1	2
2	Necrosis (cell death)	a2,a3, b2, d1	• Definition • Types • Examples • Apoptosis	2	2
3	Inflammation	a1, a4, b2,d1-3	• Acute and Chronic • Chemical Mediators • Fibrosis • Healing and Repai • Granulomatous Inflam ation	3	4
4	Infection	a4,b1, c1, d1-2	• Bacteria • Parasite • Viral • Fungi	4	2
5	Infection Skin	a2, b2, c1, d1-2	• Bacterial: impetigo cellulitis • Fugal infection and viral • Drug induce skin eruption	5	2
6	Bone Infection	a4, b1, c1, d1-2	Osteomylitis and spread of infection	6	2
7	Cancer (Neoplasia)	a1,a4, b1, b3, b4, d1-2	• Types (Benign and Malignant) • Risk Factors • Carcinogenesis • Spread • Grades • Stages • Markers • Examples	7	2

8	Mid Term Exam			8	2
9	Anemia1	a1, a2, a3, b1, c2,d1-2	• Causes • Types • Risk Factors • IDA and Megaloblastic Anemia	9	2
10	Hemolytic anemia	a1, a2, a3, b1, c2, d1-2	Hemolytic anemia (S.C.A and thalassemia	10	2
11	Coagulation disorder	a1, a4, b2, b1, c2, d1-2	• Cascade • Coagulation Factors • Diseases • Platelate Disorders	11	2
12	Immunological disease	a1, a2, b2, d2	• Definitions • Types	12	2
13	Thrombosis and embolism	a1,a4,b1,b2, c2, d2	Definitions and its related disciplines	13	2
14	Final review			14	2
15	Final Exam			15	2
Number of Weeks /and Units Per Semester				**16**	**32**

V. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VI. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation, quizzes, report and homework**	Sporadic through the semester	15	15%	a1-a4; b1,b2; d1-d2
2	**Theoretical mid-semester exam**	8th	15	15%	a1-a4; b1,b2; d1-d2
3	**Final Exam (theoretical)**	16 th	70	70%	a1-a4; b1,b2; c1-2
	Total		**100**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two hours per week	None

III. Learning Resources:

4- Required Textbook(s) (maximum two)

Robin E MD and Farber Jl,1999:Pathology,3th ed, Lippincott Williams and Wilikins, Philadelphia.

5- Recommended Readings and Reference Materials

V

3- Robbins Basic Pathology,7 th edition, 2002. 4- Lectures Notes.

6- Electronic Materials and Web Sites *etc*.

2- www.pathologyoutlines.com

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and
	their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:**

	▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutics III

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutics III					
2	Course Number & Code:	Ph257					
3	Credit hours: 3hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2			3	
4	Study level/ semester at which this course is offered:	Third year/First semester					
5	Pre –requisite (if any):	Physical pharmacy- Pharmaceutical calculationsPharmaceutics I_II					
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof. Dr. Abdulwali Ahmed Saif					
12	Date of approval:						

II. Course description:

This course aims to provide the students with basic principles of pharmaceutical semisolid dosage forms. It concentrates on the advantages and disadvantages, additives, methods of formulation and quality control tests of pharmaceutical semisolid dosage forms.

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	أحمد سيف ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin.
2. Describe the advantages and disadvantages of pharmaceutical semisolid dosage forms.
3. Recognize the different additives used in manufacturing of pharmaceutical semisolid dosage forms.
4. Describe methods of formulation of pharmaceutical semisolid dosage forms.
5. Discuss the quality control tests of pharmaceutical semisolid dosage forms.Distinguish between pharmaceutical dispersed systems.
6. Propose best formulations to enhance drug delivery through skin such TDDS.
7. Determine the appropriate methods for formulation of pharmaceutical semisolid dosage forms.
8. Select the suitable method for evaluation of pharmaceutical semisolid dosage forms.
9. Propose best approaches to solve the problems encountered in of pharmaceutical semisolid dosage forms.
10. Select and practice different methods for preparation of pharmaceutical semisolid dosage forms.
11. Formulate different pharmaceutical semisolid dosage forms.
12. Label the different formulations of pharmaceutical semisolid dosage forms.
13. perform the quality control tests for pharmaceutical semisolid dosage forms.
14. Implement writing and presentation skills
15. Work effectively in a team

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin.

A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of	**a2-**	Describe the advantages and disadvantages of pharmaceutical semisolid dosage forms.
	analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3-**	Recognize the different additives used in manufacturing of pharmaceutical semisolid dosage forms.
		a4-	Describe methods of formulation of pharmaceutical semisolid dosage forms.
		a5-	Discuss the quality control tests of pharmaceutical semisolid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures solving problem, and group discussion	Attendance, Written, oral exams, project and small projects
a1-	Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin.		
a2-	Describe the advantages and disadvantages of pharmaceutical semisolid dosage forms.		
a3-	Recognize the different additives used in manufacturing of pharmaceutical semisolid dosage forms.		
a4-	Describe methods of formulation of pharmaceutical semisolid dosage forms.		
a5-	Discuss the quality control tests of pharmaceutical semisolid dosage forms.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their	**b1-**	Propose best formulations to enhance drug delivery through skin such TDDS.
	effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.		
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Determine the appropriate methods for formulation of pharmaceutical semisolid dosage forms.
		b3-	Select the suitable method for evaluation of pharmaceutical semisolid dosage forms.
		b4-	Propose best approaches to solve the problems encountered in of pharmaceutical semisolid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams and small projects
b1-	Propose best formulations to enhance drug delivery through skin such TDDS.		
b2-	Determine the appropriate methods for formulation of pharmaceutical semisolid dosage forms.		
b3-	Select the suitable method for evaluation of pharmaceutical semisolid dosage forms.		

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b4-	Propose best approaches to solve the problems encountered in of pharmaceutical semisolid dosage forms.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Select and practice different methods for preparation of pharmaceutical semisolid dosage forms.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	Formulate different pharmaceutical semisolid dosage forms.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Label the different formulations of pharmaceutical semisolid dosage forms.
		c4-	perform the quality control tests for pharmaceutical semisolid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, tutorials, practical, discussion and brain storming	Attendance, homework, Written, practical, oral exams, report, project and observation.
c1-	Select and practice different methods for preparation of pharmaceutical semisolid dosage forms.		

c2-	Formulate different pharmaceutical semisolid dosage forms.		
c3-	Label the different formulations of pharmaceutical semisolid dosage forms.		
c4-	perform the quality control tests for pharmaceutical semisolid dosage forms.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2	Employ proper documentation and filing systems in different pharmaceutical fields.	**d1-**	Implement writing and presentation skills
		d2	Work effectively in a team
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1	Implement writing and presentation skills		
d2	Work effectively in a team		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Anatomy and physiology of skin and factors affects diffusion of drugs through skin.	**a1, b1, c1, d1-2**	- Structure and function of the skin - Target area of treatment after topical application to skin - Basic principles of diffusion through membranes and factors affecting percutaneous absorption - Enhancement of skin penetration	1	2
2	Transdermal Drug Delivery Systems (TDDS)	**a1-3, b1, b3, d1-2**	Definition, types, Advantages, disadvantages and factors affecting percutaneous absorption of TDDS	1	2
3	pharmaceutical semisolid dosage form (ointments)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, bases, excipients, method of formulation, stability and Quality control tests of Pharmaceutical ointments	4	8
4	Mid-term exam	**a1-5, b1-4**		1	2
5	pharmaceutical semisolid dosage form (Creams)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, bases, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Creams	2	4

6	pharmaceutical semisolid dosage form (gels and pests)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, bases excipients, method of formulation, stability and Quality control tests of Pharmaceutical gels and pests	1	2
7	pharmaceutical semisolid dosage form (Suppositories and pessaries)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, vehicles, factors affecting rectal absorption excipients, method of formulation, stability and Quality control tests of Pharmaceutical gels and pests	3	6
8	pharmaceutical semisolid dosage form (Vaginal preprations)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, Vaginal inserts Preparation of suppositories - displacement values in suppository bases, Specific problems in formulation of suppositories- Quality control tests for Vaginal	1	2
9	Other topical pharmaceutical semisolid dosage forms	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Other topical pharmaceutical semisolid dosage forms	1	2
10	Final-term exam	**a1-5, b1-4**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Formulate, practice preparation, label and quality control tests of Pharmaceutical ointments with hydrophilic bases	**c1-4, d1-2**	2	4
2.	Formulate, practice preparation, label and quality control tests of Pharmaceutical ointments with hydrophobic bases	**c1-4, d1-2**	4	8

3.	Mid-term exam	**c1-4**	1	2
4.	Formulate, practice preparation, label and quality control tests of Pharmaceutical O/W creams	**c1-4, d1-2**	1	2
5.	Formulate, practice preparation, label and quality control tests of Pharmaceutical W/O creams	**c1-4, d1-2**	1	2
6.	Formulate, practice preparation, label and quality control tests of Pharmaceutical gel	**c1-4, d1-2**	1	2
7.	Formulate, practice preparation, label and quality control tests of Pharmaceutical pests	**c1-4, d1-2**	1	2
8.	Formulate, practice preparation, label and quality control tests of Pharmaceutical Suppositories with hydrophilic bases	**c1-4, d1-2**	2	4
9.	Formulate, practice preparation, label and quality control tests of Pharmaceutical Suppositories with hydrophobic bases	**c1-4, d1-2**	2	4
10.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

I- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-2**	Sporadic through the semester	**10**

2	Reports	**c1-4, d1-2**		

II- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a2-4,b1-2, **d1-2**
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-3, b2-3, **d1-2**
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	6th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	6th	30	20%	**a1-5, b1-4**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

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VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Notes on Pharmaceutics prepared by the department staff.
2. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
3. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
4. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
3. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.
Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.
Further information on proprietary products can be found in: The Data Sheet Compendium,

	Datapharm Publications Ltd (published annually). The Monthly Index of Medical Specialities (MIMS), Medical Publications Ltd.

I. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.

4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutics III

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	أحمد سيف ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

I. - Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Prof. Dr. Abdulwali Ahmed Saif	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	Course Title:	Pharmaceutics III				
2-	Course Number & Code:	Ph257				
3-	Credit hours: 3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	1		3
4-	Study level/year at which this course is offered:	Third year/First semester				
5-	Pre –requisite (if any):	Physical pharmacy- Pharmaceutical calculationsPharmaceutics I_II				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

VIII. Course description:

This course aims to provide the students with basic principles of pharmaceutical semisolid dosage forms. It concentrates on the advantages and disadvantages, additives, methods of formulation and quality control tests of pharmaceutical semisolid dosage forms.

IX. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin.
2. Describe the advantages and disadvantages of pharmaceutical semisolid dosage forms.
3. Recognize the different additives used in manufacturing of pharmaceutical semisolid dosage forms.
4. Describe methods of formulation of pharmaceutical semisolid dosage forms.
5. Discuss the quality control tests of pharmaceutical semisolid dosage forms.Distinguish between pharmaceutical dispersed systems.
6. Propose best formulations to enhance drug delivery through skin such TDDS.
7. Determine the appropriate methods for formulation of pharmaceutical semisolid dosage forms.
8. Select the suitable method for evaluation of pharmaceutical semisolid dosage forms.
9. Propose best approaches to solve the problems encountered in of pharmaceutical semisolid dosage forms.
10. Select and practice different methods for preparation of pharmaceutical semisolid dosage forms.
11. Formulate different pharmaceutical semisolid dosage forms.
12. Label the different formulations of pharmaceutical semisolid dosage forms.
13. perform the quality control tests for pharmaceutical semisolid dosage forms.
14. Implement writing and presentation skills
15. Work effectively in a team

X. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Anatomy and physiology of skin and factors affects diffusion of drugs through skin.	**a1, b1, c1, d1-2**	- Structure and function of the skin - Target area of treatment after topical application to skin - Basic principles of diffusion through membranes and factors affecting percutaneous absorption - Enhancement of skin penetration	1	2
2	Transdermal Drug Delivery Systems (TDDS)	**a1-3, b1, b3, d1-2**	Definition, types, Advantages, disadvantages and factors affecting percutaneous absorption of TDDS	1	2
3	pharmaceutical semisolid dosage form (ointments)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, bases, excipients, method of formulation, stability and Quality control tests of Pharmaceutical ointments	4	8
4	Mid-term exam	**a1-5, b1-4**		1	2

5	pharmaceutical semisolid dosage form (Creams)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, bases, excipients, method of formulation, stability and Quality control tests of Pharmaceutical Creams	2	4
6	pharmaceutical semisolid	**a2-5, b2-4, d1-2**	Definition, types, Advantages,	1	2
	dosage form (gels and pests)		disadvantages, bases excipients, method of formulation, stability and Quality control tests of Pharmaceutical gels and pests		
7	pharmaceutical semisolid dosage form (Suppositories and pessaries)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, vehicles, factors affecting rectal absorption excipients, method of formulation, stability and Quality control tests of Pharmaceutical gels and pests	3	6
8	pharmaceutical semisolid dosage form (Vaginal preprations)	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, Vaginal inserts Preparation of suppositories - displacement values in suppository bases, Specific problems in formulation of suppositories- Quality control tests for Vaginal	1	2
9	Other topical pharmaceutical semisolid dosage forms	**a2-5, b2-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Other topical pharmaceutical semisolid dosage forms	1	2
10	Final-term exam	**a1-5, b1-4**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

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Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
11.	Formulate, practice preparation, label and quality control tests of Pharmaceutical ointments with hydrophilic bases	**c1-4, d1-2**	2	4
12.	Formulate, practice preparation, label and quality control tests of Pharmaceutical ointments with hydrophobic bases	**c1-4, d1-2**	4	8
13.	Mid-term exam	**c1-4**	1	2
14.	Formulate, practice preparation, label and quality control tests of Pharmaceutical O/W creams	**c1-4, d1-2**	1	2
15.	Formulate, practice preparation, label and quality control tests of Pharmaceutical W/O creams	**c1-4, d1-2**	1	2
16.	Formulate, practice preparation, label and quality control tests of Pharmaceutical gel	**c1-4, d1-2**	1	2
17.	Formulate, practice preparation, label and quality control tests of Pharmaceutical pests	**c1-4, d1-2**	1	2
18.	Formulate, practice preparation, label and quality control tests of Pharmaceutical Suppositories with hydrophilic bases	**c1-4, d1-2**	2	4
19.	Formulate, practice preparation, label and quality control tests of Pharmaceutical Suppositories with hydrophobic bases	**c1-4, d1-2**	2	4
20.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units P r Semester			**16**	**32**

III- a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-2**		

IV- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a2-4,b1-2, **d1-2**
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-3, b2-3, **d1-2**
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	6th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	6th	30	20%	**a1-5, b1-4**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4

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	Total	**150**	**100%**	

XI. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

XII. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

5. Notes on Pharmaceutics prepared by the department staff.

6. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
7. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
8. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

6- Recommended Readings and Reference Materials

4. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
5. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
6. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.
Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.
Further information on proprietary products can be found in: The Data Sheet Compendium, Datapharm Publications Ltd (published annually).
The Monthly Index of Medical Specialities (MIMS), Medical Publications Ltd.

III. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

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6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Medical Parasitology

I. General Information:

1	**Course Title:**	Medical Parasitology				
2	**Course Number & Code:**	Ph653				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		1	**2**			**2**
4	**Study level/ semester at which this course is offered:**	3rd Year/ 1st semester				
5	**Prerequisite:**	None				
	Co–requisite:	None				
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	-				
10	**Location of teaching the course:**	Faculty of Pharmacy- Sana`A University				
11	**Prepared by:**	Associate prof. Rashad Abdul-Ghani				
12	**Date of approval:**					

II. Course Description:

This course aims to provide pharmacy students with the essential information about the different types of protozoan and helminthic parasites and the parasitic diseases. It is focused on the morphologic and infective stages of parasites, their life cycle and mode(s) of transmission, pathogenesis and clinical features, diagnosis, treatment, and prevention and control of parasitic diseases.

III. Intended learning outcomes (ILOs) of the course

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At the end of this course, the students will be able to:

1. Outline medically important parasites and parasitic diseases.
2. Describe the distribution, morphology, life cycle, infective stages, hosts, mode(s) of transmission, pathogenesis and clinical features, diagnosis, best therapeutic approaches and prevention and control of parasitic diseases.
3. Recognize zoonotic and vector-borne parasitic infections and their impact on human health.
4. Propose best approaches to prevent and control of parasitic infections prevalent in Yemen.
5. Propose the best cost-effective therapeutic approaches to the control of parasitic diseases prevalent in Yemen.
6. Identify the gross morphology of visible parasite.
7. Properly use light microscope for morphologic identification of parasite stages.
8. Efficiently use computer and internet to gather information and gain knowledge.
9. Work independently or collaboratively to prepare seminars/ presentations or write reports.
10. Effectively use internet resources to search for up-to-date information to solve emerging problems.

IV. Intended learning outcomes (ILOs) of the course

(A) Knowledge and Understanding Skills:

Alignment of Course-Intended Learning Outcomes (CILOs) to Program-Intended Learning Outcomes (PILOs) in Knowledge and Understanding.

PILOs in knowledge and understanding		**CILOs in knowledge and understanding**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Explain major concepts in medical parasitology and outline medically important parasites and parasitic diseases.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care	**a2-**	Describe the distribution, morphology, life cycle, infective stages, hosts, mode(s) of transmission, pathogenesis and clinical features, diagnosis, best therapeutic approaches and prevention and control of parasitic diseases.

	and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a3-**	Recognize zoonotic and vector-borne parasitic infections and their impact on human health.

Teaching and Assessment Methods for Achieving Learning Outcomes

Alignment of learning outcomes of knowledge and understanding to teaching and assessment methods:

CILOs in Knowledge and Understanding		**Teaching strategies/methods**	**Methods of assessment**
After participating in the course, students would be able to:		Presentations Discussion-oriented lectures	• Quizzes • Mid-semester and final exams (MCQs, shortanswer and essay questions)
a1-	Explain major concepts in medical parasitology and outline medically important parasites and parasitic diseases.		
a2-	Describe the distribution, morphology, life cycle, infective stages, hosts, mode(s) of transmission, pathogenesis and clinical features, diagnosis, best therapeutic approaches and prevention and control of parasitic diseases.		
a3-	Recognize zoonotic and vector-borne parasitic infections and their impact on human health.		

(B) Intellectual Skills

Alignment of Course CILOs to PILOs in intellectual skills:

PILOs in intellectual skills		**CILOs of intellectual skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b1-**	Propose best approaches to prevent and control of parasitic infections prevalent in Yemen.

B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Propose the best cost-effective therapeutic approaches to the control of parasitic diseases prevalent in Yemen.

Teaching and Assessment Methods for Achieving Learning Outcomes

Alignment of learning outcomes of intellectual skills to teaching methods and assessment methods:

CILOs in intellectual skills		**Teaching strategies/methods**	**Methods of assessment**
After participating in the course, students would be able to:			
b1-	Propose best approaches to prevent and control of		Coursework
	parasitic infections prevalent in Yemen.	• Brainstorming • Oral presentations	assignments Oral exams
b2-	Propose the best cost-effective therapeutic approaches to the control of parasitic diseases prevalent in Yemen.		

(C) Professional and Practical Skills

Alignment of CILOs to PILOs in professional and practical skills

PILOs in professional and practical skills		**CILOs in professional and practical skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c1-**	Identify the gross morphology of visible parasite.
		c2-	Properly use light microscope for morphologic identification of parasite stages.

Teaching and Assessment Methods for Achieving Learning Outcomes

Alignment of learning outcomes of professional and practical skills to teaching and assessment methods:			
CILOs in professional and practical skills		**Teaching strategies/methods**	**Methods of assessment**
After participating in the course, students would be able to:		• Laboratory demonstration and practice • Video tutorials	• Practical quizzes • Logbooks and reports • Mid-semester and final exams
c1-	Identify the gross morphology of visible parasite.		
c2-	Properly use light microscope for morphologic identification of parasite stages.		

(D) General and Transferable Skills

Alignment of course intended-learning outcomes (CILOs) to program-intended learning outcomes (PILOs) in general and transferable skills

PILOs in general and transferable skills		**CILOs in general and transferable skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Efficiently use computer and internet to gather information and gain knowledge.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Work independently or collaboratively to prepare seminars/ presentations or write reports.
		d3-	Effectively use internet resources to search for up-to-date information to solve emerging problems.

Teaching and Assessment Methods for Achieving Learning Outcomes

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

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CILOs in general and transferable skills		Teaching strategies/methods	Methods of assessment
After participating in the course, students would be able to:		• Presentations and seminars • Group discussions • Self-study modules	• Assessment worksheets • Portfolios
d1-	Efficiently use computer and internet to gather information and gain knowledge.		
d2-	Work independently or collaboratively to prepare seminars/ presentations or write reports.		
d3-	Effectively use internet resources to search for up-to-date information to solve emerging problems.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	**Introduction to medical parasitology**	a1; b1; d1–d3	- Definitions and concepts - Types of parasites, hosts and vectors. - Parasite life cycles - Classification of medically important parasites	1	1

2	**Parasitic amoebae**	a1, a2; b1, b2; d1–d3	- *Entamoeba histolytica* - *E. coli*	1	1
3	**Pathogenic free-living amoebae**	a1, a2; b1, b2; d1–d3	- *Acanthameba* species - *Naegleria fowleri*	1	1
4	**Luminal flagellates**	a1–a3; b1, b2; d1–d3	- *Giardia lamblia* - *Dientamoeba fragilis* - *Trichomonas vaginalis*	1	1
5	**Blood and tissue flagelates**	a1–a3; b1, b2; d1–d3	- *Leishmania* species causing cutaneous, mucocutaneous and visceral leishmaniasis. - African trypanosomes - *Trypanosoma cruzi*	1	1
6	**Coccidian parasites**	a1–a3; b1, b2; d1–d3	- *Toxoplasma gondii* - *Cryptosporidium* species - *Cyclospora cayetenesis* - *Cystoisospora belli*	1	1
7	**Mid-semester exam**	a1–a3	----------	1	1
8	**Malaria parasites**	a1–a3 b1, b2; d1–d3	- *Plasmodium falciparum* - *P. vivax* - *P. ovale* - *P. malariae*	1	1
9	**Blood and liver flukes**	a1–a3; b1, b2; d1–d3	- *Schistosoma haematobium* - *S. mansoni* - *Fasciola hepatica*	1	1

10	**Cestodes**	a1–a3; b1, b2; d1–d3	- *Taenia saginata* - *Taenia solium* - *Hymenolepis nana* - *Echinococcus granulosus*	2	2
11	**Intestinal nematodes**	a1, a2; b1, b2; d1–d3	- *Ascaris lumbricoides* - *Trichuris trichiura* - *Ancylostoma duodenale* - *Strongyloides stercoralis* - *Enterobius vermicularis*	2	2
12	**Tissue nematodes**	a1–a3; b1, b2; d1–d3	- *Wuchereria bancrofti* - *Onchocerca volvulus* - *Dracunculus medinensis*	1	1
13	**Revision**				
14	**Final exam**	a1–a3	----------	1	1
Number of Weeks /and Contact Hours per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	***E. histolytica & E. coli*** - Slide spots of trophozoites and cysts.	c1, c2	1	2
2	***G. lamblia & T. vaginalis*** - Slide spots of *G. lamblia* trophozoite and cyst.	c1, c2	1	2
	- Slide spot of *T. vaginalis* trophozoite.			
3	***Leishmania* species & *Trypanosoma* species** - Slide spots of *Leishmania* species amastigote and promastigote and *Trypanosoma* species trypomastigotes.	c1, c2	1	2

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4	▯ ***P. falciparum & P. vivax*** - Blood smears of erythrocytic stages of malaria parasites (ring stages, trophozoites, schizonts and gametocytes)	c1, c2	1	2
5	▯ ***S. mansoni & S. haematobium*** - Slide spots of adult worms and eggs. - Shells of snail intermediate hosts.	c1, c2	1	2
6	▯ ***T. saginata & T. solium*** - Jar specimens of adult worms and their body parts. - Slide spots of scolices, segments (immature, mature and gravid) and egg.	c1, c2	1	2
7	**Mid-semester exam**	c1, c2	1	2
8	▯ ***H. nana & E. granulosus*** - Slide spots of adult worms, scolices, segments (immature, mature and gravid) and eggs. - Jar specimens of hydatid cysts (different sizes). -	c1, c2	1	2
10	▯ ***A. lumbricoides*** - Jar specimens of male and female adult worms. - Slide spots of eggs.	c1, c2	1	2
11	▯ ***T. trichiura & Ancylostoma duodenale*** - Slide spots of male and female adults and egg.	c1, c2	1	2
12	▯ ***E. vermicularis*** - Slide spots of male and female adult worms	c1, c2	1	2
	and egg.			

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13	▯ ***W. bancrofti* & *O. volvulus*** - Slide spots of *W. bancrofti* and *O. volvulus* microfilariae.	c1, c2	1	2
14	▯ **Final review**	c1, c2	2	4
15	▯ **Final exam**	c1, c2	1	2
Number of Weeks / Contact Hours per Semester			**16**	**32**

2- Teaching strategies of the course

- Presentations and tutorials
- Discussion-oriented and interactive teaching
- Group discussions
- Self-study modules
- Laboratory demonstrations and practice

3-Assignments

- Quizzes and oral tests.
- Theoretical and practical mid-semester exams.
- Laboratory logbooks and reports.
- Final exams.

4-Schedule of Assessment Tasks for Students During the Semester

Assessment of Theoretical Part

No.	Assessment method	Week due	Mark	Proportion of final assessment	CILOs

1	**Attendance, Participation and quizzes**	---	10	10%	a1–a3; b1, b2; d1–d3
	Attendance and practical reports	All weeks	15	15%	c1, c2
2	**Practical mid-semester exam**	7th	15	15%	c1, c2
3	**Theoretical mid-semester exam**	8th	10	10%	a1–a3
4	**Final Exam (theoretical)**	---	30	30%	a1–a3
5	**Final Exam (practical)**	----	20	20%	c1, c2
	Total		**100**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VII. Learning Resources:

1- Required Textbook(s) (maximum two)

1- Ridley JW (2012). **Parasitology for Medical and Clinical Laboratory Professionals**. Delmar Cengage Learning.

2- Recommended Readings and Reference Materials

2- Paniker CKJ (2007). **Textbook of Medical Parasitology**. 6th ed. New Delhi: Jaypee Brothers.

3- Essential References

1- Bogitsh BJ, Carter CE, Oeltmann TN (2013). **Human Parasitology**. 12th ed. Oxford: Academic Press, Elsevier.

4- Electronic Materials and Web Sites, etc.

	1- CDC -Parasites (http://www.cdc.gov/parasites/).
5- Other Learning Materials	
	1- Educational videos 2- Fixed microscope slides

VIII. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, etc. - Well-equipped laboratories with all required equipment and slide.
2 - Computing resources:	- Computer laboratory with internet facilities.

IX. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback
	▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XI. Course Policies:

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** ▪ Non-reasonable frequent tardiness will be allowed and is considered as absence from the lectures/

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Medical Parasitology

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Associate prof. Rashad Abdul-Ghani	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	**Course Title:**	Medical Parasitology

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2-	**Course Number & Code:**	Ph653				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	3rd level /2nd semester				
5-	**Pre –requisite (if any):**	General Pharmaceutical chemistry, Pharmaceutical analytical chemistry I&II and pharmaceutical organic chemistry I, II& III				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course Description:

This course aims to provide pharmacy students with the essential information about the different types of protozoan and helminthic parasites and the parasitic diseases. It is focused on the morphologic and infective stages of parasites, their life cycle and mode(s) of transmission, pathogenesis and clinical features, diagnosis, treatment, and prevention and control of parasitic diseases.

IV- Intended learning outcomes (ILOs) of the course

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At the end of this course, the students will be able to:

11. Outline medically important parasites and parasitic diseases.
12. Describe the distribution, morphology, life cycle, infective stages, hosts, mode(s) of transmission, pathogenesis and clinical features, diagnosis, best therapeutic approaches and prevention and control of parasitic diseases.
13. Recognize zoonotic and vector-borne parasitic infections and their impact on human health.
14. Propose best approaches to prevent and control of parasitic infections prevalent in Yemen.
15. Propose the best cost-effective therapeutic approaches to the control of parasitic diseases prevalent in Yemen.
16. Identify the gross morphology of visible parasite.
17. Properly use light microscope for morphologic identification of parasite stages.
18. Efficiently use computer and internet to gather information and gain knowledge.
19. Work independently or collaboratively to prepare seminars/ presentations or write reports.
20. Effectively use internet resources to search for up-to-date information to solve emerging problems.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	**Introduction to medical parasitology**	a1; b1; d1–d3	- Definitions and concepts - Types of parasites, hosts and vectors.	1	1
			- Parasite life cycles - Classification of medically important parasites		

2	**Parasitic amoebae**	a1, a2; b1, b2; d1–d3	- *Entamoeba histolytica* - *E. coli*	2	1
3	**Pathogenic free-living amoebae**	a1, a2; b1, b2; d1–d3	- *Acanthameba* species - *Naegleria fowleri*	3	1
4	**Luminal flagellates**	a1–a3; b1, b2; d1–d3	- *Giardia lamblia* - *Dientamoeba fragilis* - *Trichomonas vaginalis*	4	1
5	**Blood and tissue flagelates**	a1–a3; b1, b2; d1–d3	- *Leishmania* species causing cutaneous, mucocutaneous and visceral leishmaniasis. - African trypanosomes - *Trypanosoma cruzi*	5	1
6	**Coccidian parasites**	a1–a3; b1, b2; d1–d3	- *Toxoplasma gondii* - *Cryptosporidium* species - *Cyclospora cayetenesis* - *Cystoisospora belli*	6	1
7	**Mid-semester exam**	a1–a3	----------	7	1
8	**Malaria parasites**	a1–a3 b1, b2; d1–d3	- *Plasmodium falciparum* - *P. vivax* - *P. ovale* - *P. malariae*	8	1
9	**Blood and liver flukes**	a1–a3; b1, b2; d1–d3	- *Schistosoma haematobium* - *S. mansoni* - *Fasciola hepatica*	9	1
10	**Cestodes**	a1–a3; b1, b2;	- *Taenia saginata* - *Taenia solium*	10,11	2

		d1–d3	- *Hymenolepis nana* - *Echinococcus granulosus*		
11	**Intestinal nematodes**	a1, a2; b1, b2; d1–d3	- *Ascaris lumbricoides* - *Trichuris trichiura* - *Ancylostoma duodenale* - *Strongyloides stercoralis* - *Enterobius vermicularis*	12,13	2
12	**Tissue nematodes**	a1–a3; b1, b2; d1–d3	- *Wuchereria bancrofti* - *Onchocerca volvulus* - *Dracunculus medinensis*	14	1
13	**Revision**			15	1
14	**Final exam**	a1–a3	----------	16	1
Number of Weeks /and Contact Hours per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	***E. histolytica & E. coli*** - Slide spots of trophozoites and cysts.	c1, c2	1	2
2	***G. lamblia & T. vaginalis*** - Slide spots of *G. lamblia* trophozoite and cyst. - Slide spot of *T. vaginalis* trophozoite.	c1, c2	2	2
3	***Leishmania* species & *Trypanosoma* species** - Slide spots of *Leishmania* species amastigote and promastigote and *Trypanosoma* species trypomastigotes.	c1, c2	3	2

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4	▯ ***P. falciparum & P. vivax*** - Blood smears of erythrocytic stages of malaria parasites (ring stages, trophozoites, schizonts and gametocytes)	c1, c2	4	2

5	▯ ***S. mansoni & S. haematobium*** - Slide spots of adult worms and eggs. - Shells of snail intermediate hosts.	c1, c2	5	2
6	▯ ***T. saginata & T. solium*** - Jar specimens of adult worms and their body parts. - Slide spots of scolices, segments (immature, mature and gravid) and egg.	c1, c2	6	2
7	**Mid-semester exam**	c1, c2	7	2
8	▯ ***H. nana & E. granulosus*** - Slide spots of adult worms, scolices, segments (immature, mature and gravid) and eggs. - Jar specimens of hydatid cysts (different sizes). -	c1, c2	8	2
10	▯ ***A. lumbricoides*** - Jar specimens of male and female adult worms. - Slide spots of eggs.	c1, c2	9	2
11	▯ ***T. trichiura & Ancylostoma duodenale*** - Slide spots of male and female adults and egg.	c1, c2	10	2
12	▯ ***E. vermicularis*** - Slide spots of male and female adult worms and egg.	c1, c2	11	2

13	▯ ***W. bancrofti* & *O. volvulus*** - Slide spots of *W. bancrofti* and *O. volvulus* microfilariae.	c1, c2	12	2
14	▯ **Final review**	c1, c2	13,14	4
15	▯ **Final exam**	c1, c2	15	2
Number of Weeks / Contact Hours per Semester			**16**	**32**

3- Teaching strategies of the course

- Presentations and tutorials
- Discussion-oriented and interactive teaching
- Group discussions
- Self-study modules
- Laboratory demonstrations and practice

3-Assignments

- Quizzes and oral tests.
- Theoretical and practical mid-semester exams.
- Laboratory logbooks and reports.
- Final exams.

4-Schedule of Assessment Tasks for Students During the Semester

Assessment of Theoretical Part

No.	Assessment method	Week due	Mark	Proportion of final assessment	CILOs
1	**Attendance, Participation and quizzes**	---	10	10%	a1–a3; b1, b2; d1–d3

	Attendance and practical reports	All weeks	15	15%	c1, c2
2	**Practical mid-semester exam**	7th	15	15%	c1, c2
3	**Theoretical mid-semester exam**	8th	10	10%	a1–a3
4	**Final Exam (theoretical)**	---	30	30%	a1–a3
5	**Final Exam (practical)**	----	20	20%	c1, c2
	Total		**100**	**100%**	

VI- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VII- Learning Resources:

6- Required Textbook(s) (maximum two)

3- Ridley JW (2012). **Parasitology for Medical and Clinical Laboratory Professionals**. Delmar Cengage Learning.

7- Recommended Readings and Reference Materials

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10- Other Learning Materials	
	3- Educational videos 4- Fixed microscope slides

VIII- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, etc. - Well-equipped laboratories with all required equipment and slide.
2 - Computing resources:	- Computer laboratory with internet facilities.

IX- Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XII. Course Policies:

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** ▪ Non-reasonable frequent tardiness will be allowed and is considered as absence from the lectures/

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Toxicology

I. General information about the course :						
1.	Course Title:	Toxicology				
2.	Course Code and Number :	*Ph457*				
3.	Credit Hours :	Lecture	Seminar/Tutorial	Practical	Training	Total
		1	-	*2*	-	*2*
4.	Study Level and Semester:	3rd year– 1st semester				
5.	Pre-requisites (if any):	-				
6.	Co-requisites (if any) :	-				
7.	Program in which the course is offered	Bachelor of Pharmacy				
8.	Teaching Language:	English				
9.	Study System :	Semester- based				
10.	Prepared by :	**Professor. Nabil H. Al-Hamadi** **nblhamadi@yahoo.com**				
11.	Approval date :					
12.	Approved by:					

II. Course Description :

This course offered to fourth year pharmacy students as a toxicology course. During which common toxicological problems are presented to students to direct their knowledge towards the sources, mode of poisoning, clinical picture and treatment of poisoning, Practically students should be exposed to specific tests for detection of selected types of poisons specially those of common use & of an accidental exposure during their household use or during agricultural or medical applications.

VI. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Knowledge and Understanding PILOs	**Knowledge and Understanding CILOs**

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After completing this program, students would be able to:	After completing this course, students would be able to:
A2. Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of	**a1.** Classify and relate different poisons according to the symptoms they cause depending on group classification.
drug discovery, design and development.	
A3. Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2.** Explain the mode of poisoning either suicidal, homicidal or accidental
	a3. Establish the most important investigations to be done and biological materials collection.
	a4. Recognize different procedures of treatment and emergency measures should be followed.

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Intellectual Skills PILOs	**Intellectual Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**
B1. Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1.** Categorize the most common poisons, their classification, groups and subgroups**.**
B2. Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b2.** Explore the most important symptoms and signs of poisoning and relate them to causative toxicant.
B5. Interpret the prescriptions, patient and clinical data, analysis all the encountered pharmaceutical problems and plan the strategies for their solution to develop the health care.	**b3.** Formulate an appropriate management plans for treating poisons and emergency measures to be followed.

Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Professional and Practical Skills PILOs	**Professional and Practical Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**

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C1. Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1.** Perform a proper history from patient or relatives related to the circumstances of poisoning.
C2. Handle and dispose chemicals and pharmaceutical preparations including radio-pharmaceuticals safely and effectively.	**c2.** Interpret the possible cause of poisoning and immediate action to be followed.
	c3. Apply an immediate action to save the life of patient through medical intervention and urgent referral as needed.

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	**Transferable (General) Skills CILOs**
After completing this program, students would be able to:	**After completing this course, students would be able to:**
D1. Practice independent learning needed for continuous professional development	**d1.** Review wth patients and relatives to have an idea about the way of poisoning and the possible cause/causes.
D5. Apply information and communication technology and working effectively in a team.	**d2.** Negotiate kindly and humanly with patients and concerned relatives regardless of the mode of poisoning.

V. Alignment of CILOs to Teaching and Assessment Strategies

First: Alignment of Knowledge and Understanding CILOs

Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
A1. Describe the common types of poisons.	Lectures	1.Essay questions
A2. Outline the causes of poisoning	Discussions	2.Multiple choice questions
A3. Describe the clinical symptoms and signs of the most important types of toxicants.	Problem solving and collaboration learning.	3.Case study (problem solving)

A4. Determine &apply the most appropriate diagnostic methods to reach a proper diagnosis.	Practical tests for most common poisons (Lab. Work)	4.Written examination: • 2 long essays (Practical sheet) to determine the ability to understand the topic properly and interpret it clearly. • 20 MCQs to evaluate the ability to student to recall knowledge in a specific period of time. • Report evaluation.

Second: Alignment of Intellectual Skills CILOs		
Intellectual Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
b1. Categorize the most important poisons threatening life	1. Lectures.	1. written examination: -Essays -problem solving
b2. Test the appropriate methods of diagnosing intoxication.	2. Discussions. 3. Lab. Work (practical lessons)	2.MCQs. 3. Lab sheet work evaluation.

Third: Alignment of Professional and Practical Skills CILOs		
Professional and Practical Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
c1. Perform necessary investigations.	- Demonstrations. - Practical lessons. - Laboratory tests.	- Written exam. - Laboratory Sheet evaluation. - Report evaluation.
c2. Apply a proper action in managing poisoning.	- Lectures. - Problem solving.	- Supervisor evaluation. - Report evaluation.

Fourth: Alignment of Transferable (General) Skills CILOs		
Transferable (General) Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
d1. Review the case with patients and relatives to have a relevant data related to poisoning.	- Demonstrations. - Practical (lab.tests). - Problem solving.	- Supervisor evaluation. - Case report.

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d2. Negotiate kindly and nicely to the patients during intervention.	- Demonstrations. - Problem solving.	

VI. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents

First: Theoretical Aspects

No.	Course Topics/Units	Sub-topics	No. of Weeks	Contact Hours	CILOs
1	Introduction to Occupational Environmental & Medical Toxicology	Definitions, types & mode of poisoning	1	1	a1,a2,b1
2	General diagnosis of poisoning	Clinical & laboratory approach	1	1	a1,a2&b1
3	General treatment of poisoning	ABC, decontamination & antidotes	1	1	a1,a2&b1
4	Corrosive poisons	Household acids and alkalis	1	1	a1,a2&b1
5	Metallic poisons	Toxicology of heavy metals	1	1	a1,a2&b1
6	Non metallic poisons	Insecticides, rodenticides and biocides	1	1	a1,a2&b1
7	Analgesics	Non-steroidal antiinflammatory drugs	1	1	a1,a2&b1
8	Hypnotics	Barbiturates & benzodiazepines	1	1	a1,a2&b1
9	Narcotics	Opium, opiates & drug addiction	1	1	a1,a2&b1
10	Hallucinogens	Cannabis, LSD & datura	1	1	a1,a2&b1

11	Stimulants	Amphetamine& khat	1	1	a1,a2&b1
12	Volatile poisons	Alcohols, CO, Petroleum distillates	1	1	a1,a2&b1
13	Animal Envenomation	Snakes, scorpions, insects & rabies	1	1	a1,a2&b1
14	Harmful effects of drugs on organs.	CNS, CVS and renal intoxicants	1	1	a1,a2&b1
15	Allergic reactions to drugs		1	1	a1,a2&b1
16	Free radicals and antioxidants		1	1	a1,a2&b1
Total number of weeks and hours			**16weeks**	**16**	

Second: Practical/Tutorial/Clinical Aspects

Write up practical/tutorial/clinical topics

No.	Practical/Tutorial/Clinical topics	No. of Weeks	Contact Hours	CILOs
1	Detection of corrosive poisons.	2	4	a1,a2,b1,b2,c1
2	Detection of metallic poisons	2	4	a1,a2,b1,b2,c1 ,d1
3	Detection of organophosphorous, estimation of anticholinesterase.	2	4	a1,a2,b1,b2,c1 ,d1
4	Midterm exam	1	2	a1,a2,b1,b2,c1 ,d1
5	Detection NSAID	2	4	a1,a2,b1,b2,c1 ,d1
6	Detections of sedative, Narcotics	2	4	a1,a2,b1,b2,c1 ,d1
7	Detection of alcohols in urine	2	4	a1,a2,b1

8	Water contamination (nitrate, nitrite, metals)	2	4	a1,a2,b1
9	Final exam	1	2	a1,a2,b1,b2,c1 ,d1
Total number of weeks and hours		**16**	**32**	

VII. Teaching Strategies

III. Teaching Strategies

- Lectures.
- Practical lessons (laboratory)
- Demonstrations.
- Small group discussions.
- Self-learning.

VIII. Tasks and Assignments:

No.	Task/Assignment	CILOs	Week due	Mark
1	Exam preparation: Ask questions to clarify and increase knowledge	a1,c2,d1,d2	5th	20
2	Writing notes as case studies	a1,c2,d1,d2	8th	
3	Practical tests: selective Exam	a1,c2,d1,d2	14th	

IX. Learning Assessment:

No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment	Aligned CILOs
1	Homework/Tasks/Assignments	Through the course	10		b1,c1,d1,d2
2	Quiz 1	1st month	5		b1,c1,d1,d2
3	Midterm Exam	2nd month	20		b1,c1,d1,d2

4	Quiz 2	3rd month	5		b1,c1,d1,d2
5	Final Exam	End of course	60		b1,c1,d1,d2
Total			100%		

X. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

1. Nabil H.Hamadi (2010), Clinical &Forensic Toxicology, 3rd Edition, Sana'a University.
2. Hassan M.Mahbashi (2015), Toxicology, 1st ed. Sana'a University

Essential References-not less than 4

1. Staff.Membs.Ain Shams University (2012), Principles of Clinical Toxicology,Elmanar press
2. Robert Hoffman, Mary Howland (2014),Manual of Tox.Emergencies, 10th ed,USA
3. Curtis Klaassen (2013),Casarett &Doull's Toxicology, 8th ed, USA.

Electronic Materials and Web Sites

1.Forensic Toxicology Encyclopedia
2.Metropolitan Crime Scene investigations.

XI. Course Policies (To be determined by Faculty Deanship):

Based on university regulations, the following aspects should be figured out:

1.	**(**Class Attendance**):** Attendance is mandatory for all students for credit to be received and will be monitored. The student is
	excluded from class if absence percentage exceeds 15% with no excuse or 25% with an accepted excuse.
2.	**(**Tardy**) :**

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3.	**(**Exam Attendance/Punctuality**) :** All students registered for the course are required to attend the assigned exams. Dates and locations will be posted prior to the examination date. No re-sit exams are carried out for in-course examinations. If the student misses an in-course examination and his/her excuse was accepted, the missed exam grade will be calculated from the final exam grade. If a student misses the final exam, and unless he/she provides an accepted excuse, a grade of F will be granted. If the excuse was accepted, a student may take the exam as first attempt in the second attempt examinations.
4.	**(**Assignments & Projects**) :**
5.	**(**Cheating**) :** Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room (e.g., crib notes, pagers or cell phones). Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty. Please refer to the academic regulations of UST for further details.
6.	**(**Plagiarism**) :** "To plagiarize is to take ideas or words of another person & pass them off as one's own". Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university).
7.	**(**Other policies**) :**

I. General information about the course instructor :							
Name	Professor. Nabil H. Al-Hamadi	**Office Hours(3 Hours Weekly)**					
Location & phone number		**Sat**	**Sun**	**Mon**	**Tue**	**Wed**	**Thu**
Email	**nblhamadi@yahoo.com**						

II. General information about the course:						
1.	**Course Title :**	**Toxicology**				
2.	**Course Code and Number :**	**Ph457**				
3.	**Credit Hours :**	**Credit Hours**				**Total**
		Theoretical	**Seminar/Tutorial**	**Practical**	**Training**	
		1	**-**	***2***	**-**	***2***
4.	**Study Level and Semester:**	3rd Year Pharmacy – 1st Semester				
5.	**Pre-requisites (if any):**					
6.	**Co-requisites (if any)**:					
7.	**Program in which the course is offered:**	Bachelor of Pharmacy				
8.	**Teaching Language:**	English				
9.	**Instruction location:**					

I. Course Description :

This course offered to fourth year pharmacy students as a toxicology course. During which common toxicological problems are presented to students to direct their knowledge towards the sources, mode of poisoning, clinical picture and treatment of poisoning, Practically students should be exposed to specific tests for detection of selected types of poisons specially those of common use & of an accidental exposure during their household use or during agricultural or medical applications.

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III. Course Contents:

1st :Theoretical Aspect

No.	Course Topics/Units	Sub-topics	No. of Weeks	Contact Hours
1	Introduction to Occupational Environmental & Medical Toxicology	Definitions, types & mode of poisoning	1	1
2	General diagnosis of poisoning	Clinical & laboratory approach	2	1
3	General treatment of poisoning	ABC, decontamination & antidotes	3	1
4	Corrosive poisons	Household acids and alkalis	4	1
5	Metallic poisons	Toxicology of heavy metals	5	1
6	Non metallic poisons	Insecticides, rodenticides and biocides	6	1
7	Analgesics	Non-steroidal antiinflammatory drugs	7	1
8	Hypnotics	Barbiturates & benzodiazepines	8	1
9	Narcotics	Opium, opiates & drug addiction	9	1

10	Hallucinogens	Cannabis, LSD & datura	10	1
11	Stimulants	Amphetamine& khat	11	1
12	Volatile poisons	Alcohols, CO, Petroleum distillates	12	1
13	Animal Envenomation	Snakes, scorpions, insects & rabies	13	1
14	Harmful effects of drugs on organs.	CNS, CVS and renal intoxicants	14	1
15	Allergic reactions to drugs		15	1
16	Free radicals and antioxidants		16	1
Total number of weeks and hours			**16weeks**	**16**

Second: Practical/Tutorial/Clinical Aspects

Write up practical/tutorial/clinical topics

No.	Practical/Tutorial/Clinical topics	Weeks due	Contact Hours	CILOs
1	Detection of corrosive poisons.	1,2	4	a1,a2,b1,b2,c1
2	Detection of metallic poisons	3,4	4	a1,a2,b1,b2,c1 ,d1
3	Detection of organophosphorous, estimation of anticholinesterase.	5,6	4	a1,a2,b1,b2,c1 ,d1
4	Midterm exam	7	2	a1,a2,b1,b2,c1 ,d1
5	Detection NSAID	8,9	4	a1,a2,b1,b2,c1 ,d1

6	Detections of sedative, Narcotics	10,11	4	a1,a2,b1,b2,c1 ,d1
7	Detection of alcohols in urine	12,13	4	a1,a2,b1
8	Water contamination (nitrate, nitrite, metals)	14,15	4	a1,a2,b1
9	Final exam	16	2	a1,a2,b1,b2,c1 ,d1
Total number of weeks and hours		**16**	**32**	

V. Teaching Strategies

1. lectures
2.Practical lessons
3.Small group discussion
4.Problem solving/ case study
5.Self learning

VI. Tasks and Assignments

No.	Task/Assignment	Week due	Mark
.1	Exam preparation – Ask questions to clarify & increase knowledge	**5th**	**20**
.2	Writing notes as case studies	**8th**	
.3	Practical tests: selective Exam	**14th**	

VII. Learning Assessment:

No.	Assessment Tasks	Assessment day & date	Mark	Weight
1	Homework/Tasks/Assignments	Throughout tthe the cou	10	

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	Quiz 1	1st month	5	
2	Midterm Exam	2nd month	20	
3	Quiz 2	3rd month	5	
4	Final Exam	End course	60	
	Total		**100**	

II. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

3. Nabil H.Hamadi (2010), Clinical &Forensic Toxicology, 3rd Edition, Sana'a University.
4. Hassan M.Mahbashi (2015), Toxicology, 1st ed. Sana'a University

Essential References-not less than 4

4. Staff.Membs.Ain Shams University (2012), Principles of Clinical Toxicology,Elmanar press
5. Robert Hoffman, Mary Howland (2014),Manual of Tox.Emergencies, 10th ed,USA
6. Curtis Klaassen (2013),Casarett &Doull's Toxicology, 8th ed, USA.

Electronic Materials and Web Sites

1.Forensic Toxicology Encyclopedia
2.Metropolitan Crime Scene investigations.

III. Course Policies (To be determined by Faculty Deanship):

Based on university regulations, the following aspects should be figured out:

8.	**(**Class Attendance**):** Attendance is mandatory for all students for credit to be received and will be monitored. The student is excluded from class if absence percentage exceeds 15% with no excuse or 25% with an accepted excuse.
9.	**(**Tardy**) :**

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10.	**(**Exam Attendance/Punctuality**) :** All students registered for the course are required to attend the assigned exams. Dates and locations will be posted prior to the examination date. No re-sit exams are carried out for in-course examinations. If the student misses an in-course examination and his/her excuse was accepted, the missed exam grade will be calculated from the final exam grade. If a student misses the final exam, and unless he/she provides an accepted excuse, a grade of F will be granted. If the excuse was accepted, a student may take the exam as first attempt in the second attempt examinations.
11.	**(**Assignments & Projects**) :**
12.	**(**Cheating**) :** Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room (e.g., crib notes, pagers or cell phones). Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty. Please refer to the academic regulations of UST for further details.
13.	**(**Plagiarism**) :** "To plagiarize is to take ideas or words of another person & pass them off as one's own". Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university).
14.	**(**Other policies**) :**

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Course Specification of Pharmacology II

I. Course Identification and General Information:

1.	**Course Title**	Pharmacology II				
2.	**Course Number & Code:**	Ph468				
3.	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4.	**Study level/ semester at which this course is offered:**	3rd level /2nd semester				
5.	**Pre –requisite (if any):**	▪ Anatomy and histology ▪ Physiology I, II ▪ General Pathology				
6.	**Co –requisite (if any):**	-				
7.	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8.	**Language of teaching the course:**	English				
9.	**The department in which the course is offered:**	-				
10.	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
11.	**Prepared by:**	Associate Prof. Fahmy M. Al-Wasei				
12.	**Date of approval:**					

II. Course description:

The course also deals with the study of pharmacodynamics and pharmacokinetics of drugs used for Respiratory, Cardiovascular systems, Blood and Drugs used for alimentary system disorders.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs used for respiratory, cardiovascular systems , blood and drugs used for alimentary system disorders
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify drugs affecting a drugs used for respiratory, cardiovascular systems, blood and Drugs used for alimentary system disorders into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs.
7. Predict drug limitations on the basis of Drug MOA.
8. Select an appropriate drug for patients based on drug benefits and limitation.
9. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
10. Carry out appropriate techniques and measurements in experimental pharmacology.
11. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
12. Prepare critical, scientific and referenced reports 13. Share successfully in team-work.
14. Show respect to life.
15. Demonstrate time management and self-learning during performing practical and professional works and assignments.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a1-**	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.	**a2-**	Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs used for respiratory, cardiovascular systems , blood and drugs used for alimentary system disorders .
		a3-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders.	Lectures methods , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs used for respiratory, cardiovascular systems , blood and drugs used for alimentary system disorders .		
a3-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills	
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

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B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Classify drugs affecting a drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders into various categories
		b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
B2-	Categorize the synthetic and natural drugs	**b3-**	Relate drug indications to MAO of drugs.
	according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b4-**	Predict drug limitations on the basis of Drug MOA.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b5-**	Select an appropriate drug for patients based on drug benefits and limitation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Classify drugs affecting a drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders into various categories	Lectures methods, Group Discussion, Problem solving sessions**,** brainstorming and Computer based teaching and learning	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.		
b3-	Relate drug indications to MAO of drugs.		

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b4-	Predict drug limitations on the basis of drug MOA**.**		
b5-	Select an appropriate drug for patients based on drug benefits and limitation.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and

Practical Skills			
Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
		c2-	Carry out appropriate techniques and measurements in experimental pharmacology.
		c3-	Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c4-**	Prepare critical, scientific and referenced reports .
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.	Lectures methods, practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Carry out appropriate techniques and measurements in experimental pharmacology.		
c3-	Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and		
	precise used in experimental pharmacology.		
c4-	Prepare critical, scientific and referenced reports		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	Share successfully in team-work.
D5-	Apply information and communication technology and working effectively in a team.	d2-	Show respect to life.

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		d3-	Demonstrate time management and selflearning during performing practical and professional works and assignments.

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Share successfully in team-work.	Small group discussions, Tutorials and Practical session	Homework and reports.
d2-	Show respect to life.		
d3-	Demonstrate time management and self-learning during performing practical and professional works and assignments.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

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د.فهمي الواسعي

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1.	**Drugs acting on Respiratory system**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Drugs for common cold : nasal decongestant, antihistamines Drugs for cough • Drugs for bronchial asthma	**2**	4
2.	**Cardiovascular system drugs**	a1, a2, a3, b1, b2, b3, b4, b5, c2, d3	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Diuretics and Antihypertensive • Hypertensive • Anti-angina and drugs for myocardial infarction • Drugs for congestive heart failure • Antiarrhythmic	**4**	**8**
3.	**Midterm exam**	a1-3, b1-5		1	2
4.	**Drugs for Blood**		**Pharmacokinetics,**		

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	Disorders	a1, a2, a3, b1, b2, b3, b4, b5, d1, d2	**Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Haematinics (antianaemic drugs) • Antihemmorrhagic drugs Anticoagulants	**3**	**6**
5.	**Drugs for Alimentary System Disorders**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d3	**Physicochemical properties, synthesis, chemical & common names, structureactivity relationship, metabolism of** **•Antacids and Drugs for Peptic Ulcer** **•Anti- emetics** **• Laxatives** **•Anti-diarrheal** **•Antispasmodics** **•Drugs for irritable colon** **•Hepatic protective Drugs for gall bladder disorders**	**4**	**8**
6.	**Course Review**	a1-3, b15,d1-3	Review of the course topics by discussion session.	1	2
7.	**Final Exam**	a1-3, b1-5		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

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Order	Tasks/ Experiments	CILOs	Number of Weeks	Contact Hours
		(symbols)		
1	Demonstration of the effects of drugs on the blood pressure in an anesthetized rat.	c1-c4, d1-d3	1	2
2.	Record the effects of drugs on the blood pressure and electrocardiogram of an anesthetized rat.	c1-c4, d1-d3	2	4
3	Demonstration of isolated frog heart preparation	c1-c4, d1-d3	1	2
4	Effect of different ions on isolated frog heart preparation	c1-c4, d1-d3	1	2
5	Effect of Adrenaline and propranolol on isolated frog heart preparation	c1-c4, d1-d3	1	2
6	Effect of Ach and atropine on isolated frog heart preparation	c1-c4, d1-d3	1	2
7	Determination of bleeding time and clotting time	c1-c4, d1-d3	1	2
8	Mid-Exam	c1-c4, d1-d3	1	2
9	Study of various disorders of Respiratory system	c1-c4, d1-d3	1	2
10	Determination of vital capacity and other respiratory volumes	c1-c4, d1-d3	1	2
11	Recording of spontaneous motor activity, and muscle relaxant activity of drugs using simple experiments.	c1-c4, d1-d3	1	2
12	Study of various disorders of GIT	c1-c4, d1-d3	1	2
13	Use of computer simulated CDs or Video cassettes for pharmacology practical whenever possible.	c1-c4, d1-d3	2	4
14	Final Exam	c1-c4	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

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VI. a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-4,b1-4, d1-3
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-4, b2-5, d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	7th	15	10%	c1-4

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5.	**Theoretical mid-semester exam**	9th	30	20%	a1, a2, a3, b1, b3
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill
2- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

1. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
2. Udaykumar. Text book of medical pharmacology
3. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

www.en.wikipedia.org/

IV. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmacology II

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Fahmy M. Al-Wasei	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail			2h				

رئيس الجامعة ا.د. القاسم محمد عباس	عميدة مركز التطوير وضمان الجودة ا.م.د. هدى العماد	عميد الكلية د.خالد الشوبة	رئيس القسم	نائب العميد لشؤون الجودة ا.د. محمود البريهي	الموصف د.فهمي الواسعي

II- Course Identification and General Information:

1-	**Course Title:**	Pharmacology II				
2-	**Course Number & Code:**	Ph468				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	3rd level /2nd semester				
5-	**Pre –requisite (if any):**	▪ Anatomy and histology ▪ Physiology I, II ▪ General pathology				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course also deals with the study of pharmacodynamics and pharmacokinetics of drugs used for Respiratory, Cardiovascular systems, Blood and Drugs used for alimentary system disorders.

IV- Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of drugs used for respiratory, cardiovascular systems , blood and drugs used for alimentary system disorders
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify drugs affecting a drugs used for respiratory, cardiovascular systems , blood and Drugs used for alimentary system disorders into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs.
7. Predict drug limitations on the basis of Drug MOA.
8. Select an appropriate drug for patients based on drug benefits and limitation.
9. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
10. Carry out appropriate techniques and measurements in experimental pharmacology.
11. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
12. Prepare critical, scientific and referenced reports 13. Share successfully in team-work.
14. Show respect to life.
15. Demonstrate time management and self-learning during performing practical and professional works and assignments.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
8.	**Drugs acting on Respiratory system**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Drugs for common cold : nasal decongestant, antihistamines Drugs for cough • Drugs for bronchial asthma	**1,2**	4
9.	**Cardiovascular system drugs**	a1, a2, a3, b1, b2, b3, b4, b5, c2, d3	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Diuretics and Antihypertensive • Hypertensive • Anti-angina and drugs for myocardial infarction • Drugs for congestive heart failure	**3-6**	**8**
			Antiarrhythmic		
10.	**Midterm exam**	a1-3, b1-5		7	2

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11.	**Drugs for Blood Disorders**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Haematinics (antianaemic drugs) • Antihemmorrhagic drugs Anticoagulants	**8-10**	**6**
12.	**Drugs for Alimentary System Disorders**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d3	**Physicochemical properties, synthesis, chemical & common names, structureactivity relationship, metabolism of** **•Antacids and Drugs for Peptic Ulcer** **•Anti- emetics** **• Laxatives** **•Anti-diarrheal** **•Antispasmodics** **•Drugs for irritable colon** **•Hepatic protective Drugs for gall bladder disorders**	**11-14**	**8**
13.	**Course Review**	a1-3, b15,d1-3	Review of the course topics by discussion session.	15	2
14.	**Final Exam**	a1-3, b1-5		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

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Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	Demonstration of the effects of drugs on the blood pressure in an anesthetized rat.	c1-c4, d1-d3	1	2
2.	Record the effects of drugs on the blood pressure and electrocardiogram of an anesthetized rat.	c1-c4, d1-d3	2,3	4
3	Demonstration of isolated frog heart preparation	c1-c4, d1-d3	4	2
4	Effect of different ions on isolated frog heart preparation	c1-c4, d1-d3	5	2
5	Effect of Adrenaline and propranolol on isolated frog heart preparation	c1-c4, d1-d3	6	2
6	Effect of Ach and atropine on isolated frog heart preparation	c1-c4, d1-d3	7	2
7	Determination of bleeding time and clotting time	c1-c4, d1-d3	8	2
8	Mid-Exam	c1-c4, d1-d3	9	2
9	Study of various disorders of Respiratory system	c1-c4, d1-d3	10	2
10	Determination of vital capacity and other respiratory volumes	c1-c4, d1-d3	11	2
11	Recording of spontaneous motor activity, and muscle relaxant activity of drugs using simple experiments.	c1-c4, d1-d3	12	2
12	Study of various disorders of GIT	c1-c4, d1-d3	13	2
13	Use of computer simulated CDs or Video cassettes for pharmacology practical whenever possible.	c1-c4, d1-d3	14,15	4
14	Final Exam	c1-c4	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

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Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-4,b1-4, d1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-4, b2-5, d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	9th	30	20%	a1, a2, a3, b1, b3

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13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill

4- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

4. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
5. Udaykumar. Text book of medical pharmacology
6. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

www.en.wikipedia.org/

IX. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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3 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching
▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.
▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.
▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement
▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
د.فهمي الواسعي	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Instrumental Analysis I

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Instrumental Analysis I				
2	**Course Number & Code:**	Ph567				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	3rd level / 2nd semester				
5	**Pre –requisite (if any):**	Pharmaceutical Analytical Chemistry I & II				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy				

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11	**Prepared by:**	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamidaddin
12	**Date of approval:**	

II. Course description:

The course aims to provide students with basic knowledge about the instrumental analysis of pharmaceutical substances. It focuses on the different spectroscopic methods of analysis. The course also covers the applications of these methods for some pharmaceutical substances.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention the basic principle of instrumental analysis of pharmaceutical substances and pharmaceutical preparations.
2. Explain the advantages and disadvantages different spectroscopic methods of analysis.
3. Recognize the applications of different spectroscopic methods of analysis.
4. Choose the appropriate spectroscopic methods of analysis for different pharmaceutical substances and pharmaceutical preparations.
5. Illustrate spectroscopic methods of analysis.
6. Analyze and interpret the results of spectroscopic methods of analysis
7. Operate different pharmaceutical instruments and equipments in the lab.
8. Practice spectroscopic methods for analysis of pharmaceutical substances and pharmaceutical preparations.
9. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
10. Communicate and cooperate effectively with the others as a team work to perform the report on the results of the method of analysis.
11. Apply the information technology skills, such as word processing and internet communication and online searches.
12. Manage the time in work effectively.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be abl to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Mention the basic principle of instrumental analysis of pharmaceutical substances and pharmaceutical preparations.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development	**a2-**	Explain the advantages and disadvantages different spectroscopic methods of analysis.
		a3-	Recognize the applications of different spectroscopic methods of analysis.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Mention the basic principle of instrumental analysis of pharmaceutical substances and pharmaceutical preparations.	Lectures method, group discussion and tutorial	

a2-	Explain the advantages and disadvantages different spectroscopic methods of analysis.		Oral Exam, homework, report, Quizzes, Short answers and Written exam
a3-	Recognize the applications of different spectroscopic methods of analysis.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Choose the appropriate spectroscopic methods of analysis for different pharmaceutical substances and pharmaceutical preparations.
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Illustrate spectroscopic methods of analysis.
		b3-	Analyze and interpret the results of spectroscopic methods of analysis

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.** **After participating in the course, students would be able to:**	**Teaching strategies/methods to be used.**	***Methods of assessment***

b1-	Choose the appropriate spectroscopic methods of analysis for different pharmaceutical substances and pharmaceutical preparations.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
b2-	Illustrate spectroscopic methods of analysis.		
b3-	Analyze and interpret the results of spectroscopic methods of analysis.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Operate different pharmaceutical instruments and equipments in the lab.
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c2-**	Practice spectroscopic methods for analysis of pharmaceutical substances and pharmaceutical preparations.
		c3-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.		
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
c1-	Operate different pharmaceutical instruments and equipments in the lab.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, hort answers and Written exam
c2-	Practice spectroscopic methods for analysis of pharmaceutical substances and pharmaceutical preparations.		
c3-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	Course Intended Learning Outcomes (CILOs) in General / Transferable skills
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Manage the time in work effectively.
		d3-	Apply the information technology skills, such as word processing and internet communication and online searches.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short answers and Written exam
d2-	Manage the time in work effectively.		
d3-	Apply the information technology skills, such as word processing and internet communication and online sear		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	**Introduction to Pharmaceutical Instrumental Analysis**	a1, d1-3	- Definitions, Classifications and types of Instrumental Analysis - Instrumental methods of analysis-Advantages, comparison with other methods of analysis.	1	2

2.	**Spectroscopic methods**	a1, b1-3, d1-3	Electromagnetic radiation: Nature of electromagnetic radiation, the interaction between energy and matter, application of quantum mechanics theory, the absorption and emission of radiant energy by atoms and molecules.	1	2
3.	**UV-Visible spectroscopy** :	a1-3,b1-3, d1-3	Origin of UV spectra, chromophores and auxochromes, bathochromic and hypsochromic shift , choice of solvents, Beer-Lambert's Law, methods of color development, Instrumentation- single and double beam spectrophotometers. Single component analysis, Simultaneous spectrophotometry, Derivative spectrophotometry. Pharmaceutical Applications	2	4
4.	**Spectrofluorimetry**:	a1-3,b1-3, d1-3	- Definition, principles, instrumentation and pharmaceutical applications	1	2
5.	**Chemillumenscence**	a1-3,b1-3, d1-3	Definition, principles, instrumentation and pharmaceutical applications	1	2
6.	**Mid Exam**	a1-3,b1-3		1	2
7.	**Atomic absorption. flame emission spectroscopy**	a1-3,b1-3, d1-3	Definition, principles, instrumentation and pharmaceutical applications	2	4
8.	**Infra-red spectroscopy**	a1-3,b1-3, d1-3	-Theory, modes of vibration in polyatomic molecules, fingerprint and group frequency region, absorption frequencies of important organic functional groups, Instrumentation – single and double beam spectrophotometers, FTIR, pharmaceutical applications	2	4

9.	**H^1-NMR and C^{13} NMR**	a1-3,b1-3, d1-3	-Definition, principles, instrumentation-Nuclear Magnetic Resonance Spectroscopy (1H NMR and 13C NMR): Introduction, instrumentation , proton equivalent, coupling, chemical shift, intergration, J-coupling -pharmaceutical applications	2	4
10.	**Mass Spectroscopy:**	a1-3,b1-3, d1-3	Definition, principles, instrumentation, rules of fragmentation pattern pharmaceutical applications	2	4
	Final Exam	a1-3, b1-3		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1.	Calibration curve	c1-3, **d1-3**	1	2
2.	Location of λ max, determination of molar absorptivity and specific absorptivity, verification of Beer's law	c1-3, **d1-3**	2	4
3.	Study the effect of solvent / pH on λ max.	c1-3, **d1-3**	1	2
4.	UV-Spectrophotometric determination of Ciprofloxacin	c1-3, **d1-3**	1	2
5.	Vis-Spectrophotometric determination of diclofenac sodium	c1-3, **d1-3**	1	2
6.	Mid-Exam	c1,c2, c3	1	2
7.	Assignment of important absorption bands of indomethacin using IR spectroscopy	c1-3, **d1-3**	1	2

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8.	Assignment of important absorption bands of phenobarbital using IR spectroscopy	c1-3, **d1-3**	1	2
9.	**IR analysis of caffeine**	c1-3, **d1-3**	1	2
10.	**Practice the explanation of ^{1}H NMR and ^{13}C NMR of some pharmaceutical substances.**	c1-3, **d1-3**	3	6
11.	**Practice the fragmentation of mass spectra of some pharmaceutical substances.**	c1-3, **d1-3**	2	4
12.	Final Exam	**c1-3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures method, Discussions, Small group discussions, Tutorials and Practice session.

VII. Assignments:

- Homework
- Reports

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a3 ,b1,b2, d1-3
2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2, b1-3, d1-3
3	**Attendance, Practical Reports and Practical mid-semester exam**	7th	30	20%	c1-3
5	**Theoretical mid-semester exam**	7th	30	20%	a1-3, b1-3
6	**Final Exam (theoretical)**	**16th**	50	33%	a1-3, b1-3
7	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004. Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

2- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

1- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,

2- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.

3- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.

4- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.

5- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1. the Analyst;
2. J. Pharm. & Biomed. Anal.
3. J. Assoc. off Anal. Chem.
4. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)
5. The Analytical Forum on ChemWeb (http://analytical.
6. chemweb.com/search/search.exe)

I. Facilities Required:

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1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty.
	▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Instrumental Analysis I

I- Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail			h				

II- Course Identification and General Information:

1-	Course Title:	Pharmaceutical Instrumental Analysis I				
2-	Course Number & Code:	Ph567				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	3rd level /2nd semester				
5-	Pre –requisite (if any):	Pharmaceutical analytical chemistry I&II				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				

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10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

The course aims to provide students with basic knowledge about the instrumental analysis of pharmaceutical substances. It focuses on the different spectroscopic methods of analysis. The course also covers the applications of these methods for some pharmaceutical substances.

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IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention the basic principle of instrumental analysis of pharmaceutical substances and pharmaceutical preparations.
2. Explain the advantages and disadvantages different spectroscopic methods of analysis.
3. Recognize the applications of different spectroscopic methods of analysis.
4. Choose the appropriate spectroscopic methods of analysis for different pharmaceutical substances and pharmaceutical preparations.
5. Illustrate spectroscopic methods of analysis.
6. Analyze and interpret the results of spectroscopic methods of analysis
7. Operate different pharmaceutical instruments and equipments in the lab.
8. Practice spectroscopic methods for analysis of pharmaceutical substances and pharmaceutical preparations.
9. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
10. Communicate and cooperate effectively with the others as a team work to perform the report on th results of the method of analysis.
11. Apply the information technology skills, such as word processing and internet communication and online searches.
12. Manage the time in work effectively.

13. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
11.	**Introduction to Pharmaceutical Instrumental Analysis**	a1, d1-3	- Definitions, Classifications and types of Instrumental Analysis - Instrumental methods of analysis-Advantages, comparison with other methods of analysis.	1	2
12.	**Spectroscopic methods**	a1, b1-3, d1-3	Electromagnetic radiation: Nature of electromagnetic radiation, the interaction between energy and matter, application of quantum mechanics theory, the absorption and emission of radiant energy by atoms and molecules.	2	2
13.	**UV-Visible spectroscopy** :	a1-3,b1-3, d1-3	Origin of UV spectra, chromophores and auxochromes, bathochromic and hypsochromic shift , choice of solvents, Beer-Lambert's Law, methods of color development, Instrumentation- single and double beam spectrophotometers. Single component analysis, Simultaneous spectrophotometry, Derivative spectrophotometry. Pharmaceutical Applications	3,4	4
14.	**Spectrofluorimetry**:	a1-3,b1-3, d1-3	- Definition, principles, instrumentation and pharmaceutical applications	5	2
15.	**Chemillumenscence**	a1-3,b1-3, d1-3	Definition, principles, instrumentation and pharmaceutical applications	6	2
16.	**Mid Exam**	a1-3,b1-3		7	2
17.	**Atomic absorption. flame emission spectroscopy**	a1-3,b1-3, d1-3	Definition, principles, instrumentation and pharmaceutical applications	8,9	4

18.	**Infra-red spectroscopy**	a1-3,b1-3, d1-3	-Theory, modes of vibration in polyatomic molecules, fingerprint and group frequency region, absorption frequencies of important organic functional groups, Instrumentation – single and double beam spectrophotometers, FTIR, pharmaceutical applications	10,11	4
19.	**H^1-NMR and C^{13} NMR**	a1-3,b1-3, d1-3	-Definition, principles, instrumentation-Nuclear Magnetic Resonance Spectroscopy (1H NMR and 13C NMR): Introduction, instrumentation , proton equivalent, coupling, chemical shift, intergration, J-coupling -pharmaceutical applications	12,13	4
20.	**Mass Spectroscopy:**	a1-3,b1-3, d1-3	Definition, principles, instrumentation, rules of fragmentation pattern pharmaceutical applications	14,15	4
	Final Exam	a1-3, b1-3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
13.	Calibration curve	c1-3, **d1-3**	1	2
14.	Location of λ max, determination of molar absorptivity and specific absorptivity, verification of Beer's law	c1-3, **d1-3**	2,3	4
15.	Study the effect of solvent / pH on λ max.	c1-3, **d1-3**	4	2
16.	UV-Spectrophotometric determination of Ciprofloxacin	c1-3, **d1-3**	5	2
17.	Vis-Spectrophotometric determination of diclofenac sodium	c1-3, **d1-3**	6	2

18.	Mid-Exam	c1,c2, c3	7	2
19.	Assignment of important absorption bands of indomethacin using IR spectroscopy	c1-3, **d1-3**	8	2
20.	Assignment of important absorption bands of phenobarbital using IR spectroscopy	c1-3, **d1-3**	9	2
21.	**IR analysis of caffeine**	c1-3, **d1-3**	10	2
22.	**Practice the explanation of ^{1}H NMR and ^{13}C NMR of some pharmaceutical substances.**	c1-3, **d1-3**	11-13	6
23.	**Practice the fragmentation of mass spectra of some pharmaceutical substances.**	c1-3, **d1-3**	14-15	4
24.	Final Exam	**c1-3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

14. Teaching strategies of the course:

Lectures method, Discussions, Small group discussions, Tutorials and Practice session.

15. Assignments:

- Homework
- Reports

16. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1,a3 ,b1,b2, d1-3
2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2, b1-3, d1-3
3	**Attendance, Practical Reports and Practical mid-semester exam**	7th	30	20%	c1-3
5	**Theoretical mid-semester exam**	7th	30	20%	a1-3, b1-3
6	**Final Exam (theoretical)**	**16th**	50	33%	a1-3, b1-3
7	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

17. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

18. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004. Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

4- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

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6- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,

7- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.

8- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.

9- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.

10- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

7. the Analyst;
8. J. Pharm. & Biomed. Anal.
9. J. Assoc. off Anal. Chem.
10. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)
11. The Analytical Forum on ChemWeb (http://analytical.
12. chemweb.com/search/search.exe)

III. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

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7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Care (II)

I. Course Identification and General Information:						
1	**Course Title:**	**Pharmaceutical Care (II)**				
2	**Course Number & Code:**	Ph268				
3	**Credit hours: 2hrs**	**C.H**				**Total**
		Theoretical	**Practical**	**Training**	**Seminar**	
		1	2	-	-	2
4	**Study level/ semester at which this course is offered:**	3rd year, 2nd Semester				
5	**Pre –requisite (if any):**	Pharmaceutical Care I				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Department (s) in which the course is offered:**	Pharmaceutics and Industrial Pharmacy				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University				
10	**Prepared by:**	Prof. Dr. Ahmed Mohamed Sabati				
11	**Date of approval:**					

I. Course Description:

This course aims to provide the students with the implementation strategies of pharmaceutical care in different settings to improve health promotion and prevent diseases. It covers polices of High Alert Medication (HAM), medication errors as well as the protocol for delivering pharmaceutical care.

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II. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the implementation strategies of pharmaceutical care in different settings to improve health promotion and prevent diseases.
2. Recognize the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication in different setting.
3. Describe the polices of High Alert Medication (HAM), medication errors and their prevention
4. Discuss the general and specific issues, challenges, pitfalls, helpful tools, and some illustrative examples of best pharmaceutical care practice for specific patient groups
5. Explore the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.
6. Differentiate specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups
7. Focus on polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.
8. Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.
9. Apply different specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups
10. Implement writing and presentation skills and demonstrate creativity and time management.x
11. Implement the pharmaceutical care in different settings.
12. Implement the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.
13. Employ polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.
14. Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.
15. Explore and use internet resources to search for up-to-date information in the areas of pharmaceutical care researches to solve emerging problems.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in:

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Knowledge and Understanding.			
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of social, behavioral, health and, pharmaceutical sciences.	**a1-**	Describe the implementation strategies of pharmaceutical care in different settings to improve health promotion and prevent diseases.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs	**a2-**	Recognize the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.
A5	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.	**a3-**	Describe the polices of High Alert Medication (HAM), medication errors and their prevention
		a4-	Discuss the general and specific issues, challenges, pitfalls, helpful tools, and some illustrative examples of best pharmaceutical care practice for specific patient groups

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding	Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Oral Exam,

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a1-	Describe the implementation strategies of pharmaceutical care in different settings to improve health promotion and prevent diseases.	Lectures methods , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation,

a2-	Recognize the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.		Short answers, reports, homework, and Written exam.
a3-	Describe the polices of High Alert Medication (HAM), medication errors and their prevention		
a4-	Discuss the general and specific issues, challenges, pitfalls, helpful tools, and some illustrative examples of best pharmaceutical care practice for specific patient groups		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in:
Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b1-**	Explore the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication in different setting.
		b2-	Differentiate specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups
		b3-	Focus on polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b1-	Explore the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication in different setting.		
b2-	Differentiate specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups		
b3-	Focus on polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	c1-	Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	c2-	Implement the pharmaceutical care in different settings.

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		c3-	Implement the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.
		c4-	Employ polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.
		c5-	Apply different specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for
			specific patient groups

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c1-	Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.		
c2-	Implement the pharmaceutical care in different settings.		
c3-	Implement the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.		
c4-	Employ polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.		

c5-	Apply different specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Implement writing and presentation skills and demonstrate creativity and time management.
		d2	Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.
D4	Take responsibility for adaptation to change needs in pharmacy practice.		
D5-	Apply information and communication technology and working effectively in a team.	**d3**	Explore and use internet resources to search for up-to-date information in the areas of pharmaceutical care researches to solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills	Teaching strategies/methods to be used	Methods of assessment

After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Implement writing and presentation skills and demonstrate creativity and time management.		
d2	Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.		
d3	Explore and use internet resources to search for up-todate information in the areas of pharmaceutical care researches to solve emerging problems.		

II. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	No. of /week	No. of Hours
1	Implementing Pharmaceutical Care in Different Settings , and Some Medical Terminologies	a1, b1,d1-3	1	1
2	Implementation of Pharmaceutical Care in Nursing Homes	a1,b1, d1-3	1	1
3	Implementation of Pharmaceutical Care in Hospitals and Clinics	a1, b1, d1-3	1	1
4	Delivering Pharmaceutical Care in Practice, and Laboratory Error, Pharmaceutical Care and Dispensing Medicines	a2, b1, d1-3	1	1

5	OTC Medication and Pharmaceutical Care	a2, b1, d1-3	1	1
6	Pharmaceutical Care, Health Promotion and Disease Prevention, List various sources of medication errors.	a1, a3,b1, d1-3	1	1
7	Mid Term Exam	a1-3, b1	1	1
8	The Polices of medication errors and their prevention	a3, b3,d1-3	1	1
9	The Polices of High Alert Medication (HAM)	a3,b3, d1-3	1	1
10	Pharmaceutical Care for Patients Receiving Anticoagulation	a4, b2,d1-3	1	1
11	Pharmaceutical Care in Pediatrics	a4,b2, d1-3	1	1
12	Pharmaceutical Care in Geriatric	a4,b2, d1-3	1	1
13	Pharmaceutical Care in Type-2 Diabetes	a4,b2, d1-3	1	1
14	Pharmaceutical Care in Viral Diseases	a4,b2, d1-3	1	1
15	Pharmaceutical Care for Cancer Outpatients	a4,b2, d1-3	1	1
16	Final Term Exam	a1-4, b1-b3	1	1
Number of Weeks /and Units Per Semester			**16**	**16**

1 – Course Topics/Items:

b – Practical Aspect

Order	Practical Task	CILOs (symbols)	No. of week	No. of Hours

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1	Report: Care planning, observation, discussion, and reflection on Implementing Pharmaceutical Care in Different Settings	c1, c2, d1-d3	1	2
2	Report: Care planning, observation, discussion, and reflection on Implementation of Pharmaceutical Care in Nursing Homes	c1-c2,d1-d3	1	2
3	Report : Care planning, observation, discussion, and reflection on Implementation of Pharmaceutical Care in Hospitals and Clinics	c1-c2,d1-d3	1	2
4	Report : Care planning, observation, discussion, and reflection on Delivering Pharmaceutical Care in Practice Pharmaceutical Care and Dispensing Medicines	c1, c3, d1-d3	1	2
5	Report : Care planning, observation, discussion, and reflection on pharmaceutical care practice – and OTC Medication	c1, c3, d1-d3	1	2
6	Report : Care planning, observation, discussion, and reflection on Care Around Medical Devices: Infusion Sets and Devices	c1-c2,d1-d3	1	2
7	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care, Health Promotion and Disease Prevention	c1,c4,d1-d3	1	2
8	Mid Term Exam	c1-c3	1	2
9	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in the Aged, Asthma and Chronic	c1,c5,d1-d3	1	2
	Obstructive Pulmonary Disease			
10	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in Type-2 Diabetes	c1,c5,d1-d3	1	2

11	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care and Cardiovascular Diseases	c1,c5,d1-d3	1	2
12	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care for Patients Receiving Anticoagulation	c1,c5,d1-d3	1	2
13	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in Pediatrics	c1,c5,d1-d3	1	2
14	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care for Cancer Outpatients	c1,c5,d1-d3	1	2
15	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in Viral Diseases	c1,c5,d1-d3	1	2
16	Final Term Exam	c1-5	1	2
Number of Weeks /and Units Per Semester			**16**	32

I- Teaching strategies of the course:

Lectures using data show video animation, brainstorming, case study, Practice session, Discussions, Small group discussions, Tutorials and Practical classes

II- Assignments:

- Homework
- Reports

III- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3, b1,b2, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, b2-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	30%	c1-3
3	**Theoretical mid-semester exam**	7th	20	20%	a1-3, b1
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-4, b1-b3
6	**Final Exam (practical)**	**16th**	20	20%	c1-5, d1-3
	Total		**100**	**100%**	

I. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours	-

II. Learning Resource (MLA style or APA style)s:

1- Required Textbook(s) (maximum two)

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	Filipa Alves da Costa, J. W. Foppe Van Mil and Aldo Alvarez-Risco, (2019), The Pharmacist Guide to Implementing Pharmaceutical Care, Springer, Switzerland.
2- Recommended Readings and Reference Materials	
	Cipolle RJ, Strand LM, Morley PC (2007), Pharmaceutical care practice: the clinician`s guide, 2nd edition, McGraw-Hill, New York.
3- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
4- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
5- Other Learning Material:	

IV- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V- Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

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2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VI- Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances,

	such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.
4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.

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6	**Plagiarism:** ▪ Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. ▪ Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.
7	**Other policies:** ▪ - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Plan of Pharmaceutical Care (II)

I- Information about Faculty Member Responsible for the Course:		
Name of Faculty Member	Prof. Dr. Ahmed Mohamed Sabati	**Office Hours**

رئيس الجامعة	عميدة مركز التطوير وضمان الجودة	عميد الكلية	رئيس القسم	نائب العميد لشؤون الجودة	الموصف
ا.د. القاسم محمد عباس	ا.م.د. هدى العماد	د.خالد الشوبة	ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د.احمد سباتي

Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Pharmaceutical Care (II)				
2-	Course Number & Code:	Ph268				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	2		2
4-	Study level/year at which this course is offered:	3rd year, 2nd Semester				
5-	Pre –requisite (if any):					
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

III- Course Description:

This course aims to provide the students with the implementation strategies of pharmaceutical care in different settings to improve health promotion and prevent diseases. It covers polices of High Alert Medication (HAM), medication errors as well as the protocol for delivering pharmaceutical care.

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IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the implementation strategies of pharmaceutical care in different settings to improve health promotion and prevent diseases.
2. Recognize the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication in different setting.
3. Describe the polices of High Alert Medication (HAM), medication errors and their prevention
4. Discuss the general and specific issues, challenges, pitfalls, helpful tools, and some illustrative examples of best pharmaceutical care practice for specific patient groups
5. Explore the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.
6. Differentiate specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups
7. Focus on polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.
8. Perform pharmaceutical care activities such as writing reports, documentation and presentation skills.
9. Apply different specific issues, challenges, pitfalls and helpful tools in pharmaceutical care practice for specific patient groups
10. Implement writing and presentation skills and demonstrate creativity and time management.x
11. Implement the pharmaceutical care in different settings.
12. Implement the protocol for delivering pharmaceutical care in dispensing of medicines as well as OTC medication.
13. Employ polices of High Alert Medication (HAM) and medication errors to improve health promotion and prevent diseases.
14. Communicate and cooperate effectively with his colleagues and other practitioners in different settings when incorporating pharmaceutical care in their practice.
15. Explore and use internet resources to search for up-to-date information in the areas of pharmaceutical care researches to solve emerging problems.

III. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	No. of Hours
1	Implementing Pharmaceutical Care in Different Settings , and Some Medical Terminologies	a1, b1,d1-3	1	1
2	Implementation of Pharmaceutical Care in Nursing Homes	a1,b1, d1-3	2	1
3	Implementation of Pharmaceutical Care in Hospitals and Clinics	a1, b1, d1-3	3	1
4	Delivering Pharmaceutical Care in Practice, and Laboratory Error, Pharmaceutical Care and Dispensing Medicines	a2, b1, d1-3	4	1
5	OTC Medication and Pharmaceutical Care	a2, b1, d1-3	5	1
6	Pharmaceutical Care, Health Promotion and Disease Prevention, List various sources of medication errors.	a1, a3,b1, d1-3	6	1
7	Mid Term Exam	a1-3, b1	7	1
8	The Polices of medication errors and their prevention	a3, b3,d1-3	8	1
9	The Polices of High Alert Medication (HAM)	a3,b3, d1-3	9	1

10	Pharmaceutical Care for Patients Receiving Anticoagulation	a4, b2,d1-3	10	1
11	Pharmaceutical Care in Pediatrics	a4,b2, d1-3	11	1
12	Pharmaceutical Care in Geriatric	a4,b2, d1-3	12	1
13	Pharmaceutical Care in Type-2 Diabetes	a4,b2, d1-3	13	1
14	Pharmaceutical Care in Viral Diseases	a4,b2, d1-3	14	1
15	Pharmaceutical Care for Cancer Outpatients	a4,b2, d1-3	15	1
16	Final Term Exam	a1-4, b1-b3	16	1
Number of Weeks /and Units Per Semester			**16**	**16**

1 – Course Topics/Items:

b – Practical Aspect

Order	Practical Task	CILOs (symbols)	Week Due	No. of Hours
1	Report: Care planning, observation, discussion, and reflection on Implementing Pharmaceutical Care in Different Settings	c1, c2, d1-d3	1	2
2	Report: Care planning, observation, discussion, and reflection on Implementation of Pharmaceutical Care in Nursing Homes	c1-c2,d1-d3	2	2
3	Report : Care planning, observation, discussion, and reflection on Implementation of Pharmaceutical Care in Hospitals and Clinics	c1-c2,d1-d3	3	2

4	Report : Care planning, observation, discussion, and reflection on Delivering Pharmaceutical Care in Practice Pharmaceutical Care and Dispensing Medicines	c1, c3, d1-d3	4	2
5	Report : Care planning, observation, discussion, and reflection on pharmaceutical care practice – and OTC Medication	c1, c3, d1-d3	5	2
6	Report : Care planning, observation, discussion, and reflection on Care Around Medical Devices: Infusion Sets and Devices	c1-c2,d1-d3	6	2
7	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care, Health Promotion and Disease Prevention	c1,c4,d1-d3	7	2
8	Mid Term Exam	c1-c3	8	2
9	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in the Aged, Asthma and Chronic Obstructive Pulmonary Disease	c1,c5,d1-d3	9	2
10	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in Type-2 Diabetes	c1,c5,d1-d3	10	2
11	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care and Cardiovascular Diseases	c1,c5,d1-d3	11	2
12	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care for Patients Receiving Anticoagulation	c1,c5,d1-d3	12	2
13	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in Pediatrics	c1,c5,d1-d3	13	2

14	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care for Cancer Outpatients	c1,c5,d1-d3	14	2
15	Report: Care planning, observation, discussion, and reflection on Pharmaceutical Care in Viral Diseases	c1,c5,d1-d3	15	2
16	Final Term Exam	c1-5	16	2
Number of Weeks /and Units Per Semester			**16**	32

VII- Teaching strategies of the course:

Lectures using data show video animation, brainstorming, case study, Practice session, Discussions, Small group discussions, Tutorials and Practical classes

VIII- Assignments:

- Homework
- Reports

IX- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3, b1,b2, d1-3

	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, b2-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	30%	c1-3
3	**Theoretical mid-semester exam**	7th	20	20%	a1-3, b1
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-4, b1-b3
6	**Final Exam (practical)**	**16th**	20	20%	c1-5, d1-3
	Total		**100**	**100%**	

IV. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours	-

V. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

Filipa Alves da Costa, J. W. Foppe Van Mil and Aldo Alvarez-Risco, (2019), The Pharmacist Guide to Implementing Pharmaceutical Care, Springer, Switzerland.

7- Recommended Readings and Reference Materials

Cipolle RJ, Strand LM, Morley PC (2007), Pharmaceutical care practice: the clinician`s guide, 2nd edition, McGraw-Hill, New York.

8- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
9- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
10- Other Learning Material:	

X- Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XI- **Course Improvement Processes:**	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the

	Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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XII- Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
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3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family,

	an acceptable documentation approved by the university medical unit for the excused absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.
4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** ▪ Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. ▪ Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.

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7	**Other policies:** ▪ - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Specification of Pharmacognosy – II

I. Course Identification and General Information:							
1	Course Title:	Pharmacognosy – II					
2	Course Number & Code:	Ph363					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2			3	
4	Study level/ semester at which this course is offered:	3rd level / 2nd semester					
5	Pre –requisite (if any):	Pharmaceutical Organic Chemistry and Medicinal Botany					
6	Co –requisite (if any):	None					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
	The department in which the course is offered:	Department of Pharmacognosy					
9	Location of teaching the course:	Faculty of Pharmacy					
10	Prepared by:	Dr. Bushra Moharam					
11	Date of approval:						

II. Course description:

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محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

This course involves of basic principles of pharmacognosy, including introduction and definitions, scope of pharmacognosy, historical review of medicinal plants and natural products. It concerns about medicinal plants classification, geographical distribution, cultivation, collection and preparation, drying, processing and storage, standardization, adulteration of crude drugs.
The course including identification of major active constituents and use of medicinal plants.

Also includes the macro- and micro-morphological characteristics of different plant organs (morphological and histological examination, and chemical identification, leaves, flowers, seeds, barks and woods).
- at the end of this course, the students should have the knowledge and skills related to drugs of plant sources from different organs including flower, seeds, fruits, unorganised drugs, which are known to be used in traditional medicine and have curative values.

I. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. know the modern concept and scope of Pharmacognosy
2. Enumerate the factors affecting cultivation of medicinal plants
3. Recognize botanical aspects, nomenclature, and classification of crude drugs
4. Recognize the morphology and anatomy of different plant organs
5. Identify the active constituents using chemical tests
6. Differentiate the different types of plant tissues.
7. Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.
8. Investigate the morphology and anatomy of different plant organs.
9. Analyse herbal drugs to identify the adulteration of herbal drugs.
10. Identify different classes of natural compounds chemically
11. Handle and dispose chemicals and broken glasses safely and effectively
12. Work effectively in team and independently to perform the required tasks
13. Demonstrate written and oral communication skills 14. Use technology in collecting data and information
15. Acquire effective time-management skills.

II. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**			
Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	know the modern concept and scope of Pharmacognosy
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a2-**	Enumerate the factors affecting cultivation of medicinal plants
		a3-	Recognize botanical aspects, nomenclature, and classification of crude drugs
		a4-	Recognize the morphology and anatomy of different plant organs

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures, group discussion	Written exam, homework, Quizzes, and participation.
a1-	know the modern concept and scope of Pharmacognosy		
a2-	Enumerate the factors affecting cultivation of medicinal plants		
a3-	Recognize botanical aspects, nomenclature, and classification of crude drugs		
a4-	Recognize the morphology and anatomy of different plant organs		

(B) Intellectual Skills:

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Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Identify the active constituents using chemical tests
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing.	**b2-**	Differentiate the different types of plant tissues.
		b3-	Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.
		b4-	Investigate the morphology and anatomy of different plant organs.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Discussions, Solving Problem methods	Oral presentation, **Written and Practical examination for assessment**
b1-	Identify the active constituents using chemical tests		
b2-	Differentiate the different types of plant tissues.		
b3-	Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.		
b4-	Investigate the morphology and anatomy of different plant organs.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	c1-	Analyse herbal drugs to identify the adulteration of herbal drugs.
		c2-	Identify different classes of natural compounds chemically
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c3-	Handle and dispose chemicals and broken glasses safely and effectively

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures ,Laboratory work, .	practical reports, Practical works and presentations based on their experimental work.
c1-	Analyse herbal drugs to identify the adulteration of herbal drugs.		
c2-	Identify different classes of natural compounds chemically		
c3-	Handle and dispose chemicals and broken glasses safely and effectively		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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	محرم ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	Work effectively in team and independently to perform the required tasks
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d2-	Demonstrate written and oral communication skills.
		d3-	Use technology in collecting data and information
		d4-	Acquire effective time-management skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:			Reports, presentations and
d1-	Work effectively in team and independently to perform the required tasks	Lectures, practical classes. Discussions in groups	communication with the lecturer and his colleagues.
d2-	Demonstrate written and oral communication skills.		
d3-	Use technology in collecting data and information		
d4-	Acquire effective time-management skills.		

III. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	**Seed**	a2,a4, b1-4 , c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of nutmeg, fenugreek Cardamom, colchicum, nxvomica, Linseed, black and white mustard,	**4**	**8**
2	**Fruits**	a2,a4, b1-4 , c2-3, d2-3	Microscopical examination, macroscopical characters, active constituents, chemical test, uses of Ammi visnaga and anise, Fennel caraway, Capsicum, ammi majus, star-anise, coriander and, vanilla	**3**	**6**
3	**Midterm exam**	a1-4, b1-2		**1**	**2**
4	Flowers	a2,a4, b1-4 , c2-3, d2-3	Introduction, morphology and anatomy characters, active constituents, chemical test, uses of chamomile, Pyrethrum,	**3**	**6**
			Clove, Santonica, arnica, Lavender, saffron,		
5	unorganized drugs	a2,a4, b1-4 , c2-3, d2-3	Definition, classification, chemical and physical properties, History, formation, collection, characters, constituent, uses of Resins; colophony, myrrh, balsam, tragacanth. latex; opium, Juice; aloe,, olibanum; Gum: Gum Arabic,	**3**	**6**
6	Revision	a2,a4, b1-4 , c2-3, d2-3		**1**	**2**

7	Final exam	a1-4, b1-2		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Morphology - microscopical identification of seeds; nutmeg, fenugreek, Cardamom, Linseed, mustard	**c1-3,d1-4**	**4**	**8**
2	Morphology - microscopical examination of fruit; anis, coriander, capsicum	**c1-3,d1-4**	**3**	**6**
3	Midterm exam	**c1-3**	**1**	**2**
4	Morphology - microscopical examination of flowers; clove, chamomile, saffron,	**c1-3,d1-4**	**3**	**6**
5	Unorganized drugs; colophony, myrrh, asafetida, gum acacia, gum tragacanth, aloes	**c1-3,d1-4**	**3**	**6**
6	Revision	**c1-3,d1-4**	**1**	**2**
7	Final exam	**c1-3**	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

IV. Teaching strategies of the course:

- Lectures, Practice session, solving problem, Small group discussions, Tutorials and Practical classes

-Assessment Methods:

Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance ,Participation and quizzes**	**1-12**	20	13%	a1,a4,b3-4
2	**Attendance, Practical Reports and Practical mid-semester exam**	8-12	30	20%	c1,c2,c3
3	**Theoretical Mid-semester exam**	**8**	30	20%	a1-4, b1, b2
5	**Final Exam (practical)**	**16**	20	13%	c1-3
6	**Final Exam (Theoretical)**	**16**	50	33%	a1-4, b1, b2
	Total		150	100%	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

	1- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi 2- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevier, New York
2- Recommended Readings and Reference Materials	
	1- Steven M. Colegate and Russell J. Molyneux. (2008); "Bioactive natural products : detection, isolation, and structural determination" 2nd ed,. 2- Cordell G.A. (2002); "The alkaloids: Chemistry and Biology" Volume 59, Elsevier, New York 3- Lectures Notes and Practical Manual.
3- Essential References	
4- Electronic Materials and Web Sites *etc*.	
	1. http/www.Phytomania.org. 2. http/www.medicalbotanyintroduction.html. http/www.botanical.com
5- Other Learning Material:	
	-

VIII. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

IX. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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	محرم ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmacognosy – I

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Bushra Moharam	Office Hours						
Location & Telephone No.	730010755	SAT	SUN	MON	TUE	WED	THU	
E-mail	bushramoharam@yahoo.com.	1		1				

II. Course Identification and General Information:						
1-	Course Title:	Pharmacognosy II				
2-	Course Number & Code:	Ph353				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	3rd level / 2nd semester				
5-	Pre –requisite (if any):	Medicinal Botany				
6-	Co –requisite (if any):	None				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.م.د.بشرى
محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Course Description:

This course involves of basic principles of pharmacognosy, including introduction and definitions, scope of pharmacognosy, historical review of medicinal plants and natural products. It concerns about medicinal plants classification, geographical distribution, cultivation, collection and preparation, drying, processing and storage, standardization, adulteration of crude drugs.
The course including identification of major active constituents and use of medicinal plants.
Also includes the macro- and micro-morphological characteristics of different plant organs (morphological and histological examination, and chemical identification, leaves, flowers, seeds, barks and woods).
- at the end of this course, the students should have the knowledge and skills related to drugs of plant sources from different organs including flower, seeds, fruits, unorganised drugs, which are known to be used in traditional medicine and have curative values.

IV. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

1. know the modern concept and scope of Pharmacognosy
2. Enumerate the factors affecting cultivation of medicinal plants
3. Recognize botanical aspects, nomenclature, and classification of crude drugs
4. Recognize the morphology and anatomy of different plant organs
5. Identify the active constituents using chemical tests
6. Differentiate the different types of plant tissues.
7. Determine microscopical methods and knowledge for qualitative evaluation of natural drugs.
8. Investigate the morphology and anatomy of different plant organs.
9. Analyse herbal drugs to identify the adulteration of herbal drugs.
10. Identify different classes of natural compounds chemically
11. Handle and dispose chemicals and broken glasses safely and effectively
12. Work effectively in team and independently to perform the required tasks
13. Demonstrate written and oral communication skills
14. Use technology in collecting data and information
15. Acquire effective time-management skills.

X. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	**Seed**	a2,a4, b1-4 , c2-3, d2-3	Introduction, Morphology and anatomy, active constituents, chemical test, uses of nutmeg, fenugreek Cardamom, colchicum, nxvomica, Linseed, black and white mustard,	**1-4**	**8**
2	**Fruits**	a2,a4, b1-4 , c2-3, d2-3	Microscopical examination, macroscopical characters, active constituents, chemical test, uses of Ammi visnaga and anise, Fennel caraway, Capsicum, ammi majus, star-anise, coriander and, vanilla	**5-7**	**6**
3	**Midterm exam**	a1-4, b1-2		**8**	**2**
4	Flowers	a2,a4, b1-4 , c2-3, d2-3	Introduction, morphology and anatomy characters, active constituents, chemical test, uses of chamomile, Pyrethrum, Clove, Santonica, arnica, Lavender, saffron,	**9-11**	**6**

5	unorganized drugs	a2,a4, b1-4 , c2-3, d2-3	Definition, classification, chemical and physical properties, History, formation, collection, characters, constituent, uses of Resins; colophony, myrrh, balsam, tragacanth. latex; opium, Juice; aloe,,	**12-14**	**6**
			olibanum; Gum: Gum Arabic,		
6	Revision	a2,a4, b1-4 , c2-3, d2-3		**15**	**2**
7	Final exam	a1-4, b1-2		**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Training Tasks	CILOs (symbols)	Week Due	Contact hours
1	Morphology - microscopical identification of seeds; nutmeg, fenugreek, Cardamom, Linseed, mustard	**c1-3,d1-4**	**1-4**	**8**
2	Morphology - microscopical examination of fruit; anis, coriander, capsicum	**c1-3,d1-4**	**5-7**	**6**
3	Midterm exam	**c1-3**	**8**	**2**
4	Morphology - microscopical examination of flowers; clove, chamomile, saffron,	**c1-3,d1-4**	**9-11**	**6**
5	Unorganized drugs; colophony, myrrh, asafetida, gum acacia, gum tragacanth, aloes	**c1-3,d1-4**	**12-14**	**6**
6	Revision	**c1-3,d1-4**	**15**	**2**
7	Final exam	**c1-3**	**16**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

V. Teaching strategies of the course:

Lectures, Practice session, solving problem, Small group discussions, Tutorials and Practical classe

VI. Assessment Methods:

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	**Attendance ,Participation and quizzes**	**All**	20	13%
2	**Attendance, Practical Reports and Practical mid-semester exam**	All	30	20%
3	**Theoretical Mid-semester exam**	**8th**	30	20%
	Final Exam (practical)	**16th**	20	13%
4	**Final Exam (Theoretical)**	**16th**	50	33%
5	**Total**		**150**	**100%**

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VII. Learning Resources:

1- Required Textbook(s) (maximum two).	
	1- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi **2-** Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevi New York
2- Essential References.	
3- Electronic Materials and Web Sites *etc.*	
	1. http/www.Phytomania.org. **2.** http/www.medicalbotanyintroduction.html. **3.** http/www.botanical.com

VIII. Course Policies:

1	**Class Attendance:** ▪ **Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.**
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ **Absence from assignments or exams will be dealt with according to the general policy of the university.**
4	**Assignments & Projects**: ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ **Projects: Not applicable.**

5	**Cheating:** ▪ **Punishment of cheating will be according to the general policy of the university in this respect**
6	**Plagiarism:** ▪ **Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.**
7	**Other policies:** **General policies of the Students' Affairs of the University and the Quality Assurance Unit.**

Course Specification of Medicinal Chemistry I

I. Course Identification and General Information:

1.	**Course Title**	Medicinal Chemistry I				
2.	**Course Number & Code:**	Ph568				
3.	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4.	**Study level/ semester at which this course is offered:**	3rd level /2nd semester				
5.	**Pre –requisite (if any):**	General Pharmaceutical chemistry, Pharmaceutical analytical chemistry I&II and Pharmaceutical organic chemistry I, II& III				
6.	**Co –requisite (if any):**	-				
7.	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8.	**Language of teaching the course:**	English				
9.	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10.	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
11.	**Prepared by:**	Associate Prof. Tawfeek Ahmed Alobaidy Assistant Prof. Abdulmoneim Ali Alhakami				
12.	**Date of approval:**					

II. Course description:

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ا.م.د.توفيق العبيدي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس د. عبد المنعم الحكمي

This course introduces students to basic principles of medicinal chemistry, the quantitative relationship between the physicochemical parameters of the chemical structure to their biological activity. It demonstrates the principles of metabolism and prodrugs. It also covers also the basic principles of the medicinal chemistry of ANS drugs, in addition to the practical determination of some drugs.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic principles of medicinal chemistry.
2. Relate the quantitative physicochemical parameters of drug structure to their biological activity
3. Characterize the basic principles, types and the objectives of prodrugs technique and their uses in optimizing the drug profile.
4. Discuss the types of drug metabolism and their objectives.
5. Discuss the structure activity relationship (SAR), biosynthesis, synthesis, metabolism of the ANS drugs
6. Determine the functional groups in drug structure and their effect on pharmacokinetic profile.
7. Identify the predicted moieties of drug structure that are responsible for pharmacodynamics. 8. Predict the functional groups in the drug structure at which the prodrug will be constructed
9. Diagram the schemes that describe SAR of topics in autonomic nervous system.
10. Apply safety precautions in the laboratory to work in a risk-free environment.
11. Determine the limit of impurities in some raw materials and pharmaceutical preparations.
12. Calculate practically the log p of some pharmaceutical substances.
13. Practice the qualitative and quantitative determination of some autonomic nervous system drugs.
14. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.
15. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some topics in medicinal chemistry.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

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ا.م.د.توفيق العبيدي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس د. عبد المنعم الحكمي

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize the basic principles of medicinal chemistry.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a2-	Demonstrate the essential knowledge and understanding about the physicochemical parameters of drug`s structure and their effect on the biological activity.
		a3-	Characterize the basic principles, types and the objectives of prodrugs technique and their uses in optimizing the drug profile.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.	a4-	Discuss the types of drug metabolism and their objectives.
		a5-	Discuss the structure activity relationship (SAR), biosynthesis, synthesis, metabolism of the autonomic nervous system drugs.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the basic principles of medicinal chemistry.	Lectures methods , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Relate the quantitative physicochemical parameters of drug structure to their biological activity.		

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a3-	Characterize the basic principles, types and the objectives of prodrugs technique and their uses in optimizing the drug profile.		
a4-	Discuss the types of drug metabolism and their objectives.		
a5-	Discuss the structure activity relationship (SAR), biosynthesis, synthesis, metabolism of the autonomic nervous system drugs.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Determine the functional groups in drug structure and their effect on pharmacokinetic profile.
		b2-	Identify the predicted moieties of drug structure that are responsible for pharmacodynamics.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Predict the functional groups in the drug structure at which the prodrug will be constructed
		b4-	Diagram the schemes that describe SAR of topics in autonomic nervous system.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* **Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Determine the functional groups in drug structure and their effect on pharmacokinetic profile.	Lectures methods, Group Discussion, Problem solving sessions**,** brainstorming and Computer based teaching and learning	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Identify the predicted moieties of drug structure that are responsible for pharmacodynamics.		
b3-	Predict the functional groups in the drug structure at which the prodrug will be constructed		
b4-	Diagram the schemes that describe SAR of topics in autonomic nervous system.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical	**c1-**	Apply safety precautions in the laboratory to work in a risk-free environment.
		c2-	Determine the limit of impurities in some raw materials and pharmaceutical preparations.

	products according to GLP, GSP and cGMP guidelines.	**c3-**	Calculate practically the log p of some pharmaceutical substances.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c4-**	Practice the qualitative and quantitative determination of some autonomic nervous system drugs.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
c1-	Apply safety precautions in the laboratory to work	Lectures methods, practical	Practical works,
	in a risk-free environment.	session, brainstorming and group discussion	homework, practical exam and practical reports.
c2-	Determine the limit of impurities in some raw materials and pharmaceutical preparations.		
c3-	Calculate practically the log p of some pharmaceutical substances.		
c4-	Practice the qualitative and quantitative determination of some ANS drugs.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**

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After completing this program, students would be able to:		After participating in the course, students would be able to:	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	**d2-**	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some topics in medicinal chemistry.
D5-	Apply information and communication technology and working effectively in a team.		

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Explore and use internet resources to search for up-todate information in the areas of interest and solve emerging problems.	Small group discussions, Tutorials and Practical session	Homework and reports.
d2-	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some topics in medicinal chemistry.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

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1.	**Introduction to medicinal chemistry**	a1, d1,d2	-Important terminology related to medicinal chemistry and its orientation. - Medicinal chemistry and their relations to other sciences.	1	2
2.	**Quantitative structure activity relationship (QSAR)**	a2,b1, d1, d2	-Definition, -Physicochemical parameters: Hydrophobicity, electronic effect and steric effect	1	2
3.	**Application of QSAR**	a2,b1,d1, d3	- Calculation of p.c, - Craig plot, - Topless scheme and - Hansch equations and their applications	1	2
4.	**Drug-receptor interaction**	a2, a2,d1, d2	- Types of bonds in drug receptor interaction. - The applications of D-R interaction	1	2
5.	**Prodrug and drug latenation**	a3,b3, d1, d2	-Types and structural classification of prodrug, -Objectives and mechanisms of prodrug supported with examples	1	2
6.	**Mid Exam**	a1, a2, a3, b1, b3		1	2

7.	**Drug metabolism**	a4,b1,d1, d3	-Site of drug biotransformation, -Factors affecting metabolism, - - Types of drug metabolism: aPhase I (oxidation, reduction and hydrolysis) b-Phase II (conjugation with glucuronic acid, sulfate, glycine, glutamate, glutathione, and acylation and methylation)	3	6
8.	**Sympathomimitic (adrenergic agonists)**	a1, a5, b14,d1, d2	Classification, SAR, biosynthesis, synthesis metabolism, route of administration and uses.	2	4
9.	**Sympatholytic (adrenergic antagonists)**	a1, a5, b14,d1, d2	Classification, SAR, synthesis, metabolism, route of administration and uses.	1	2
10.	**Parasympathatic**	a1, a5, b14,d1, d2	Classification, SAR, biosynthesis, synthesis metabolism, route of administration and uses.	1	2
11.	**Parasympatholytic**	a1, a5, b14,d1, d2	Classification, SAR, synthesis, metabolism, and uses.	2	4
12.	**Final Exam**	a1-5, b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours

1.	Limit Test For Chloride and limit test for chloride in colored compound (potassium permanganate)	**c1,c2, d1, d2**	2	4
2.	Limit Test For Sulphate limit test for sulphate in sod thiosulphate	**c1,c2, d1, d2**	2	4
3.	Limit test for Chloride, Sulphate and salicylic acid in aspirin	**c1,c2, d1, d2**	2	4
4.	Limit Test For iron	**c1,c2, d1, d2**	1	2
5.	Calculation the log p for some pharmaceutical preparations	**c1,c3, d1, d2**	3	6
6.	Mid-Exam	**c1,c2, c3**	1	2
7.	Assay of Adrenaline	**c1,c4, d1, d2**	1	2
8.	Estimation of Ephedrine	**c1,c4, d1, d2**	1	2
9.	Assay of Methyldopa Tab.	**c1,c4, d1, d2**	1	2
10.	Revision	**c1-4**	1	2
11.	Final Exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

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No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-2**		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-5,b1-4, d1-2
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-5, b1-3, d1-2
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	11th	15	10%	c1-3
5.	**Theoretical mid-semester exam**	6th	30	20%	a1, a2, a3, b1, b3
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-4
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)

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Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

2- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

1- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approach edition, Oxford University Press, Inc., New York.

2- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia. 3- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

4- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

5- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

6- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

	1- http://www.chemaxon/marvin 2 - http://www.webmolecules.com 3-http://www.acdlabs.com 4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

IV. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of of Medicinal Chemistry I

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	1.Tawfeek A. Al-Obaidy 2.Abdulmoneim Ali Alhakami	Office Hours					
Location & Telephone No.	770507931	SAT	SUN	MON	TUE	WED	THU
E-mail	Tawfik_93@yahoo.com		4h				

II- Course Identification and General Information:		
1-	Course Title:	Medicinal Chemistry I

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2-	**Course Number & Code:**	Ph568				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	3rd level /2nd semester				
5-	**Pre –requisite (if any):**	General Pharmaceutical chemistry, Pharmaceutical analytical chemistry I&II and pharmaceutical organic chemistry I, II& III				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

This course introduces students to basic principles of medicinal chemistry, the quantitative relationship between the hysicochemical parameters of the chemical structure to their biological activity. It demonstrates the principles of etabolism and prodrugs. It also covers also the basic principles of the medicinal chemistry of ANS drugs, in addition o the practical determination of some drugs.

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IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

16. Recognize the basic principles of medicinal chemistry.
17. Relate the quantitative physicochemical parameters of drug structure to their biological activity
18. Characterize the basic principles, types and the objectives of prodrugs technique and their uses in optimizing the drug profile.
19. Discuss the types of drug metabolism and their objectives.
20. Discuss the structure activity relationship (SAR), biosynthesis, synthesis, metabolism of the ANS drugs
21. Determine the functional groups in drug structure and their effect on pharmacokinetic profile.
22. Identify the predicted moieties of drug structure that are responsible for pharmacodynamics. 23. Predict the functional groups in the drug structure at which the prodrug will be constructed
24. Diagram the schemes that describe SAR of topics in autonomic nervous system.
25. Apply safety precautions in the laboratory to work in a risk-free environment.
26. Determine the limit of impurities in some raw materials and pharmaceutical preparations.
27. Calculate practically the log p of some pharmaceutical substances.
28. Practice the qualitative and quantitative determination of some autonomic nervous system drugs.
29. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.
30. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some topics in medicinal chemistry.

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V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
13.	**Introduction to medicinal chemistry**	a1, d1,d2	-Important terminology related to medicinal chemistry and its orientation. - Medicinal chemistry and their relations to other sciences.	1	2
14.	**Quantitative structure activity relationship (QSAR)**	a2,b1, d1, d2	-Definition, -Physicochemical parameters: Hydrophobicity, electronic effect and steric effect	2	2
15.	**Application of QSAR**	a2,b1,d1, d3	- Calculation of p.c, - Craig plot, - Topless scheme and - Hansch equations and their applications	3	2
16.	**Drug-receptor interaction**	a2, a2,d1, d2	- Types of bonds in drug receptor interaction. - The applications of D-R interaction	4	2

17.	**Prodrug and drug latenation**	a3,b3, d1, d2	-Types and structural classification of prodrug, -Objectives and mechanisms of prodrug supported with examples	5	2
18.	**Mid Exam**	a1, a2, a3, b1, b3		6	2
19.	**Drug metabolism**	a4,b1,d1, d3	-Site of drug biotransformation, -Factors affecting metabolism, - - Types of drug metabolism: aPhase I (oxidation, reduction and hydrolysis) b-Phase II (conjugation with glucuronic acid, sulfate, glycine, glutamate, glutathione, and acylation and methylation)	7-9	6
20.	**Sympathomimitic (adrenergic agonists)**	a1, a5, b14,d1, d2	Classification, SAR, biosynthesis, synthesis metabolism, route of administration and uses.	10,11	4
21.	**Sympatholytic (adrenergic antagonists)**	a1, a5, b14,d1, d2	Classification, SAR, synthesis, metabolism, route of administration and uses.	12	2
22.	**Parasympathatic**	a1, a5, b14,d1, d2	Classification, SAR, biosynthesis, synthesis metabolism, route of administration and uses.	13	2
23.	**Parasympatholytic**	a1, a5, b14,d1, d2	Classification, SAR, synthesis, metabolism, and uses.	14,15	4
24.	**Final Exam**	a1-5, b1-4		16	2

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Number of Weeks /and Units Per Semester		32

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1.	Limit Test For Chloride and limit test for chloride in colored compound (potassium permanganate)	c1,c2, d1, d2	1,2	4
2.	Limit Test For Sulphate limit test for sulphate in sod thiosulphate	c1,c2, d1, d2	3,4	4
3.	Limit test for Chloride, Sulphate and salicylic acid in aspirin	c1,c2, d1, d2	5,6	4
4.	Limit Test For iron	c1,c2, d1, d2	7	2
5.	Calculation the log p for some pharmaceutical preparations	c1,c3, d1, d2	8-10	6
6.	Mid-Exam	c1,c2, c3	11	2
7.	Assay of Adrenaline	c1,c4, d1, d2	12	2
8.	Estimation of Ephedrine	c1,c4, d1, d2	13	2
9.	Assay of Methyldopa Tab.	c1,c4, d1, d2	14	2
10.	Revision	c1-4	15	2
11.	Final Exam	c1-4	16	2
Number of Weeks /and Units Per Semester				32

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII- Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4**, d1-2		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-5,b1-4, d1-2
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-5, b1-3, d1-2
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	11th	15	10%	c1-3
12.	**Theoretical mid-semester exam**	6th	30	20%	a1, a2, a3, b1, b3
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-4
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4

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	Total	**150**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X- Learning Resources:

1- Required Textbook(s) (maximum two).

3- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold. Lippincott Williams and Wilkins, a Wolters Kluwer Company, Philadelphia.

4- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

7- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approac edition, Oxford University Press, Inc., New York.

8- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia. 9- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

10- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

11- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

12- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

2- http://www.chemaxon/marvin

2 - http://www.webmolecules.com

3-http://www.acdlabs.com

4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

XI- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc.

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	- Well-equipped laboratories with all required equipment and reagents.
3 - **Computing resources:**	- Computer laboratory with internet facilities.

II- Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII- Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others
	will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutics IV

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutics IV					
2	Course Number & Code:	Ph269					
3	Credit hours: 3hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2			3	
4	Study level/ semester at which this course is offered:	Third year/ Second semester					
5	Pre –requisite (if any):	Physical pharmacy- Pharmaceutical calculations- PharmaceuticsI,II,III					
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof. Dr. Abdulwali Ahmed Saif					
12	Date of approval:						

II. Course description:

This course aims to provide the students with basic principles of pharmaceutical solid dosage forms. It concentrates on the advantages and disadvantages, additives, methods of formulation and quality control tests of pharmaceutical solid dosage forms.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the characteristics of pharmaceutical solid dosage forms.
2. Describe the advantages and disadvantages of pharmaceutical solid dosage forms.
3. Recognize the different additives used in manufacturing of pharmaceutical solid dosage forms.
4. Describe methods of formulation of pharmaceutical solid dosage forms.
5. Discuss the method of evaluation of pharmaceutical solid dosage forms.
6. Distinguish between pharmaceutical solid dosage forms.
7. Determine the appropriate methods for formulation of pharmaceutical solid dosage forms.
8. Select the suitable method for evaluation of of pharmaceutical solid dosage forms.
9. Propose best approaches to solve the problems encountered in of pharmaceutical solid dosage forms.
10. Select and practice different methods for preparation of pharmaceutical solid dosage forms.
11. Formulate different pharmaceutical solid dosage forms.
12. Label the different formulations of pharmaceutical solid dosage forms.
13. Evaluate the formulations of pharmaceutical solid dosage forms.
14. Implement writing and presentation skills
15. Work effectively in a team

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students will be able to:	**After completing this course, students will be able to:**

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the characteristics of pharmaceutical solid dosage forms.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical	**a2-**	Describe the advantages and disadvantages of pharmaceutical solid dosage forms.
	and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3-**	Recognize the different additives used in manufacturing of pharmaceutical solid dosage forms.
		a4-	Describe methods of formulation of pharmaceutical solid dosage forms.
		a5-	Discuss the method of evaluation of pharmaceutical solid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures solving problem, and group discussion	Attendance, Written, oral exams, project and small projects
a1-	Recognize the characteristics of pharmaceutical solid dosage forms.		
a2-	Describe the advantages and disadvantages of pharmaceutical solid dosage forms.		
a3-	Recognize the different additives used in manufacturing of pharmaceutical solid dosage forms.		
a4-	Describe methods of formulation of pharmaceutical solid dosage forms.		
a5-	Discuss the method of evaluation of pharmaceutical solid dosage forms.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
B1	Consolidate the chemical, biochemical and physiological principles to construct the	**b1-**	Distinguish between pharmaceutical solid dosage forms.
	pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.		
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Determine the appropriate methods for formulation of pharmaceutical solid dosage forms.
		b3-	Select the suitable method for evaluation of of pharmaceutical solid dosage forms.
		b4-	Propose best approaches to solve the problems encountered in of pharmaceutical solid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams and small projects
b1-	Distinguish between pharmaceutical solid dosage forms.		
b2-	Determine the appropriate methods for formulation of pharmaceutical solid dosage forms.		

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b3-	Select the suitable method for evaluation of of pharmaceutical solid dosage forms.		
b4-	Propose best approaches to solve the problems encountered in of pharmaceutical solid dosage forms.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Select and practice different methods for preparation of pharmaceutical solid dosage forms.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	Formulate different pharmaceutical solid dosage forms.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Label the different formulations of pharmaceutical solid dosage forms.
		c4-	Evaluate the formulations of pharmaceutical solid dosage forms.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		

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c1-	Select and practice different methods for preparation of pharmaceutical solid dosage forms.	Lectures, tutorials, practical, discussion and brain storming	Attendance, homework, Written, practical, oral exams, report, project and observation.
c2-	Formulate different pharmaceutical solid dosage forms.		
c3-	Label the different formulations of pharmaceutical solid dosage forms.		
c4-	Evaluate the formulations of pharmaceutical solid dosage forms.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2	Employ proper documentation and filing systems in	**d1-**	Implement writing and presentation skills
	different pharmaceutical fields.	**d2**	Work effectively in a team
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1	Implement writing and presentation skills		
d2	Work effectively in a team		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmaceutical solid dosage forms.	**a1, b1, d1-2**	Definition, types, Advantages, disadvantages,	1	2
2	pharmaceutical powder dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical powder dosage form	1	2
3	Pharmaceutical granules dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, method of	1	2
			formulation, stability and Quality control tests of Pharmaceutical granules dosage form		
4	Pharmaceutical Capsules dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, Shell manufacture, method of formulation, stability and Quality control tests of Pharmaceutical Capsules dosage form	4	8
5	Mid-term exam	**a1-5, b1-4**		1	2

6	Pharmaceutical tablets dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, , method of formulation, stability and Quality control tests of Pharmaceutical tablets dosage form	7	14
7	Final-term exam	**a1-5, b1-4**		1	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Formulate, practice preparation, label and quality control tests of Pharmaceutical powder	**c1-4, d1-2**	1	2
2.	Formulate, practice preparation, label and quality control tests of Pharmaceutical dry granules	**c1-4, d1-2**	1	2
3.	Formulate, practice preparation, label and quality control tests of Pharmaceutical wets granules	**c1-4, d1-2**	1	2
4.	Formulate, practice preparation, label and quality control tests of Pharmaceutical soft gelatin capsules	**c1-4, d1-2**	1	2
5.	Formulate, practice preparation, label and quality control tests of Pharmaceutical hard	**c1-4, d1-2**	2	4
	gelatin capsules			
6.	Mid-term exam	**c1-4**	1	2
7.	Formulate, practice preparation, label and quality control tests of Pharmaceutical uncoated tablets	**c1-4, d1-2**	2	4
8.	Formulate, practice preparation, label and quality control tests of Pharmaceutical coated tablets	**c1-4, d1-2**	2	4

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9.	Formulate, practice preparation, label and quality control tests of Pharmaceutical coated tablets	**c1-4, d1-2**	2	4
10.	Formulate, practice preparation, label and quality control tests of Pharmaceutical effervescences tablets	**c1-4, d1-2**	1	2
11.	Formulate, practice preparation, label and quality control tests of Pharmaceutical fast dissolved tablets	**c1-4, d1-2**	1	2
12.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units P r Semester			**16**	**32**

I- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-2**		

II- Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a2-4,b1-2, **d1-2**
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-3, b2-3, **d1-2**
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	**c2-4**
5.	**Theoretical mid-semester exam**	8th	30	20%	**a1-5, b1-4**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

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3. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
4. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
3. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.
Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.
Further information on proprietary products can be found in: The Data Sheet Compendium, Datapharm Publications Ltd (published annually).
The Monthly Index of Medical Specialities (MIMS), Medical Publications Ltd.

1. Notes on Pharmaceutics prepared by the department staff.
2. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.

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I. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
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- Checking of a sample of students' work by an independent faculty member.
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- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutics IV

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Abdulwali Ahmed Saif	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:						
1-	Course Title:	Pharmaceutics IV				
2-	Course Number & Code:	Ph269				
3-	Credit hours: 3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	1		3

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4-	**Study level/year at which this course is offered:**	Third year/ Second semester
5-	**Pre –requisite (if any):**	Physical pharmacy- Pharmaceutical calculations- PharmaceuticsI,II,III
6-	**Co –requisite (if any):**	
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy
8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University

III- Course description:

This course aims to provide the students with basic principles of pharmaceutical solid dosage forms. It concentrates on the advantages and disadvantages, additives, methods of formulation and quality control tests of pharmaceutical solid dosage forms.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the characteristics of pharmaceutical solid dosage forms.
2. Describe the advantages and disadvantages of pharmaceutical solid dosage forms.
3. Recognize the different additives used in manufacturing of pharmaceutical solid dosage forms.
4. Describe methods of formulation of pharmaceutical solid dosage forms.
5. Discuss the method of evaluation of pharmaceutical solid dosage forms.
6. Distinguish between pharmaceutical solid dosage forms.
7. Determine the appropriate methods for formulation of pharmaceutical solid dosage forms.
8. Select the suitable method for evaluation of of pharmaceutical solid dosage forms.
9. Propose best approaches to solve the problems encountered in of pharmaceutical solid dosage forms.
10. Select and practice different methods for preparation of pharmaceutical solid dosage forms.
11. Formulate different pharmaceutical solid dosage forms.
12. Label the different formulations of pharmaceutical solid dosage forms.
13. Evaluate the formulations of pharmaceutical solid dosage forms.
14. Implement writing and presentation skills
15. Work effectively in a team

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmaceutical solid dosage forms.	**a1, b1, d1-2**	Definition, types, Advantages, disadvantages,	1	2
2	pharmaceutical powder dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical powder dosage form	1	2
3	Pharmaceutical granules dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, method of formulation, stability and Quality control tests of Pharmaceutical granules dosage form	1	2
4	Pharmaceutical Capsules dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, Shell manufacture, method of formulation, stability and Quality control tests of Pharmaceutical Capsules dosage form	4	8
5	Mid-term exam	**a1-5, b1-4**		1	2
6	Pharmaceutical tablets dosage form	**a1-5, b1-4, d1-2**	Definition, types, Advantages, disadvantages, excipients, , method of formulation, stability and Quality control tests of Pharmaceutical tablets	7	14
			dosage form		
7	Final-term exam	**a1-5, b1-4**		1	**2**

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Number of Weeks /and Units Per Semester	16	32

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
13.	Formulate, practice preparation, label and quality control tests of Pharmaceutical powder	**c1-4, d1-2**	1	2
14.	Formulate, practice preparation, label and quality control tests of Pharmaceutical dry granules	**c1-4, d1-2**	1	2
15.	Formulate, practice preparation, label and quality control tests of Pharmaceutical wets granules	**c1-4, d1-2**	1	2
16.	Formulate, practice preparation, label and quality control tests of Pharmaceutical soft gelatin capsules	**c1-4, d1-2**	1	2
17.	Formulate, practice preparation, label and quality control tests of Pharmaceutical hard gelatin capsules	**c1-4, d1-2**	2	4
18.	Mid-term exam	**c1-4**	1	2
19.	Formulate, practice preparation, label and quality control tests of Pharmaceutical uncoated tablets	**c1-4, d1-2**	2	4
20.	Formulate, practice preparation, label and quality control tests of Pharmaceutical coated tablets	**c1-4, d1-2**	2	4
21.	Formulate, practice preparation, label and quality control tests of Pharmaceutical coated tablets	**c1-4, d1-2**	2	4
22.	Formulate, practice preparation, label and quality control tests of Pharmaceutical effervescences tablets	**c1-4, d1-2**	1	2
23.	Formulate, practice preparation, label and quality control tests of Pharmaceutical fast	**c1-4, d1-2**	1	2
	dissolved tablets			

24.	Final-term exam	**c1-4**	1	2
Number of Weeks /and Units P r Semester			**16**	**32**

VI- a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-2**		

VII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a2-4,b1-2**, d1-2**
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-3, b2-3**, d1-2**

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10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	**c2-4**
12.	**Theoretical mid-semester exam**	8th	30	20%	**a1-5, b1-4**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VIII- Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

&

IX- Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

5. Notes on Pharmaceutics prepared by the department staff.
6. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
7. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
8. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

6- Recommended Readings and Reference Materials

4. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
5. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
6. Banker, G.S.and Rhodes, C.T, (1999) Modern Pharmaceutics, 3rd edn. Marcel Dekker.

7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.
Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.
Further information on proprietary products can be found in: The Data Sheet Compendium, Datapharm Publications Ltd (published annually).
The Monthly Index of Medical Specialities (MIMS), Medical Publications Ltd.

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III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of First Aid

I. Course Identification and General Information:							
1	**Course Title:**	First Aid					
2	**Course Number & Code:**	Ph864					
3	**Credit hours: 2hrs**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		1	2	-	-	2	
4	**Study level/ semester at which this course is offered:**	3rd year, 2nd Semester					
5	**Pre –requisite (if any):**	Anatomy and Physiology					
6	**Co –requisite (if any):**						
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy					
7	**Department (s) in which the course is offered:**	-					
8	**Language of teaching the course:**	English					
9	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University					
10	**Prepared by:**	Dr. Adel Al-Mutawakel					
11	**Date of approval:**						

I. Course Description:

This qualification is designed for those learners wishing to gain a nationally recognized qualification in first aid and become emergency first aiders in their pharmacy workplace. This qualification meets the requirements for training emergency first-aiders in those organizations that have identified that staff need to be trained to this level within their first-aid needs assessment.

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II. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic management, purpose, general rules, and limitations of first aids.
2. Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.
3. Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.
4. Discuss the relationship between human body systems, safe and effective use of medicine.
5. Identify the purpose, Limitations, General Rules And proper application of first-aid.
6. Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.
7. Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature.
8. Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.
9. Provide emergency first aids.
10. Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.
11. Manage time effectively.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding

After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of social, behavioral, health and, pharmaceutical sciences.	a1-	Recognize the basic management, purpose, general rules, and limitations of first aids.
		a2-	Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.
		a3-	Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures, seminars and discussion	Quizzes, written exam (MCQ/Essay questions), assignments and participation
a1-	Recognize the basic management, purpose, general rules, and limitations of first aids.		
a2-	Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.		
a3-	Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.		

(B) Intellectual Skills:

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Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b1-**	Discuss the relationship between human body systems, safe and effective use of medicine.
		b2-	Identify the purpose, Limitations, General Rules And proper application of first-aid.
		b3-	Select and assess appropriate methods of
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.		first aid to save life, prevent further injury, and limit infection.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group activities, brainstorming discussion	Oral exams, assignments, interpretative exercises
b1-	Discuss the relationship between human body systems, safe and effective use of medicine.		
b2-	Identify the purpose, Limitations, General Rules And proper application of first-aid.		
b3-	Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.		

(C) Professional and Practical Skills:

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Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Professional and Practical Skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c1-	Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature.		
c2-	Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **General and Transferable skills**

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Provide emergency first aids.
		d2	Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.
D5-	Apply information and communication technology and working effectively in a team.		
		d3	Manage time effectively.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small groups	Reports,
d1-	Provide emergency first aids.	discussion and practical classes	presentation and direct observations
d2	Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.		
d3	Manage time effectively.		

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I. Course Content:

1 - Course Topics/Items:

a - Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hour
1	Introduction and definition of first aid	a1-a3, b1-b3, d1-d3	Identify the role and responsibilities of a first aider	1	1
2	General rules of first aid	a1-a3, b1-b3, d1-d3	• Conduct a scene survey Conduct a primary survey of a casualty • Summon appropriate assistance when necessary	1	1
3	Cardiopulmonary resuscitation (CPR)	a1-a3, b1-b3, d1-d3	• Identify when to administer Cardio Pulmonary Resuscitation (CPR) Demonstrate CPR using a manikin • Justify when to place a casualty into the recovery position Demonstrate how to place a casualty into the recovery position • Identify how to administer first aid to a casualty who is	1	1

			experiencing a seizure heart attack, stroke		
4	Airway obstruction	a1-a3, b1-b3, d1-d3	• Asthma, chest injury and allergy.	1	1
5	Fainting syncope	a1-a3, b1-b3, d1-d3	unconscious (including seizure	1	1
6	Hemorrhage and shock	a1-a3, b1-b3, d1-d3	• Identify when choking is mild or severe • Demonstrate how to administer first aid to a casualty who is choking • Identify the severity of external bleeding • Demonstrate how to control external bleeding	1	1
7	Poisoning	a1-a3, b1-b3, d1-d3	Origins, sudden poisoning, anaphylactic shock and treatment	1	1
8	**Midterm exam**	a1, a2, a3, b1, b2, b3, c1, c2, c3, d1, d2	Written evaluation (long and short answer question)	1	1
9	Home pharmacy	a1-a3, b1-b3, d1-d3	Essential medication in home, precaution, uses and side effects.	1	1

10	Burns	a1-a3, b1-b3, d1-d3	Identify how to administer first aid to a casualty with minor burns and scalds.	1	1
11	Food-Drug interaction	a1-a3, b1-b3, d1-d3	Types of food and drug that causing interaction, effects and treatment	1	1
12	Convulsion	a1-a3, b1-b3, d1-d3	Epilepsy, thermal disturbance and convulsion in children	1	1
13	Insect bites and stings	a1-a3, b1-b3, d1-d3	Types, origins, effects and treatment	1	1
14	Wounds	a1-a3, b1-b3, d1-d3	Identify how to administer first aid to a casualty with Small cuts, Grazes, Bruises and Small splinters. Identify how to administer first aid to a casualty with minor burns and scalds. Bone fracture, eye injury and ear bleeding.	1	1
15	Drowning	a1-a3, b1-b3, d1-d3	Anatomy and physiology of respiratory system, how to rescue drowning victim.	1	1
16	Final exam	a1-a3, b1-b3, d1-d3		1	1
Number of Weeks /and Units Per Semester				**16**	**16**

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b- Practical Aspect: (if any)				
Order	**Tasks/ Experiments**	**Learning Outcomes**	**Number of Weeks**	**contact hours**
1	Introduction	**c1-2, d1-3**	**1**	2
2	Vital Signs (Pulse, Bp, and Temperature.)	**c1, d1-3**	**2**	4
3	Cardiopulmonary Resuscitation (CPR).	**c2, d1-3**	**2**	4
4	Bleeding and Loss of Consciousness	**c2, d1-3**	**1**	2
5	Burns	**c2, d1-3**	**2**	4
6	Midterm Exam	**c1-2**	**1**	2
7	Shock	**c2, d1-3**	**1**	2
9	Poisoning	**c2, d1-3**	**1**	2
10	Insect bites and stings	**c2, d1-3**	**1**	2
11	Wounds	**c2, d1-3**	**2**	4
12	**Revision**	**c2, d1-3**	**1**	2
13	**Final Exam**	**c2, d1-3**	**1**	2
Number of Weeks /and Units Per Semester		**16**	**32**	

I- Teaching strategies of the course:

Lectures for knowledge and understanding including videos and simulators

II- Assignments:

- Written examination by the end of the semester

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د. عادل المتوكل	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3, b1,b2, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, b2-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	9th	30	30%	c1-2
3	**Theoretical mid-semester exam**	7th	20	20%	a1-3, b1
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-4, b1-b3
6	**Final Exam (practical)**	**16th**	20	20%	c1-2, d1-3
	Total		**100**	**100%**	

I. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours	-

II. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

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	John Camm and Tim McCarthy, First Aid Step By Step
2- Recommended Readings and Reference Materials	
	1- Seb Sevett 2009, 7th Edition …First Aid at work
3- Essential References	
	David and carryl , first responder (you first response in emergency care)
4- Electronic Materials and Web Sites *etc*.	
	https://www.besafetraining.co.nz/course-category/first-aid/?gclid=Cj0KCQjw6_vzBRCIARIsAOs54z5hXVslw7hYOvQ35HZlzjLDA981beaoxrEzY-pXxr3tfDMcnX3vdyEaAkgWEALw_wcB
5- Other Learning Material:	

IV- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V- Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VI- Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.

2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.
4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and
	shall be deemed to have failed the course.

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6	**Plagiarism:** ▪ Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. ▪ Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.
7	**Other policies:** ▪ - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Plan of Course Specification of First Aid

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Adel Al-Mutawakel	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	First Aid				
2-	Course Number & Code:	Ph864				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	2		2
4-	Study level/year at which this course is offered:	3rd year, 2nd Semester				
5-	Pre –requisite (if any):	Anatomy and Physiology				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				

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11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

IV. Course Description:

This qualification is designed for those learners wishing to gain a nationally recognized qualification in first aid and become emergency first aiders in their pharmacy workplace. This qualification meets the requirements for training emergency first-aiders in those organizations that have identified that staff need to be trained to this level within their first-aid needs assessment.

V. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic management, purpose, general rules, and limitations of first aids.
2. Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.
3. Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.
4. Discuss the relationship between human body systems, safe and effective use of medicine.
5. Identify the purpose, Limitations, General Rules And proper application of first-aid.
6. Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.
7. Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature.
8. Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.
9. Provide emergency first aids.
10. Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.
11. Manage time effectively.

s

II. Course Content:

1 - Course Topics/Items:

a - Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hour
1	Introduction and definition of first aid	a1-a3, b1-b3, d1-d3	Identify the role and responsibilities of a first aider	1	1
2	General rules of first aid	a1-a3, b1-b3, d1-d3	Conduct a scene survey Conduct a primary survey of a casualty	1	1
			Summon appropriate assistance when necessary		
3	Cardiopulmonary resuscitation (CPR)	a1-a3, b1-b3, d1-d3	• Identify when to administer Cardio Pulmonary Resuscitation (CPR) Demonstrate CPR using a manikin • Justify when to place a casualty into the recovery position Demonstrate how to place a casualty into the recovery position • Identify how to administer first aid to a casualty who is experiencing a seizure • heart attack, stroke	1	1
4	Airway obstruction	a1-a3, b1-b3, d1-d3	• Asthma, chest injury and allergy.	1	1

5	Fainting syncope	a1-a3, b1-b3, d1-d3	unconscious (including seizure	1	1
6	Hemorrhage and shock	a1-a3, b1-b3, d1-d3	• Identify when choking is mild or severe • Demonstrate how to administer first aid to a casualty who is choking • Identify the severity of external bleeding • Demonstrate how to control external bleeding	1	1
7	Poisoning	a1-a3, b1-b3, d1-d3	Origins, sudden poisoning, anaphylactic shock and treatment	1	1

8	**Midterm exam**	a1, a2, a3, b1, b2, b3, c1, c2, c3, d1, d2	Written evaluation (long and short answer question)	1	1
9	Home pharmacy	a1-a3, b1-b3, d1-d3	Essential medication in home, precaution, uses and side effects.	1	1
10	Burns	a1-a3, b1-b3, d1-d3	Identify how to administer first aid to a casualty with minor burns and scalds.	1	1
11	Food-Drug interaction	a1-a3, b1-b3, d1-d3	Types of food and drug that causing interaction, effects and treatment	1	1

12	Convulsion	a1-a3, b1-b3, d1-d3	Epilepsy, thermal disturbance and convulsion in children	1	1
13	Insect bites and stings	a1-a3, b1-b3, d1-d3	Types, origins, effects and treatment	1	1
14	Wounds	a1-a3, b1-b3, d1-d3	Identify how to administer first aid to a casualty with Small cuts, Grazes, Bruises and Small splinters. Identify how to administer first aid to a casualty with minor burns and scalds. Bone fracture, eye injury and ear bleeding.	1	1
15	Drowning	a1-a3, b1-b3, d1-d3	Anatomy and physiology of respiratory system, how to rescue drowning victim.	1	1
16	Final exam	a1-a3, b1-b3, d1-d3		1	1
Number of Weeks /and Units P r Semester				**16**	**16**

b- Practical Aspect: (if any)

Order	Tasks/ Experiments	Learning Outcomes	Week Due	contact hours
1	Introduction	**c1-2, d1-3**	**1**	2
2	Vital Signs (Pulse, Bp, and Temperature.)	**c1, d1-3**	**2,3**	4
3	Cardiopulmonary Resuscitation (CPR).	**c2, d1-3**	**4,5**	4

الموصف
د. عادل المتوكل

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ا.د. محمود البريهي

رئيس القسم

عميد الكلية
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4	Bleeding and Loss of Consciousness	**c2, d1-3**	**6**	2
5	Burns	**c2, d1-3**	**7,8**	4
6	Midterm Exam	**c1-2**	**9**	2
7	Shock	**c2, d1-3**	**10**	2
9	Poisoning	**c2, d1-3**	**11**	2
10	Insect bites and stings	**c2, d1-3**	**12**	2
11	Wounds	**c2, d1-3**	**13,14**	4
12	**Revision**	**c2, d1-3**	**15**	2
13	**Final Exam**	**c2, d1-3**	**16**	2
Number of Weeks /and Units Per Semester		**16**	**32**	

VII- Teaching strategies of the course:

Lectures for knowledge and understanding including videos and simulators

VIII- Assignments:

- Written examination by the end of the semester

IX- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3, b1,b2, d1-3

	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, b2-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	9h	30	30%	c1-2
3	**Theoretical mid-semester exam**	7th	20	20%	a1-3, b1
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-4, b1-b3
6	**Final Exam (practical)**	**16th**	20	20%	c1-2, d1-3
	Total		**100**	**100%**	

III. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours	-

IV. Learning Resource (MLA style or APA style)s:

6- Required Textbook(s) (maximum two)

- John Camm and Tim McCarthy, First Aid Step By Step

7- Recommended Readings and Reference Materials

1- Seb Sevett 2009, 7th Edition …First Aid at work

8- Essential References

David and carryl , first responder (you first response in emergency care)

9- Electronic Materials and Web Sites *etc*.

	https://www.besafetraining.co.nz/course-category/first-aid/?gclid=Cj0KCQjw6_vzBRCIARIsAOs54z5hXVslw7hYOvQ35HZlzjLDA981beaoxrEzY-pXxr3tfDMcnX3vdyEaAkgWEALw_wcB
10- Other Learning Material:	

X- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XI- Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.

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	▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XII- Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused.

	-In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
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4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses.
	If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** ▪ Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. ▪ Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.

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7	**Other policies:** ▪ - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Specification of Public Health

I. Course Identification and General Information:							
1	**Course Title:**	Public Health					
2	**Course Number & Code:**	**Ph865**					
3	**Credit hours: 1hrs**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		1				**1**	
4	**Study level/ semester at which this course is offered:**	Third year/Second semester					
5	**Pre –requisite (if any):**						
6	**Co –requisite (if any):**						
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy					
8	**Language of teaching the course:**	English					
9	**The department in which the course is offered:**						
10	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University					
11	**Prepared by:**	**Prof Dr/**					
12	**Date of approval:**						

II. Course description:

This course aims to provide the students the basic information about epidemiology, etiology, risk factors, risk groups, control and prevention the basic information about promoting , maintaining health and preventing disease The basic information about viral and arthropod diseases

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Know The epidemiological cycle of infection in the community.
2. Know The modes and the patterns of infection spread in the community.
3. Discuss The general and specific preventive and control measures of communicable diseases.
4. Know different types of viral zoonotic and arthropod borne diseases.
5. Develop appropriate methods for infection control.
6. Promote public health awareness.
7. Detect the different types of viral, zoonotic , arthropod borne diseases.
8. Assess the role of the pharmacist in public health education.
9. Use effectively information to advise patients by informing and influencing decisions and actions of health and social care professionals.Communicate effectively with patients and health care professionals
10. Communicate with the patient to give advice and counseling on nutrition, vaccination and general health.
11. Implement writing and presentation skills

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Know The epidemiological cycle of infection in the community.

A3-	Understand the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and	**a2-**	Know The modes and the patterns of infection spread in the community.
	pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.		
A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.	**a3-**	Discuss The general and specific preventive and control measures of communicable diseases.
		a4-	Know different types of viral zoonotic and arthropod borne diseases.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures and group discussion	Attendance, Written, oral exams and small projects
a1-	Know The epidemiological cycle of infection in the community.		
a2-	Know The modes and the patterns of infection spread in the community.		
a3-	Discuss The general and specific preventive and control measures of communicable diseases.		
a4-	Know different types of viral zoonotic and arthropod borne diseases.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	b1-	Develop appropriate methods for infection control.
B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	b2-	Promote public health awareness
		b3-	Detect the different types of viral, zoonotic , arthropod borne diseases.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams project, and small projects
b1-	Develop appropriate methods for infection control.		
b2-	Promote public health awareness		
b3-	Detect the different types of viral, zoonotic, arthropod borne diseases.		

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(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	c1-	Assess the role of the pharmacist in public health education.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	c2-	Use effectively information to advise patients by informing and influencing decisions and actions of health and social care professionals.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
c1-	Assess the role of the pharmacist in public health education.		
c2	Use effectively information to advise patients by informing and influencing decisions and actions of health and social care professionals		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Communicate with the patient to give advice and counseling on nutrition, vaccination and general health.
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	d2	Implement writing and presentation skills
D5-	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
d1-	Communicate with the patient to give advice and counseling on nutrition, vaccination and general health.		
d2-	Implement writing and presentation skills		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Basic concept of health and disease.	**a1**		1	1
2	Epidemiology of disease	**a1**		1	1
3	Hereditary immunity	**a2**		1	1
4	Clinical and subclinical diseases	**a2,b2,c1,c2,d1,d2**		1	1
5	Preventive and control measures of infectious diseases	**a3,b1,c1,c2,d1,d2**		1	1
6	Herpes viruses infections	**a4,b3,c2,d1,d2**		1	1
7	**Mid-term exam**	**a1-4, b1-3, c1-2**		1	1
8	Adenoviruses infections and paramyxoviruses infections.	**a4,b3,c2,d1,d2**		1	1
9	Common cold and influenza	**a4,b3,c2,d1,d2**		1	1
10	Food-borne diseases	**a4,b3,c2,d1,d2**		1	1
11	Viral hepatitis	**a4,b3,c2,d1,d2**		1	1
12	Sexually-transmitted diseases.	**a4,b3,c2,d1,d2**		1	1
13	Zoonoses and contact diseases.	**a4,b3,c2,d1,d2**		1	1
14	Arthropod-borne diseases and mycotic diseases.	**a4,b3,c2,d1,d2**		1	1
15	Oral diseases and hygiene.	**a4,b3,c2,d1,d2**		1	1
16	Final-term exam	**a1-4, b1-3, c1-2**		1	1
Number of Weeks /and Units Per Semester				16	16

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.
b-Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-4, b1-3, c1-2**
2	Written Mid exam, Oral exam, reports, projects	2-14	**15**	30%	**a1-4, b1-3, c1-2**
3	Written Final exam	16th	**30**	60%	**a1-4, b1-3, c1-2**
	Total		**50**	**100%**	

VIII. Students' Support:

Office Hours/week	Other Procedures (if any)
1hrs/week	

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IX. Learning Resource (MLA style or APA style)S:	
1- Required Textbook(s) (maximum two)	
	1. A book prepared by the staff members
2- Recommended Readings and Reference Materials	
	1. Recommended books -Gwendolyn R.W.; Burton, Paul G.; Engerl Kirk, 2004, Microbiology fo health sciences (7th edition)
3- Electronic Materials and Web Sites *etc*.	
	-http://www.cpublichealth.co.nz/ -http://www.amsa.org/cph/
4- Other Learning Material:	

I. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Public Health

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Prof Dr	Office Hours						
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU	
E-mail								

II. Course Identification and General Information:							
1-	Course Title:	Public Health					
2-	Course Number & Code:	Ph865					
3-	Credit hours: 1hrs	C.H				Total	
		Th.	Seminar	Pr.	F. Tr.		
		1	-	-		1	
4-	Study level/year at which this course is offered:	Third year/Second semester					
5-	Pre –requisite (if any):						
6-	Co –requisite (if any):						
7-	Program (s) in which the course is offered	Bachelor of Pharmacy					
8-	Language of teaching the course:	English					
9-	System of Study:	Semesters					
10-	Mode of delivery:	Regular					
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					

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III. Course description:

This course aims to provide the students the basic information about epidemiology, etiology, risk factors, risk groups, control and prevention the basic information about promoting , maintaining health and preventing disease The basic information about viral and arthropod diseases

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Know The epidemiological cycle of infection in the community.
2. Know The modes and the patterns of infection spread in the community.
3. Discuss The general and specific preventive and control measures of communicable diseases.
4. Know different types of viral zoonotic and arthropod borne diseases.
5. Develop appropriate methods for infection control.
6. Promote public health awareness.
7. Detect the different types of viral, zoonotic , arthropod borne diseases.
8. Assess the role of the pharmacist in public health education.
9. Use effectively information to advise patients by informing and influencing decisions and actions of health and social care professionals.Communicate effectively with patients and health care professionals
10. Communicate with the patient to give advice and counseling on nutrition, vaccination and general health.
11. Implement writing and presentation skills

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Basic concept of health and disease.	**a1**		1	1
2	Epidemiology of disease	**a1**		1	1
3	Hereditary immunity	**a2**		1	1
4	Clinical and subclinical diseases	**a2,b2,c1,c2,d1,d2**		1	1
5	Preventive and control measures of infectious diseases	**a3,b1,c1,c2,d1,d2**		1	1
6	Herpes viruses infections	**a4,b3,c2,d1,d2**		1	1
7	**Mid-term exam**	**a1-4, b1-3, c1-2**		1	1
8	Adenoviruses infections and paramyxoviruses infections.	**a4,b3,c2,d1,d2**		1	1
9	Common cold and influenza	**a4,b3,c2,d1,d2**		1	1
10	Food-borne diseases	**a4,b3,c2,d1,d2**		1	1
11	Viral hepatitis	**a4,b3,c2,d1,d2**		1	1
12	Sexually-transmitted diseases.	**a4,b3,c2,d1,d2**		1	1
13	Zoonoses and contact diseases.	**a4,b3,c2,d1,d2**		1	1

14	Arthropod-borne diseases and mycotic diseases.	**a4,b3,c2,d1,d2**		1	1
15	Oral diseases and hygiene.	**a4,b3,c2,d1,d2**		1	1
16	Final-term exam	**a1-4, b1-3, c1-2**		1	1
Number of Weeks /and Units Per Semester				16	16

VI- a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation,	All weeks	**5**	10%	**a1-4, b1-3, c1-2**
2	Written Mid exam, Oral exam, reports, projects	2-14	**15**	30%	**a1-4, b1-3, c1-2**
3	Written Final exam	16th	**30**	60%	**a1-4, b1-3, c1-2**
	Total		**50**	**100%**	

VIII- Students' Support:

Office Hours/week	Other Procedures (if any)

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1hrs/week	

6- Recommended Readings and Reference Materials	
	2. Recommended books -Gwendolyn R.W.; Burton, Paul G.; Engerl Kirk, 2004, Microbiology fo health sciences (7th edition)
7- Electronic Materials and Web Sites *etc*.	
	-http://www.cpublichealth.co.nz/ -http://www.amsa.org/cph/
8- Other Learning Material:	

IX- Learning Resource (MLA style or APA style)s:

5- Required Textbook(s) (maximum two)	
	2. A book prepared by the staff members

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III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification for Phytochemistry-I

I. Course Identification and General Information:							
1	Course Title:	Phytochemistry-I					
2	Course Number & Code:	Ph374					
3	Credit hours:	C.H					Total
		Theoretical	Practical	Training	Seminar		
		2	2				3
4	Study level/ semester at which this course is offered:	4th level /1st semester					
5	Pre –requisite (if any):	Botany, pharmacognosy					
6	Co –requisite (if any):	None					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Department of Pharmacognosy					
10	Location of teaching the course:	Faculty of Pharmacy					
11	Prepared by:	Dr. Bushra Moharam					
12	Date of approval:						

II. Course description:

This course provides information and discus of naturally occurring products from their chemical, pharmaceutical and therapeutic applications. It deals with their extraction, isolation, detection, pharmacological and toxicological effects. Phytochemical components in this course including; alkaloids, terpenoids, and steroids are demonstrated.

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محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

I. Intended learning outcomes (ILOs) of the course:

1. Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.
2. Clarify physico-chemical properties of substances
3. Recognize the methods of extraction, separation and purification of the constituents of natural products
4. Describe the chemical structure of phytochemical substances of different alkaloids, steroids and terpens, their biological properties and contraindications of them.
5. Propose the possible leads to new drugs depending on natural product templates
6. Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity
7. Determine suitable methods for extraction; isolation of different compounds from natural origin
8. Perform suitable methods for extraction; isolation of alkaloids, terpenoids and steroids
9. Carry out different methods for quantitative determination of alkaloids, terpenoids and steroids in their origin or preparations
10. Identify different groups of alkaloids, terpenoids, steroids,
11. Collaborate in the write reports about the chemistry natural products such as alkaloids, terpenoids, steroids and their isolation and present them.
12. Collaborate effectively with other people, work in teamwork, team planning and manage times
13. Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.

II. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.

A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the	**a2-**	Clarify physico-chemical properties of substances
		a3-	Recognize the methods of extraction, separation and purification of the constituents of natural
	pharmaceutical industries and research.		products
		a4-	Describe the chemical structure of phytochemical substances of different alkaloids, steroids and terpens, their biological properties and contraindications of them.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures tutorial and group discussion.	Written exam, Quizzes, homework and participation.
a1-	Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.		
a2-	Clarify physico-chemical properties of substances		
a3-	Recognize the methods of extraction, separation and purification of the constituents of natural products		
a4-	Describe the chemical structure of phytochemical substances, their biological properties and contraindications of them.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills
After completing this program, students will be able to:	**After completing this course, students will be able to:**

B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Propose the possible leads to new drugs depending on natural product templates
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing .	**b2-**	Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity
		b3-	Determine suitable methods for extraction; isolation of different compounds from natural origin

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Solving Problem, Discussions, methods	Oral presentation, Written exam, Quizzes, and participation
b1-	propose the possible leads to new drugs depending on natural product templates		
b2-	Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity		
b3-	determine suitable methods for extraction; isolation of different compounds from natural origin		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.م.د.بشرى
محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

After completing this program, students will be able to:		After completing this course, students will be able to:	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	c1-	Perform suitable methods for extraction; isolation of alkaloids, terpenoids and steroids
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c2-	Carry out different methods for quantitative determination of alkaloids, terpenoids and steroids in their origin or preparations
		c3-	Identify different groups of alkaloids, terpenoids and steroids

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures ,Laboratory work, independent study.	Practical works and reports and presentations based on their experimental work.
c1-	Perform suitable methods for extraction; isolation of alkaloids, terpenoids and steroids		
c2-	Carry out different methods for quantitative determination of alkaloids, terpenoids and steroids in their origin or preparations		
c3-	Identify different groups of alkaloids, terpenoids and steroids		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	Course Intended Learning Outcomes (CILOs) in General / Transferable skills
After completing this program, students will be able to:	After completing this course, students will be able to:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.م.د.بشرى
	محرم ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

D1-	Practice independent learning needed for continuous professional development	**d1-**	Collaborate in the write reports about the chemistry natural products such as alkaloids, terpenoids, steroids and their isolation and present them.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2-**	Collaborate effectively with other people, work in teamwork, team planning and manage times
		d3-	Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, small group discussions and practical classes	Reports, presentations and communication with the lecturer and his colleagues.
d1-	Collaborate in the write reports about the chemistry natural products such as alkaloids, terpenoids,		
	steroids and their isolation and present them.		
d2-	Collaborate effectively with other people, work in teamwork, team planning and manage times		
d3-	Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.		

III. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Alkaloids	a1-4, b1-4, c1-3, d1-3	Definition, classification, distribution, functions, function in plant, properties, extraction, uses. **Phenylalkylamine alk**.; Ephedra, khat . Capsicum. **Tropolone alk.;** Colchicum,	**3**	**6**
2	Alkaloids	a1-4, b1-4, c1-3, d1-3	**Pyridine and piperidine**; tobacco, Pepper, Pomegranate **Tropane alk**.; Belladonna, Coca, **Quinoline alk**; cinchona alk, **Isoquinoline alk**; opium alk**, (Phenanthrene)**: morphine, Codeine, thebaine; **benzylisoquinoline alk:** papaverine;	**2**	**4**
3	Alkaloids	a1-4, b1-4, c1-3,	**phthalidisoquinoline**; ipecacuanha alk. **Indol alk;** phystostigma,, ergot , Nux	**2**	**4**
		d1-3	vomica, Vinca, Rauwolfia		
4	**Mid exam**	a1-4, b1-3		**1**	**2**
5	Alkaloids	a1-4, b1-4, c1-3, d1-3	**Purine alk**.; caffeine, theophylline, theobromine **imidazol alk**; pilocarpus alk, **Terpenoid alk;** aconitine, taxol alk	**2**	**4**
6	Steroids	a1-4, b1-4, c1-3, d1-3	Definition, Classification, Structures, **Sterols, Vitamin D, Bile acids**: Sources, structure, action, clinical uses **Steroid hormones:** (sex hormones and adrenocortical hormones)	**2**	**4**

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.م.د.بشرى ا.د. القاسم محمد عباس

7	Terpenoids	a1-4, b1-4, c1-3, d1-3	Definition, classification, distribution, extraction, functions **Monoterpenes**; Classification, extraction & characterization, plant containing **regular monoterpene** , valerian, olea eurropae**,** **Irregular monoterpene**, pyrethrum.	**2**	**4**
8	Terpenoids	a1-4, b1-4, c1-3, d1-3	**Sesquiterpene**; Structure, chemical and biological properties; gossypol compound, sesquiterpene lactones; arnica, sweet wormwood **Diterpene** Structure, chemical and biological properties; yews, coleus.	**1**	**2**
9	Final exam	a1-4, b1-4, d1-3		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b-Practical Aspect :

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Introduction and lab direction	**c2-3, d1-3**	**1**	**2**
2	Extraction and identification of alkaloids derived from Phenylalkylamine (khat)	**c2-3, d1-3**	**2**	**4**
3	Extraction and identification of Caffeine from Tea Leaves	**c2-3, d1-3**	**1**	**2**
4	Isolation and Identification of Nicotine-Identification of Atropine and Ephedrine	**c2-3, d1-3**	**2**	**4**
5	Extraction and Identification of Tropolone Alkaloids e.g. Leek Leaves	**c1-3, d1-3**	**1**	**2**

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة ا.م.د.بشرى
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6	Mid exam	**c1-2**	**1**	**2**
7	Extraction and Chemical Identification of Quinoline Alkaloids from Cinchona bark	**c1-3, d1-3**	**2**	**4**
8	Extraction and identification of alkaloids derived from piperidine (Pomegranate)	**c1-3, d1-3**	**1**	**2**
9	Identification of Datura Alkaloids by TLC	**c1-3, d1-3**	**1**	**2**
10	Extraction and identification of terpenoids	**c1-3, d1-3**	**1**	**2**
11	Extraction and identification of steroids	**c1-3, d1-3**	**1**	**2**
12	Revision	**c1-3**	**1**	**2**
13	Final exam	**c1-2**	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

IV. Teaching strategies of the course:

- Lectures, Practice session, solving problem, Small group discussions, Tutorials and Practical classes

3-Assessment Methods:

Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance ,Participation and quizzes**	**1-16**	20	13%	a1,a3, a4, b1-2
2	**Attendance, Practical Reports and Practical mid-semester exam**	8-16	30	20%	a2, a4, b1-3

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة ا.م.د.بشرى
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3	**Theoretical Mid-semester exam**	**8**	30	20%	c1-3
5	**Final Exam (practical)**	**16**	20	13%	a1-4, b1, b2
6	**Final Exam (Theoretical)**	**16**	50	33%	c1-3
	Total		**150**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi
- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevier, New York

2- Recommended Readings and Reference Materials

1- Steven M. Colegate and Russell J. Molyneux. (2008); "Bioactive natural products : detection, isolation, and structural determination" 2nd ed,.
2- Cordell G.A. (2002); "The alkaloids: Chemistry and Biology" Volume 59, Elsevier, New York

3- Lectures Notes and Practical Manual.

3- Essential References

4- Electronic Materials and Web Sites *etc*.	
	www.biomedcentral.com www.medscape.com http://www.sciencedirect.com/ http://www.ncbi.nlm.nih.gov/
5- Other Learning Material:	
	-

VIII. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

IX. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and

	discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Phytochemistry-I

I. - Information about Faculty Member Responsible for the Course:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.م.د.بشرى
محرم	ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Name of Faculty Member	Bushra Moharam	Office Hours					
Location & Telephone No.	730010755	SAT	SUN	MON	TUE	WED	THU
E-mail	bushramoharam@yahoo.com.	1		1			

II. Course Identification and General Information:

1-	Course Title:	**Phytochemistry-I**				
2-	Course Number & Code:	**Ph374**				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	4th level /1st semester				
5-	Pre –requisite (if any):	Botany, pharmacognosy				
6-	Co –requisite (if any):	None				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

III. Course Description:

This course provides information and discus of naturally occurring products from their chemical, pharmaceutical and therapeutic applications. It deals with their extraction, isolation, detection, pharmacological and toxicological effects. Phytochemical components in this course including; alkaloids, terpenoids, and steroids are demonstrated.

IV. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

1. nature and classification.
2. Clarify physico-chemical properties of substances
3. Recognize the methods of extraction, separation and purification of the constituents of natural products
4. Describe the chemical structure of phytochemical substances of different alkaloids, steroids and terpens, their biological properties and contraindications of them.
5. Propose the possible leads to new drugs depending on natural product templates
6. Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity
7. Determine suitable methods for extraction; isolation of different compounds from natural origin
8. Perform suitable methods for extraction; isolation of alkaloids, terpenoids and steroids
9. Carry out different methods for quantitative determination of alkaloids, terpenoids and steroids in their origin or preparations
10. Identify different groups of alkaloids, terpenoids and steroids
11. Collaborate in the write reports about the chemistry natural products such as alkaloids, terpenoids, steroids and their isolation and present them.
12. Collaborate effectively with other people, work in teamwork, team planning and manage times
13. Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Alkaloids	a1-4, b1-4, c1-3, d1-3	Definition, classification, distribution, functions, function in plant, properties, extraction, uses. **Phenylalkylamine alk.**; Ephedra, khat . Capsicum. **Tropolone alk.;** Colchicum,	**1-3**	**6**
2	Alkaloids	a1-4, b1-4, c1-3, d1-3	**Pyridine and piperidine**; tobacco, Pepper, Pomegranate **Tropane alk.**; Belladonna, Coca, **Quinoline alk**; cinchona alk, **Isoquinoline alk**; opium alk**, (Phenanthrene)**: morphine, Codeine, thebaine; **benzylisoquinoline alk:** papaverine;	**4,5**	**4**
3	Alkaloids	a1-4, b1-4, c1-3, d1-3	**phthalidisoquinoline**; ipecacuanha alk. **Indol alk;** phystostigma,, ergot , Nux vomica, Vinca, Rauwolfia	**6,7**	**4**
4	**Mid exam**	a1-4, b1-3		**8**	**2**

5	Alkaloids	a1-4, b1-4, c1-3, d1-3	**Purine alk**.; caffeine, theophylline, theobromine **imidazol alk**; pilocarpus alk, **Terpenoid alk;** aconitine, taxol alk	**9,10**	**4**
6	Steroids	a1-4, b1-4, c1-3,	Definition, Classification, Structures, **Sterols, Vitamin D, Bile acids**:	**11-12**	**4**
		d1-3	Sources, structure, action, clinical uses **Steroid hormones:** (sex hormones and adrenocortical hormones)		
7	Terpenoids	a1-4, b1-4, c1-3, d1-3	Definition, classification, distribution, extraction, functions **Monoterpenes**; Classification, extraction & characterization, plant containing **regular monoterpene** , valerian, olea eurropae**, Irregular monoterpene**, pyrethrum.	**13-14**	**4**
8	Terpenoids	a1-4, b1-4, c1-3, d1-3	**Sesquiterpene**; Structure, chemical and biological properties; gossypol compound, sesquiterpene lactones; arnica, sweet wormwood **Diterpene** Structure, chemical and biological properties; yews, coleus.	**15**	**2**
9	Final exam	a1-4, b1-4, d1-3		**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b-Practical Aspect :

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.م.د.بشرى
	محرم ا.د. محمود البريهي	د.سلوى راوح	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Order	Training Tasks	CILOs (symbols)	Week Due	Contact hours
1	Introduction and lab direction	**c2-3, d1-3**	**1**	**2**
2	Extraction and identification of alkaloids derived from Phenylalkylamine (khat)	**c2-3, d1-3**	**2,3**	**4**
3	Extraction and identification of Caffeine from Tea Leaves	**c2-3, d1-3**	**4**	**2**
4	Isolation and Identification of Nicotine-	**c2-3, d1-3**	**5,6**	**4**
	Identification of Atropine and Ephedrine			
5	Extraction and Identification of Tropolone Alkaloids e.g. Leek Leaves	**c1-3, d1-3**	**7**	**2**
6	Mid exam	**c1-2**	**8**	**2**
7	Extraction and Chemical Identification of Quinoline Alkaloids from Cinchona bark	**c1-3, d1-3**	**9,10**	**4**
8	Extraction and identification of alkaloids derived from piperidine (Pomegranate)	**c1-3, d1-3**	**11**	**2**
9	Identification of Datura Alkaloids by TLC	**c1-3, d1-3**	**12**	**2**
10	Extraction and identification of terpenoids	**c1-3, d1-3**	**13**	**2**
11	Extraction and identification of steroids	**c1-3, d1-3**	**14**	**2**
12	Revision	**c1-3**	**15**	**2**
13	Final exam	**c1-2**	**16**	**2**
Number of Weeks /and Units Pr Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures, Practice session, Small group discussions, Tutorials and Practical classes

VII. Assessment Methods:

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	**Attendance ,Participation and quizzes**	**1-16**	20	13%
2	**Attendance, Practical Reports and Practical mid-semester exam**	8-16	30	20%
3	**Theoretical Mid-semester exam**	**8**	30	20%
5	**Final Exam (practical)**	**16**	20	13%
6	**Final Exam (Theoretical)**	**16**	50	33%
	Total		**150**	**100%**

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi
- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevier, New York

2- Essential References.

3- Electronic Materials and Web Sites *etc*.

www.biomedcentral.com www.medscape.com
http://www.sciencedirect.com/ http://www.ncbi.nlm.nih.gov/

IX. Course Policies:	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty.
	▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmacology III

I. Course Identification and General Information:

1.	**Course Title**	Pharmacology III					
2.	**Course Number & Code:**	Ph479					
3.	**Credit hours:**	**C.H**				**Total**	
		Th.	**Pr.**	**Tr.**	**Seminar.**		
		2	**-**			**2**	
4.	**Study level/ semester at which this course is offered:**	4th level /1st semester					
5.	**Pre –requisite (if any):**	Anatomy and histology Physiology I &II General Pathology Pharmacology I & II					
6.	**Co –requisite (if any):**	-					
7.	**Program (s) in which the course is offered:**	Bachelor of Pharmacy					
8.	**Language of teaching the course:**	English					
9.	**The department in which the course is offered:**	-					
10.	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university					
11.	**Prepared by:**	Associate Prof. Fahmy M. Al-Wasei					
12.	**Date of approval:**						

II. Course description:

The course also deals with the study of pharmacodynamics and pharmacokinetics of chemotherapeutic drugs for infections and cancer.

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الواسعي	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of chemotherapeutic drugs for infections and cancer.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patient categories and drug interactions) of chemotherapeutic drugs for infections and cancer.
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify chemotherapeutic drugs for infections and cancer into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs.
7. Predict drug limitations on the basis of Drug MOA.
8. Select an appropriate drug for patients based on drug benefits and limitation.
9. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
10. Search efficiently for information using documented and electronic sources of information.
11. Prepare critical, scientific and referenced reports 12. Share successfully in team-work.
13. Show respect to life.
14. Demonstrate time management and self-learning during performing practical and professional works and assignments.

15. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a1-	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of chemotherapeutic drugs for infections and cancer.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.	a2-	Discuss drug limitations (side effects, contraindications, precautions, use in special patient categories and drug interactions) of chemotherapeutic drugs for infections and cancer..
		a3-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
a1-	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of chemotherapeutic drugs for infections and cancer.	Lectures methods , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Discuss drug limitations (side effects, contraindications, precautions, use in special patient categories and drug interactions) of chemotherapeutic drugs for infections and cancer..		
a3-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**	
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Classify chemotherapeutic drugs for infections and cancer into various categories
		b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Relate drug indications to MAO of drugs.
		b4-	Predict drug limitations on the basis of Drug MOA.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b5-**	Select an appropriate drug for patients based on drug benefits and limitation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Classify chemotherapeutic drugs for infections and cancer into various categories	Lectures methods, Group Discussion, Problem solving sessions**,** brainstorming and Computer based teaching and learning	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.		
b3-	Relate drug indications to MAO of drugs.		
b4-	Predict drug limitations on the basis of drug MOA**.**		

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b5-	Select an appropriate drug for patients based on drug benefits and limitation.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
		c2-	Search efficiently for information using documented and electronic sources of information.
		c3-	Prepare critical, scientific and referenced reports
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.		
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

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Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.	Lectures methods, practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Search efficiently for information using documented and electronic sources of information.		
c3-	Prepare critical, scientific and referenced reports		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	Share successfully in team-work.
D5-	Apply information and communication technology and working effectively in a team.	d2-	Show respect to life.
		d3-	Demonstrate time management and selflearning during performing practical and professional works and assignments.

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Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Share successfully in team-work.	Small group discussions, Tutorials and Practical session	Homework and reports.
d2-	Show respect to life.		
d3-	Demonstrate time management and self-learning during performing practical and professional works and assignments.		

16. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1.	**Chemotherapeutic drugs bacterial infections** (Antibacterial)	a1, a2, a3, b1, b2, b3, b4, b5, c13, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** **Antibacterials** • antibiotics: (β-lactams: penicillins, cephalosporins, penems, others), macrolides, aminoglycosides, tetracyclines, chloramphenicols, lincosamides, others • Synthetic Antibacterials: sulphonamides, fluroquinolones, nitrothiazoles (e.g. metronidazole) • Antituberculars and antileprotics • Antiseptics and disinfectants	4	8
2.	**Chemotherapeutic drugs for fungi and viruses infections** (Antifungals& antivirals)	a1, a2, a3, b1, b2, b3, b4, b5, c12, d1, d3	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :**	3	6

			Antifungals (antimycotics) • Polyene antibiotics : nystatin, amphotericin B, griseofulvin • antimetabolites : flucytosine azoles : clotrimazole, miconazoles, etc **Antivirals** • anti-herpes simplex • anti-influenza • anti-AIDS • immunomodulators e.g. interferone		
3.	**Midterm exam**	a1-3, b1-5 ,c1-3		1	2

4.	**Chemotherapeutic drugs for parasitic infections**	a1, a2, a3, b1, b2, b3, b4, b5, c13, d1-3	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** **Antiprotozoals** • Antamoebics and antigiardials • Anti-leishmanials and antitoxoplasmosis • Antimalarials **Anthelmintics** • For common worms infection • For tape worm : trematodes (taenia, H.	3	6
			nana) infections • For schistosoma (Bilharzia)infections • For filarisis		

5.	**Chemotherapeutic drugs for cancer (Anticancer ; antineoplastic)**	a1, a2, a3, b1, b2, b3, b4, b5, c1, c3, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Antimetabolites : methotrexate, 5-flurouracil. 6-mercaptopurine • Alkylating agents: nitrogen mustards, alkyl sulphonates, nitrosurea • Natural products: antibiotics, plant alkaloids, enzymes, interferons • Hormones and hormones anatgonists • Radioactive isotopes • Miscellaneous: cisplatin, mitotane , etc	4	8
6.	**Final Exam**	a1-3, b1-5		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

17. a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions and tutorials and brainstorming and.
b- Assessment Methods:

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Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-5, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-3**		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation, reports, Quizzes and Homework-assignments**	**All Weeks**	10	10%	a1-4,b1-4, d1-3
2.	**Theoretical mid-semester exam**	8th	20	20%	a1, a2, a3, b1, b3
3.	**Final Exam (theoretical)**	**16th**	70	70%	a1-4, b1-5
	Total		**100**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill

2- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

1. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
2. Udaykumar. Text book of medical pharmacology
3. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

www.en.wikipedia.org/

IV. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmacology III

I- Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Fahmy M. Al-Wasei						
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail			2h				

II- Course Identification and General Information:

1-	Course Title:	Pharmacology III				
2-	Course Number & Code:	Ph479				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	3rd level /2nd semester				

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5-	**Pre –requisite (if any):**	Anatomy and histology Physiology I &II General Pathology Pharmacology I & II
6-	**Co –requisite (if any):**	-
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy
8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

The course also deals with the study of pharmacodynamics and pharmacokinetics of chemotherapeutic drugs for infections and cancer.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & drug physiology of chemotherapeutic drugs for infections and cancer.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patient categories and drug interactions) of chemotherapeutic drugs for infections and cancer.
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify chemotherapeutic drugs for infections and cancer into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs.
7. Predict drug limitations on the basis of Drug MOA.
8. Select an appropriate drug for patients based on drug benefits and limitation.
9. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
10. Search efficiently for information using documented and electronic sources of information.
11. Prepare critical, scientific and referenced reports 12. Share successfully in team-work.
13. Show respect to life.
14. Demonstrate time management and self-learning during performing practical and professional works and assignments.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
7.	**Chemotherapeutic drugs bacterial infections** (Antibacterial)	a1, a2, a3, b1, b2, b3, b4, b5, c13, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** **Antibacterials** • antibiotics: (β-lactams: penicillins, cephalosporins, penems, others), macrolides, aminoglycosides, tetracyclines, chloramphenicols, lincosamides, others • Synthetic Antibacterials: sulphonamides, fluroquinolones, nitrothiazoles (e.g. metronidazole) • Antituberculars and antileprotics • Antiseptics and disinfectants	1-4	8
8.	**Chemotherapeutic drugs for fungi and viruses infections**	a1, a2, a3, b1, b2, b3, b4, b5, c1-	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic**		

	(Antifungals& antivirals)	2, d1, d3	**action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** **Antifungals (antimycotics)** • Polyene antibiotics : nystatin, amphotericin B, griseofulvin • antimetabolites : flucytosine azoles : clotrimazole, miconazoles, etc **Antivirals** • anti-herpes simplex • anti-influenza • anti-AIDS • immunomodulators e.g. interferone	5-7	6
9.	**Midterm exam**	a1-3, b1-5 ,c1-3		8	2

10.	**Chemotherapeutic drugs for parasitic infections**	a1, a2, a3, b1, b2, b3, b4, b5, c13, d1-3	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** **Antiprotozoals** • Antamoebics and antigiardials • Anti-leishmanials and antitoxoplasmosis • Antimalarials	9-11	6
			Anthelmintics • For common worms infection • For tape worm : trematodes (taenia, H. nana) infections • For schistosoma (Bilharzia)infections • For filarisis		

11.	**Chemotherapeutic drugs for cancer (Anticancer ; antineoplastic)**	a1, a2, a3, b1, b2, b3, b4, b5, c1, c3, d2	**Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of :** • Antimetabolites : methotrexate, 5-flurouracil. 6-mercaptopurine • Alkylating agents: nitrogen mustards, alkyl sulphonates, nitrosurea • Natural products: antibiotics, plant alkaloids, enzymes, interferons • Hormones and hormones anatgonists • Radioactive isotopes • Miscellaneous: cisplatin, mitotane , etc	12-15	8
12.	**Final Exam**	a1-3, b1-5		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and tutorials and brainstorming and.

b- Assessment Methods:

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Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-5, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-3**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
4.	**Attendance, Participation, reports, Quizzes and Homework-assignments**	**All Weeks**	10	10%	a1-4,b1-4, d1-3
5.	**Theoretical mid-semester exam**	8th	20	20%	a1, a2, a3, b1, b3
6.	**Final Exam (theoretical)**	**16th**	70	70%	a1-4, b1-5
	Total		**100**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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الواسعي	ا.د. محمود البريهي		د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill

4- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

4. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
5. Udaykumar. Text book of medical pharmacology
6. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

www.en.wikipedia.org/

IX. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.

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	▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Pharmacy Law and Ethics

I. Course Identification and General Information:						
1	Course Title:	Pharmacy Law and Ethics				
2	Course Number & Code:	Ph2710				
3	Credit hours:2hrs	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2				2
4	Study level/ semester at which this course is offered:	Fourth year / First semester				
5	Pre –requisite (if any):	Pharmaceutics I-IV- Pharmaceutical Care I,II				
6	Co –requisite (if any):					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy				
8	Language of teaching the course:	English				
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy				
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				
11	Prepared by:	Prof Dr/ Mahmoud Mahyoob Alburyhi				
12	Date of approval:					

II. Course description:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميدة مركز التطوير وضمان الجودة	عميد الكلية	رئيس الجامعة
	البريهي ا.د. محمود البريهي	ا.د.ماجد علوان	ا.م.د. هدى العماد	د.خالد الشوبة	ا.د. القاسم محمد عباس

This course aims to provide the students the knowledge basics of pharmacy legislation and understanding of ethics specific to pharmacy. The course will examine the laws that impact the practice of pharmacy, while emphasizing the legal and ethical principles applied by pharmacists in their daily decision-making.. Students will learn the governmental framework within which pharmacy is practiced, as well as acquire an understanding of the laws, regulations, and the ethical responsibilities applicable to pharmacists so that they will be able to protect the public and ensure patients' well-being.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define different principles of pharmacy legislation
2. Identify the principles of pharmacy profession
3. Understand the ethics related to pharmacy practice
4. Utilize the pharmacy law and ethics in pharmacy practice.
5. Recognize how the laws applied in the field Pharmacy can control and play a great effect in the behavior of pharmacist and those who work in the medical field.
6. Demonstrate drugs and narcotics ethically and properly according to the regulation.
7. Recognize the differences between criminal law.
8. Distinguish between Acts, regulations and rules
9. Relate legislation to relevant examples in pharmacy practice.
10. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.
11. Develop good relationships with the customers.
12. Arrange Presentation and interviewing skills.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

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Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Define different principles of pharmacy legislation
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of	**a2-**	Identify the principles of pharmacy profession
		a3-	Understand the ethics related to pharmacy practice
	therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.		
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.		
A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care..		
Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			

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Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures, discussion	▪ Attendance, report and project ▪ Written and oral exams
a1-	Define different principles of pharmacy legislation		
a2-	Identify the principles of pharmacy profession		
a3-	Understand the ethics related to pharmacy practice		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Utilize the pharmacy law and ethics in pharmacy practice.
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Recognize how the laws applied in the field Pharmacy can control and play a great effect in the behavior of pharmacist and those who work in the medical field.
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures, discussion and brain storming	Written and oral exams
b1-	Utilize the pharmacy law and ethics in pharmacy practice.		
b2-	Recognize how the laws applied in the field Pharmacy can control and play a great effect in the behavior of pharmacist and those who work in the medical field.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines	**c1-**	Demonstrate drugs and narcotics ethically and properly according to the regulation.
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c2-**	Recognize the differences between criminal law.
		c3-	Distinguish between Acts, regulations and rules
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c4-**	Demonstrate proper inspection and prepare a report on pharmaceutical institution

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures, discussion and brain storming	Written, oral exams, report, project and observation.
c1-	Demonstrate drugs and narcotics ethically and properly according to the regulation.		
c2-	Recognize the differences between criminal law.		
c3-	Distinguish between Acts, regulations and rules		
c4-	Relate legislation to relevant examples in pharmacy practice		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d2-**	Develop good relationships with the customers.
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	**d3-**	Arrange Presentation and interviewing skills.
D5-	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

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Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.		
d2	Develop good relationships with the customers.		
d3	Arrange Presentation and interviewing skills.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmacy law and ethics	**a1,a2,a3,b1,c1,d1**	Pharmacy Ethics: Why Knowing Law Is Not Enough Introduction to ethics Distinction between personal and professional	**1**	**2**

			role based ethics Relation of law to ethics Ethical theories Principles of healthcare (biomedical) ethics		
2	Legislation The Medicines Act 1968	**a1,a2,b1, c1.d2**	The nature and role of law Laws Public consultations Head of pharmacy Acts, regulations and rule Implementation: public spending, government and the Department of Health Sale and supply of medicines	**1**	**2**
3	Veterinary medicines regulations	**a1, ,b1,c2,d1**	Types, definitions	**1**	**2**
4	Misuse of drugs Act	**a1,a2,a3,b1,b2,c2, c3,d1,d2,d3**	Classifications	**1**	**2**
5	Health Acta 1999 to 2006	**a1,a2,a3,b1,c1,c2 ,d1,d2,d3**	Types, definitions	**1**	**2**
6	NHS legislation	**a1,a2,a3,b1,b2,c1, c2,c3, d1,d2,d3**	Types, definitions	**1**	**2**
7	Mid-term exam	**a1-3,b1-2,c1-3**		**1**	**2**
8	Legislation to pharmacy practice	**a3,b1,b2,c3,c4, d1,d2,d3**	Applications	**1**	**2**
9	Professional registration and regulation	**a3 , b1,b2, c3,c4, d1,d2,d3**	Code ethics	**1**	**2**

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البريهي **ا.د. محمود البريهي** **ا.د.ماجد علوان** **د.خالد الشوبة** **ا.م.د. هدى العماد** **ا.د. القاسم محمد عباس**

10	Ethics and profissionalism	**a3, b1,b2,c1,c2, c3,c4, d1,d2,d3**	Prescription vs. OTC Drugs, Generic Substitution, and Filling Prescriptions, Case study, Pharmacy practice problems, Local legal and professional to pharmacy practice regulation, new legal and professional to pharmacy practice, Applying	**5**	**10**
			Ethical Principles and Rules regulation		
11	Pharmacy organizations.	**a1,a2,a3,b2,c2, c3,c4, d1,d2,d3**	WHO and FIP	**1**	**2**
12	Final-term exam	**a1-3,b1-2,c1-4**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-2, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes and Homework-assignments, Attendance, Participation	All weeks	**10**	10%	**a1-3, b1-2, c1-3,** d1-3
2	Written Mid exam, Oral exam, reports, projects	2-14	**30**	30%	**a1-3, b1-2, c1-3**
3	Written Final exam	16th	**60**	60%	**a1-3, b1-3, c1-4**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hours	-

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1-A book prepared by the staff members

2-Beauchamp TL, Childress JF., 2008, Principles of Biomedical Ethics, 6th ed. Oxford University Press, New York.
3-Appelbe GE, Wingfield J. Dale and Appelbe's, 2009, Pharmacy Law and Ethics, 9th edn. Pharmaceutical Press., London.

2- Recommended Readings and Reference Materials

	1-Merrills J, Fisher J., 2003, Pharmacy Law and Practice.: Blackwell Science,. Rogers R, London. 2-Anderson S (ed.), 2005, Making Medicines, A Brief History of Pharmacy and Pharmaceuticals.: Pharmaceutical Press, London. 3-Langley CA, Belcher D., 2009, Applied Pharmaceutical Practice: Pharmaceutical Press, London. 4-Wingfield J, Badcott D., 2007, Pharmacy Ethics and Decision Making: Pharmaceutical Press, . London. 5-Hope T, Savulescu J, Hendrick J., 2003, Medical Ethics and Law: The Core Curriculum. Churchill Livingstone, London.
3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com
4- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics

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XI. Facilities Required:

1- Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, internet connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

I. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.

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	▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmacy Law and Ethics

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Prof / Mahmoud Mahyoob Alburyhi	Office Hours						
Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:						
1-	Course Title:	Pharmacy Law and Ethics				
2-	Course Number & Code:	Ph2710				
3-	Credit hours: 2hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	Fourth year/Second semester				
5-	Pre –requisite (if any):	Pharmaceutics I-IV-Pharmaceutical Care I,II				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

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III. Course description:

This course aims to provide the students the knowledge basics of pharmacy legislation and understanding of ethics specific to pharmacy. The course will examine the laws that impact the practice of pharmacy, while emphasizing the legal and ethical principles applied by pharmacists in their daily decision-making.. Students will learn the governmental framework within which pharmacy is practiced, as well as acquire an understanding of the laws, regulations, and the ethical responsibilities applicable to pharmacists so that they will be able to protect the public and ensure patients' well-being.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define different principles of pharmacy legislation
2. Identify the principles of pharmacy profession
3. Understand the ethics related to pharmacy practice
4. Utilize the pharmacy law and ethics in pharmacy practice.
5. Recognize how the laws applied in the field Pharmacy can control and play a great effect in the behavior of pharmacist and those who work in the medical field.
6. Demonstrate drugs and narcotics ethically and properly according to the regulation.
7. Recognize the differences between criminal law.
8. Distinguish between Acts, regulations and rules
9. Relate legislation to relevant examples in pharmacy practice.
10. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems.
11. Develop good relationships with the customers.
12. Arrange Presentation and interviewing skills.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmacy law and ethics	**a1,a2,a3,b1,c1,d1**	Pharmacy Ethics: Why Knowing Law Is Not Enough Introduction to ethics Distinction between personal and professional role based ethics Relation of law to ethics Ethical theories Principles of healthcare (biomedical) ethics	**1**	**2**
2	Legislation The Medicines Act 1968	**a1,a2,b1, c1.d2**	The nature and role of law Laws Public consultations Head of pharmacy Acts, regulations and rule Implementation: public spending, government and the Department of Health Sale and supply of medicines	**1**	**2**

3	Veterinary medicines regulations	**a1, ,b1,c2,d1**	Types, definitions	**1**	**2**
4	Misuse of drugs Act	**a1,a2,a3,b1,b2,c2, c3,d1,d2,d3**	Classifications	**1**	**2**
5	Health Acta 1999 to 2006	**a1,a2,a3,b1,c1,c2 ,d1,d2,d3**	Types, definitions	**1**	**2**
6	NHS legislation	**a1,a2,a3,b1,b2,c1, c2,c3, d1,d2,d3**	Types, definitions	**1**	**2**
7	Mid-term exam	**a1-3,b1-2,c1-3**		**1**	**2**
8	Legislation to pharmacy practice	**a3,b1,b2,c3,c4, d1,d2,d3**	Applications	**1**	**2**
9	Professional registration and regulation	**a3 , b1,b2, c3,c4, d1,d2,d3**	Code ethics	**1**	**2**
10	Ethics and profissionalism	**a3, b1,b2,c1,c2, c3,c4, d1,d2,d3**	Prescription vs. OTC Drugs, Generic Substitution, and Filling Prescriptions, Case study, Pharmacy practice problems, Local legal and professional to pharmacy practice regulation, new legal and professional to pharmacy practice, Applying Ethical Principles and Rules regulation	**5**	**10**
11	Pharmacy organizations.	**a1,a2,a3,b2,c2, c3,c4, d1,d2,d3**	WHO and FIP	**1**	**2**
12	Final-term exam	**a1-3,b1-2,c1-4**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, tutorials and brainstorming.

b-Assessment Methods:

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Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-2, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes and Homework-assignments, Attendance, Participation	All weeks	**10**	10%	**a1-3, b1-2, c1-3,** d1-3
2	Written Mid exam, Oral exam, reports, projects	2-14	**30**	30%	**a1-3, b1-2, c1-3**
3	Written Final exam	16th	**60**	60%	**a1-3, b1-3, c1-4**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hours	-

X. Learning Resource (MLA style or APA style)s:

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5- Required Textbook(s) (maximum two)	
	1-A book prepared by the staff members 2-Beauchamp TL, Childress JF., 2008, Principles of Biomedical Ethics, 6th ed. Oxford University Press, New York. 3-Appelbe GE, Wingfield J. Dale and Appelbe's, 2009, Pharmacy Law and Ethics, 9th edn. Pharmaceutical Press., London.
6- Recommended Readings and Reference Materials	
	1-Merrills J, Fisher J., 2003, Pharmacy Law and Practice.: Blackwell Science,. Rogers R, London. 2-Anderson S (ed.), 2005, Making Medicines, A Brief History of Pharmacy and Pharmaceuticals.: Pharmaceutical Press, London.
	3-Langley CA, Belcher D., 2009, Applied Pharmaceutical Practice: Pharmaceutical Press, London. 4-Wingfield J, Badcott D., 2007, Pharmacy Ethics and Decision Making: Pharmaceutical Press, . London. 5-Hope T, Savulescu J, Hendrick J., 2003, Medical Ethics and Law: The Core Curriculum. Churchill Livingstone, London.
7- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com
8- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics

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I. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

I. **Course Improvement Processes:**	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

X

I

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8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

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The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Biopharmaceutics

I. Course Identification and General Information:						
1	Course Title:	Biopharmaceutics				
2	Course Number & Code:	Ph2711				
3	Credit hours: 3 hrs	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2	2			3
4	Study level/ semester at which this course is offered:	Fourth year/ First semester				
5	Pre –requisite (if any):	Pharmaceutics I-IV				
6	Co –requisite (if any):					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy				
8	Language of teaching the course:	English				
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy				
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				
11	Prepared by:	Prof Dr / Mahmoud Mahyoob Alburyhi				
12	Date of approval:					

II. Course description:

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This course aims to provide the students with a comprehensive theoretical foundation of biopharmaceutics in new drug design**.** Examines the interrelationship of the physical / chemical properties of the drug, the dosage form (drug product) in which the drug is given, and the route of administration on the rate and extent of systemic drug absorption. To develop and select the dosage form that will provide a consistent bioavailability at desirable rate especially for narrow therapeutic index drugs.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the ADME and the mechanisms of gastrointestinal absorption of drugs.
2. Discuss the factors affecting gastrointestinal absorption of drugs.
3. Identify the role of dosage form on drug bioavailability.
4. Identify the factors affecting drug absorption, distribution and elimination.
5. Identify bioavailability and bioequivalance.
6. Utilization the effect of absorption, distribution, metabolism, and excretion (ADME) of drugs in the body for dosage optimization and evaluating drug dosage regimen.
7. Demonstrate the biopharmaceutical considerations in drug product design.
8. Recognize the relationship between product design and the drug absorption, distribution and elimination.
9. Predict the effect of excipients and food on drug absorption, distribution and elimination.
10. Analyze the results of the in-vitro and in-vivo studies.
11. Assess physicochemical characteristics of drug substances as a factor affecting drug absorption.
12. Analyze bioavailability and bioequivalence studies.
13. Examine the biopharmaceutical consideration in dosage form design.
14. Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.
15. Retrieve information from a variety of sources, including libraries, databases and internet.
16. Work effectively in a team and demonstrate time management skills.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**			
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Describe the ADME and the mechanisms of gastrointestinal absorption of drugs.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Discuss the factors affecting gastrointestinal absorption of drugs.
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research	**a3-**	Identify the role of dosage form on drug bioavailability.
A5	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care	**a4-**	Identify the factors affecting drug absorption, distribution and elimination.
		a5-	Identify bioavailability and bioequivalance.
Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			

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Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures, and group discussion	Attendance, Written, oral exams and small projects
a1-	Describe the ADME and the mechanisms of gastrointestinal absorption of drugs.		
a2-	Discuss the factors affecting gastrointestinal absorption of drugs.		
a3-	Identify the role of dosage form on drug bioavailability.		
a4-	Identify the factors affecting drug absorption, distribution and elimination.		
a5-	Identify bioavailability and bioequivalance.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Utilization the effect of absorption, distribution, Metabolism, and excretion (ADME) of drugs in the body for dosage optimization and evaluating drug dosage regimen.
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Demonstrate the biopharmaceutical considerations in drug product design.

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B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b3-**	Developing dosing regimens for the individualization of therapy for the patient.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, solving problem brainstorming and group discussion	Project, homework, Written, oral exams and small projects
b1-	Utilization the effect of absorption, distribution, Metabolism, and excretion (ADME) of drugs in the body for dosage optimization and evaluating drug dosage regimen.		
b2-	Demonstrate the biopharmaceutical considerations in drug product design.		
b3-	Recognize the relationship between product design and the drug absorption, distribution and elimination.		
b4-	Predict the effect of excipients and food on drug absorption, distribution and elimination.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills
After completing this program, students will be able to:	**After completing this course, students will be able to:**

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C1	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Analyze the results of the in-vitro and invivo studies.
C3	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	Assess physicochemical characteristics of drug substances as a factor affecting drug absorption.
		c3-	Analyze bioavailability and bioequivalence studies.
C4	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c4-**	Examine the biopharmaceutical consideration in dosage form design.
C5	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
c1-	Analyze the results of the in-vitro and in-vivo studies.		
c2-	Assess physicochemical characteristics of drug substances as a factor affecting drug absorption.		
c3-	Analyze bioavailability and bioequivalence studies.		
c4-	Examine the biopharmaceutical consideration in dosage form design.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D2	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d2	Retrieve information from a variety of sources, including libraries, databases and internet.
D4	Take responsibility for adaptation to change needs in pharmacy practice.	d3	Work effectively in a team and demonstrate time management skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1-	Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring		
	plans for physicians and use different information sources to solve medication problems.		
d2-	Retrieve information from a variety of sources, including libraries, databases and internet.		
d3	Work effectively in a team and demonstrate time management skills.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect					
Order	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Number of weeks**	**Contact hours**
1	Introduction to biopharmaceutics , pharmacokinetic, pharmacodynamic and clinical pharmacokinetics	**a1,a2,a3, b1,b2,b3,b4, d1**	Definitions, Define pharmacokinetics and describe how pharmacokinetics is related to pharmacodynamics and drug toxicity, parameters and Mechanisms	**1**	**2**
2	Drug absorption, Mechanisms of drug absorption	**a1,a2, b1,b2,b3, b4,d1,d2,d3**	Definition, Mechanisms of drug absorption process, factors affecting absorption	**1**	**2**
3	Physiologic factors related to drug absorption	**a3,a4, b2,b3,b4, d1,d2,d3**	Types of factors pH, gastric and GIT factors	**1**	**2**
4	Physiochemical factors related to drug absorption	**a4, b2,b3,b4, d1,d2,d3**	Nature of drug, drug solubility, dissolution and drug stability	**1**	**2**
5	Biopharmaceutical aspects of the active pharmaceutical ingredient and pharmaceutical equivalence	**a4, b2, d1,d2,d3**	Formulation factors, method of manufacture, excipients, drug dosage and dosage regimen	**1**	**2**

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6	Drug distribution Physiologic drug distribution and protein binding	**a4, b1,b2,b3,b4, d1,d2,d3**	Definition, parameters, volume of distribution, Mechanisms , factors and Clinical Application	**1**	**2**
7	Mid-term exam	**a1-4, b1-4**		**1**	**2**
8	Drug metabolism	**a3,a4,a5, b1,b2,b3,b4 d1,d2,d3**	Definition and parameters,	**1**	**2**
9	Pharmacogenetics and drug metabolism	**a5, b3,b4, d1,d2,d3**	Mechanisms, classification and factors	**1**	**2**
10	Drug excretion	**a5, b1,b2,b3,b4, d1,d2,d3**	Definition and parameters,	**1**	**2**
11	Drug elimination, clearance, and renal clearance	**a4, b3,b4, d1,d2,d3**	Mechanisms, classification and factors	**1**	**2**
12	Drug elimination and hepatic clearance	**a4, b3,b4, d1,d2,d3**	Mechanisms, types and factors	**1**	**2**
13	Bioavailability	**a2,a3,,a5, b1,b2,b3, b4,d1,d2,d3**	Definition, classification, Relative bioavailability, Absolute bioavailability parameters and evaluations	**1**	**2**
14	Bioavailability and bioequivalence	**a2,a3, b1,b2,b3,b4, d1,d2,d3**	Model parameters , drug absorption and bioavailability of dosage forms.	**1**	**2**
15	Biopharmaceutic considerations in drug product design and in vitro drug product performance	**a3, b1,b2,b3, d1,d2,d3**	Pharmaceutical alternative, Pharmaceutical equivalent	**1**	**2**

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1.	final-term exam	**a1-5, b1-4**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Biopharmaceutic considerations in drug product design	**c1, d1,d2,d3**	**1**	**2**
2	Practice how stomach emptying, GI residence time, and gastric window affect drug absorption	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
3	Determine the drugs for which gastric pH can affect bioavailability	**c1,c2,c3, d1,d2,d3**	**1**	**2**
4	Determine the particle size, crystal form, solubility, dissolution, and ionization affect in vivo dissolution and absorption.	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
5	Dissolution test methods and relation to in vivo performance.	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
6	Determine the simulating drug distribution in the body	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
7	Mid-term exam	**c1-4**	**1**	**2**
8	Determine the formulation factors and manufacturing method affecting PE and TE.	**c2,c3,c4, d1,d2,d3**	**1**	**2**
9	Practice use plasma or urine data to calculate fraction of drug excreted and metabolized.	**c2,c3,c4, d1,d2,d3**	**1**	**2**
10	Practice use plasma or urine data to calculate fraction of drug excreted and metabolized.	**c2,c3,c4, d1,d2,d3**	**1**	**2**
11	Practice application of the physiologically factors include understanding the effect of renal impairment	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
12	Practice drug elimination and hepatic clearance Application of the physiologically factors include understanding the effect of hepatic	**c4, d2 d1,d2,d3**	**1**	**2**
	clearance			

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13	Determine the methods of drug excretion from the body	**c4, d1,d2,d3**	**1**	**2**
14	Determine the select API from multiple sources while meeting PE (pharmaceutical equivalence) and TE (therapeutic equivalence) requirement as defined in CFR. How pharmaceutical equivalence affects therapeutic equivalence and Pharmaceutical alternatives.	**c1-4, d1,d2,d3**	**1**	**2**
15	Bioavailability and bioequivalence test methods, and analysis.	**c2-4, d1,d2,d3**	**1**	**2**
1.	Final-term exam	**c1-4**	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, Written exam, Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	**a1-5,b1-4, d1-3**
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	**a1-5, b1-4, d1-3**
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	**c1-4**
4.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
5.	**Theoretical mid-semester exam**	7th	30	20%	**a1-4, b1-4**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
7.	**Final Exam (practical)**	**16th**	20	13%	**c1-4**
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

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1-	Notes on biopharmaceutics prepared by the department staff. 2-Shargel, L and Yu, ABC., 2016, *Applied Biopharmaceutics & pharmacokinetics*, 7th edition, McGraw-Hill Education, New York. 3-Bauer, LA, 2008, *Applied clinical pharmacokinetics*, 2nd edition, McGraw-Hill Companies, Inc, New York.
2- Recommended Readings and Reference Materials	
	1-Rowland M, Tozer T, 1995, Clinical Pharmacokinetics—Concepts and Applications, 3rd ed, Lea & Febiger, Philadelphia. 2-Levine RR, 1990, Drug Actions and Reactions, 4th ed., Little, Brown, Boston. 3- Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia.
3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com/
4- Other Learning Material:	
	J Pharmacokinet Biopharm J Pharm Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, etc. - Well-equipped laboratories with all required equipment and slide.

2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

6- Course development plans

- Conducting regular workshops for the staff for improving their course specification skills.
- Regular revision of course specification and syllabus items.

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6- Course Policies:	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** ▪ Non-reasonable frequent tardiness will be allowed and is considered as absence from the lectures/
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

I. - Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Prof Dr/ Mahmoud Mahyoob Alburyhi	Office Hours					
Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:

1-	Course Title:	Biopharmaceutics				
2-	Course Number & Code:	Ph2711				
3-	Credit hours: 3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	Fourth year/First semester				
5-	Pre –requisite (if any):	Pharmaceutics I-IV				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

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III. Course description:

This course aims to provide the students with a comprehensive theoretical foundation of biopharmaceutics in new drug design**.** Examines the interrelationship of the physical / chemical properties of the drug, the dosage form (drug product) in which the drug is given, and the route of administration on the rate and extent of systemic drug absorption. To develop and select the dosage form that will provide a consistent bioavailability at desirable rate especially for narrow therapeutic index drugs.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the ADME and the mechanisms of gastrointestinal absorption of drugs.
2. Discuss the factors affecting gastrointestinal absorption of drugs.
3. Identify the role of dosage form on drug bioavailability.
4. Identify the factors affecting drug absorption, distribution and elimination.
5. Identify bioavailability and bioequivalance.
6. Utilization the effect of absorption, distribution, metabolism, and excretion (ADME) of drugs in the body for dosage optimization and evaluating drug dosage regimen.
7. Demonstrate the biopharmaceutical considerations in drug product design.
8. Recognize the relationship between product design and the drug absorption, distribution and elimination.
9. Predict the effect of excipients and food on drug absorption, distribution and elimination.
10. Analyze the results of the in-vitro and in-vivo studies.
11. Assess physicochemical characteristics of drug substances as a factor affecting drug absorption.
12. Analyze bioavailability and bioequivalence studies.
13. Examine the biopharmaceutical consideration in dosage form design.
14. Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.
15. Retrieve information from a variety of sources, including libraries, databases and internet.
16. Work effectively in a team and demonstrate time management skills.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Introduction to biopharmaceutics , pharmacokinetic, pharmacodynamic and clinical pharmacokinetics	**a1,a2,a3, b1,b2,b3,b4, d1**	Definitions, Define pharmacokinetics and describe how pharmacokinetics is related to pharmacodynamics and drug toxicity, parameters and Mechanisms	**1**	**2**
2	Drug absorption, Mechanisms of drug absorption	**a1,a2, b1,b2,b3, b4,d1,d2,d3**	Definition, Mechanisms of drug absorption process, factors affecting absorption	**1**	**2**
3	Physiologic factors related to drug absorption	**a3,a4, b2,b3,b4, d1,d2,d3**	Types of factors pH, gastric and GIT factors	**1**	**2**
4	Physiochemical factors related to drug absorption	**a4, b2,b3,b4, d1,d2,d3**	Nature of drug, drug solubility, dissolution and drug stability	**1**	**2**
5	Biopharmaceutical aspects of the active pharmaceutical ingredient and pharmaceutical equivalence	**a4, b2, d1,d2,d3**	Formulation factors, method of manufacture, excipients, drug dosage and dosage regimen	**1**	**2**
6	Drug distribution Physiologic drug distribution and protein binding	**a4, b1,b2,b3,b4, d1,d2,d3**	Definition, parameters, volume of distribution,	**1**	**2**
			Mechanisms , factors and Clinical Application		
7	Mid-term exam	**a1-4, b1-4**		**1**	**2**

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8	Drug metabolism	**a3,a4,a5, b1,b2,b3,b4 d1,d2,d3**	Definition and parameters,	**1**	**2**
9	Pharmacogenetics and drug metabolism	**a5, b3,b4, d1,d2,d3**	Mechanisms, classification and factors	**1**	**2**
10	Drug excretion	**a5, b1,b2,b3,b4, d1,d2,d3**	Definition and parameters,	**1**	**2**
11	Drug elimination, clearance, and renal clearance	**a4, b3,b4, d1,d2,d3**	Mechanisms, classification and factors	**1**	**2**
12	Drug elimination and hepatic clearance	**a4, b3,b4, d1,d2,d3**	Mechanisms, types and factors	**1**	**2**
13	Bioavailability	**a2,a3,,a5, b1,b2,b3, b4,d1,d2,d3**	Definition, classification, Relative bioavailability, Absolute bioavailability parameters and evaluations	**1**	**2**
14	Bioavailability and bioequivalence	**a2,a3, b1,b2,b3,b4, d1,d2,d3**	Model parameters , drug absorption and bioavailability of dosage forms.	**1**	**2**
15	Biopharmaceutic considerations in drug product design and in vitro drug product performance	**a3, b1,b2,b3, d1,d2,d3**	Pharmaceutical alternative, Pharmaceutical equivalent	**1**	**2**
2.	final-term exam	**a1-5, b1-4**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Biopharmaceutic considerations in drug product design	**c1, d1,d2,d3**	**1**	**2**
2	Practice how stomach emptying, GI residence time, and gastric window affect drug absorption	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
3	Determine the drugs for which gastric pH can affect bioavailability	**c1,c2,c3, d1,d2,d3**	**1**	**2**
4	Determine the particle size, crystal form, solubility, dissolution, and ionization affect in vivo dissolution and absorption.	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
5	Dissolution test methods and relation to in vivo performance.	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
6	Determine the simulating drug distribution in the body	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
7	Mid-term exam	**c1-4**	**1**	**2**
8	Determine the formulation factors and manufacturing method affecting PE and TE.	**c2,c3,c4, d1,d2,d3**	**1**	**2**
9	Practice use plasma or urine data to calculate fraction of drug excreted and metabolized.	**c2,c3,c4, d1,d2,d3**	**1**	**2**
10	Practice use plasma or urine data to calculate fraction of drug excreted and metabolized.	**c2,c3,c4, d1,d2,d3**	**1**	**2**
11	Practice application of the physiologically factors include understanding the effect of renal impairment	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
12	Practice drug elimination and hepatic clearance Application of the physiologically factors include understanding the effect of hepatic clearance	**c4, d2 d1,d2,d3**	**1**	**2**
13	Determine the methods of drug excretion from the body	**c4, d1,d2,d3**	**1**	**2**
			1	**2**

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14	Determine the select API from multiple sources while meeting PE (pharmaceutical equivalence) and TE (therapeutic equivalence) requirement as defined in CFR. How pharmaceutical	**c1-4, d1,d2,d3**		
	equivalence affects therapeutic equivalence and Pharmaceutical alternatives.			
15	Bioavailability and bioequivalence test methods, and analysis.	**c2-4, d1,d2,d3**	**1**	**2**
2.	Final-term exam	**c1-4**	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, Written exam, Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

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8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	**a1-5,b1-4, d1-3**
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	**a1-5, b1-4, d1-3**
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	**c1-4**
11.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
12.	**Theoretical mid-semester exam**	7th	30	20%	**a1-4, b1-4**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-4**
14.	**Final Exam (practical)**	**16th**	20	13%	**c1-4**
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

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	www.pubmed.com http://www.sciencedirect.com/
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XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, etc. - Well-equipped laboratories with all required equipment and slide.

2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

7- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

8- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

9- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

10- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
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- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
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11- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
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6- Course development plans

- Conducting regular workshops for the staff for improving their course specification skills.
- Regular revision of course specification and syllabus items.

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XIII. Course Policies:	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** ▪ Non-reasonable frequent tardiness will be allowed and is considered as absence from the lectures/
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Community Pharmacy Practice (I)

I. Course Identification and General Information:						
1	**Course Title:**	**Community Pharmacy Practice (I)**				
2	**Course Number & Code:**	Ph2712				
3	**Credit hours:**	**C.H**				**Total**
		Theoretical	**Practical**	**Training**	**Seminar**	
		2	2		-	3
4	**Study level/ semester at which this course is offered:**	Fourth year, First Semester				
5	**Pre –requisite (if any):**	Pharmaceutical Care (I)				
6	**Co –requisite (if any):**	4th level/ 1st semester				
7	**Program (s) in which the course is offered:**	Bachelor degree of pharmacy				
7	**Department (s) in which the course is offered:**	Pharmaceutics				
8	**Language of teaching the course:**	English				
9	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University				
10	**Prepared by:**	Prof. Dr. Ahmed Mohamed Sabati				
11	**Date of approval:**					

II. Course Description:

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The course includes the activities of the community pharmacist in processing prescription, care of patients or clinical pharmacy, monitoring and utilization, small-scale manufacture of medicines, responding to symptoms of minor ailments (OTC drug), informing health care professionals and the public health promotion. **Overall Aims of Course:**

Diagnose and treatment of some minor illness

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the objectives of community pharmacy
2. Identify the High-Risk Groups
3. Describe prescription and symptoms of some minor ailments.
4. Choose rationally the optimal adjuvant OTC drugs for some minor ailments
5. Differentiate the symptoms of different conditions 6. Relate the High-Risk Groups to OTC products.
7. Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders
8. Diagnose and treat of some minor illnesses
9. Monitor and dispense the drug prescription
10. Manage the drug adverse effect or drug interaction.
11. Practice OTC For treat different conditions
12. Interact effectively with patients, the public and health professionals.
13. Reflect on the use of communication skills in counter prescribing.
14. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**			
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of social, behavioral, health and, pharmaceutical sciences.	**a1-**	Recognize the objectives of community pharmacy
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology,	**a2-**	Identify the High-Risk Groups.
		a3-	Describe prescription and symptoms of some minor ailments.
	and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in and Understanding strategies/methods to be used		Teaching Methods of	assessment Knowledge
completing this course, students will be able to:		Lectures methods , Computer	Oral Exam, Quizzes,
a1-	Recognize the objectives of community pharmacy	based teaching and learning, Participation, group discussion, case study	Attendance, Short answers, reports,
a2-	Identify the High-Risk Groups. and tutorial	homework, and Written exam.	
a3-	Describe prescription and symptoms of some minor ailments.		

			3

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub- PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills
After completing this program, students will be able	**After completing this course, students will be able to: to:**
B5- Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b1-** Choose rationally the optimal adjuvant OTC drugs for some minor ailments **b2-** Differentiate the symptoms of different conditions **b3-** Relate the High-Risk Groups to OTC products. **b4-** Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b1-	Choose rationally the optimal adjuvant OTC drugs for some minor ailments		
b2-	Differentiate the symptoms of different conditions		
b3-	Relate the High-Risk Groups to OTC products.		
b4-	Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

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Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	c1-	Diagnose and treat of some minor illnesses.
		c2-	Monitor and dispense the drug prescription.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	c3-	Manage the drug adverse effect or drug interaction.
		c4-	Practice OTC For treat different conditions

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming, case study and group	Practical works, homework, practical exam and practical reports.
c1-	Diagnose and treat of some minor illnesses.		
c2-	Monitor and dispense the drug prescription.		
c3-	Manage the drug adverse effect or drug interaction.	discussion	
c4-	Practice OTC For treat different conditions		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	Course Intended Learning Outcomes (CILOs) in General / Transferable skills

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After completing this program, students will be able to:		After completing this course, students will be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	Interact effectively with patients, the public and health professionals.
D4	Take responsibility for adaptation to change needs in pharmacy practice.	d2	Reflect on the use of communication skills in counter prescribing.
D5-	Apply information and communication technology and working effectively in a team.	d3	Explore and use internet resources to search for up-todate information in the areas of interest and solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Interact effectively with patients, the public and health professionals.		
d2	Reflect on the use of communication skills in counter prescribing.		
d3	Explore and use internet resources to search for up-todate information in the areas of interest and solve emerging problems.		

V. VI. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Week	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction	a1	Objectives of community pharmacy	1	2
2	High-Risk Groups :	a2 , a3,	OTC products for the elderly	1	2

3	High-Risk Groups :		OTC products for children	1	2
4	High-Risk Groups :	a2,a3,b1,b2	OTC products during pregnancy	1	2
5	High-Risk Groups :	a2a3,b1,b2	OTC products during lactation	1	2
6	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Indigestion	1	2
7	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Indigestion	1	2
8	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Constipation	1	2
9	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Diarrhea	1	2
10	GIT Infections	a2, a3,b1-3, c1-3, d1-3	Treatment of Intestinal Helminthes	1	2
11	GIT Infections	a2, a3,b1-3, c1-3, d1-3	Treatment of Intestinal Protozoal	1	2
12	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Infants colic	1	2
13	Cystitis	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Cystitis	1	2
14	insomnia	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of insomnia	1	2
Number of Weeks /and Units Per Semester				**14**	**28**

Note: 2 practical hours equal one credit hour

b- Practical Aspect:

Week	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	OTC products for the elderly	c1-4	**1**	**2**

2	OTC products for children	**c2**	**1**	**2**
3	OTC products during pregnancy	**c2**	**1**	**2**
4	OTC products during lactation	**c2**	**1**	**2**
5	OTC For treatment of Indigestion	**c2**	**1**	**2**
6	OTC For treatment of Constipation	**c2**	**1**	**2**
7	OTC For treatment of Diarrhea	**c2**	**1**	**2**
8	Treatment of Intestinal Helminthes	**c2**	**1**	**2**
9	Treatment of Intestinal Protozoal	**c2**	**1**	**2**
10	OTC For treatment of Infants colic	**c2**	**1**	**2**
11	OTC For treatment of Cystitis	**c2**	**1**	**2**
12	OTC For treatment of insomnia	**c2**	**1**	**2**
13	Revision		**2**	**4**
Number of Weeks /and Units Per Semester			**14**	**28**

I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-2,b1-2, c1-3
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-3, b3, c1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	8th	30	20%	a1-3,b1-3, c1-3
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-3,b1-3, c1-3
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)

VIII. Learning Resource (MLA style or APA style)s:

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1- Required Textbook(s) (maximum two)	
	1- Handbook of Non-Prescription drugs
2- Recommended Readings and Reference Materials	
	Pharmaceutical Practice, Winfield, 4th edition
3- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
4- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
5- Other Learning Material:	
	-

II. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

III. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- ☐ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- ☐ Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

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3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three
	weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Community Pharmacy Practice (I)

I- Information about Faculty Member Responsible for the Course:

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Name of Faculty Member		Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Community Pharmacy Practice (I)				
2-	Course Number & Code:	Ph2712				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	4th level /1st semester				
5-	Pre –requisite (if any):	Pharmaceutical care (I)				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor degree of pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

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III- Course Description:

The course includes the activities of the community pharmacist in processing prescription, care of patients or clinical pharmacy, monitoring and utilization, small-scale manufacture of medicines, responding to symptoms of minor ailments (OTC drug), informing health care professionals and the public health promotion. **Overall Aims of Course:**

Diagnose and treatment of some minor illness

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the objectives of community pharmacy
2. Identify the High-Risk Groups
3. Describe prescription and symptoms of some minor ailments.
4. Choose rationally the optimal adjuvant OTC drugs for some minor ailments
5. Differentiate the symptoms of different conditions
6. Relate the High-Risk Groups to OTC products.
7. Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders
8. Diagnose and treat of some minor illnesses
9. Monitor and dispense the drug prescription
10. Manage the drug adverse effect or drug interaction.
11. Practice OTC For treat different conditions
12. Interact effectively with patients, the public and health professionals.
13. Reflect on the use of communication skills in counter prescribing.
14. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems

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15	**V- Course Content:**
	1 – Course Topics/Items:
	a – Theoretical Aspect

Week	Topic List / Units	CILOs (symbols)	Sub-topic List	Week due	Contact hours
1	Introduction	a1	Objectives of community pharmacy	1	2
2	High-Risk Groups :	a2 , a3,	OTC products for the elderly	2	2
3	High-Risk Groups :		OTC products for children	3	2
4	High-Risk Groups :	a2a3,b1,b2	OTC products during pregnancy	4	2
5	High-Risk Groups :	a2a3,b1,b2	OTC products during lactation	5	2
6	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Indigestion	6	2
7	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Indigestion	7	2
8	Med Term Exam	a1-3,b1-3, c1-3		8	2

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9	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Constipation	9	2
10	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Diarrhea	10	2
11	GIT Infections	a2, a3,b1-3, c1-3, d1-3	Treatment of Intestinal Helminthes	11	2
12	GIT Infections	a2, a3,b1-3, c1-3, d1-3	Treatment of Intestinal Protozoal	12	2
13	Treatment of GIT	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Infants colic	13	2
14	Cystitis	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of Cystitis	14	2
15	insomnia	a2, a3,b1-3, c1-3, d1-3	OTC For treatment of insomnia	15	2
16	**Final Term Exam**	a1-3,b1-3, c1-3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

Note: 2 practical hours equal one credit hour

b- Practical Aspect:

Week	Training Tasks	CILOs (symbols)	Week due	Contact hours
1	OTC products for the elderly	c1-4	**1**	**2**
2	OTC products for children	**c2**	**2**	**2**
3	OTC products during pregnancy	**c2**	**3**	**2**

4	OTC products during lactation	**c2**	**4**	**2**
5	OTC For treatment of Indigestion	**c2**	**5**	**2**
6	OTC For treatment of Constipation	**c2**	6	**2**
7	OTC For treatment of Diarrhea	**c2**	**7**	**2**
8	Med Term Exam	-	**8**	**2**
9	Treatment of Intestinal Helminthes	**c2**	**9**	**2**
10	Treatment of Intestinal Protozoal	**c2**	**1**0	**2**
11	OTC For treatment of Infants colic	**c2**	**1**1	**2**
12	OTC For treatment of Cystitis	**c2**	**1**2	**2**
13	OTC For treatment of insomnia	**c2**	**1**3	**2**
14	Revision	**-**	**14,15**	**4**
15	Final Exam	-	**16**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

II. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

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IV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-2,b1-2, c1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-3, b3, c1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	8th	30	20%	a1-3,b1-3, c1-3
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-3,b1-3, c1-3
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VI- Students' Support:

Office Hours/week	Other Procedures (if any)

VII- Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

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	1- Handbook of Non-Prescription drugs
7- Recommended Readings and Reference Materials	
	Pharmaceutical Practice, Winfield, 4th edition
8- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
9- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
10- Other Learning Material:	
	-

V. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

VI. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

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8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Sterile Preparations

I. Course Identification and General Information:							
1	Course Title:	Sterile Preparations					
2	Course Number & Code:	Ph2713					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1				1	
4	Study level / semester at which course is offered:	**Level:** - Fourth years/ First Semester					
5	Pre –requisite (if any):	Pharmaceutics I,II,III and IV					
6	Co –requisite (if any):	-					
7	Programs in which course is offered:	Bachelor of pharmacy					
8	Language of teaching the course:	English					
9	Department in which course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy- Sana`a university					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

Upon successful completion of the course, the students should be able to Recognize liquid dosage forms, sterile products, specification of radiopharmaceutical products, design and additives maintaining the stability, bioavailability of drug and quality attributes of the selected products.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

Recognize sterile products such injectable and ocular preparations according the cGMP regulation

1. Explain knowledge of radiopharmaceutical formulations
2. Recognize the role of formulation design and additives in maintaining the stability of the dosage forms and the bioavailability of drug.
3. Discuss the quality attributes of the selected products.
4. Select the best liquid forms, additives and packaging to enhance the stability of pharmaceutical solutions, suspensions and other disperse systems
5. Predict instability problems in selected products and suggest solutions for these problems.
6. Adjust the quality attributes of sterile pharmaceuticals.
7. Analyze stable effective liquid dosage form.
8. Examine the best method for sterilization of different pharmaceutical products.
9. Assess the quality attributes of liquid dosage forms and packaging.
10. Examine the necessary quality control tests of parenteral and other sterile products according to the cGMP regulation.
11. Work independently and in groups
12. Retrieve and evaluate information from different sources.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Recognizeing:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Recognizeing.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Recognizeing		Course Intended Learning Outcomes (CILOs) in: Knowledge and Recognizeing	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to	**a1-**	Recognize sterile products such injectable and ocular preparations according the cGMP regulation.

	GMP and pharmacopeial requirements to support the pharmaceutical industries.	**a2-**	Explain knowledge of radiopharmaceutical formulations
		a3	Recognize the role of formulation design and
			additives in maintaining the stability of the dosage forms and the bioavailability of drug.
		a4	Discuss the quality attributes of the selected products

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Recognizeing to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Recognizeing		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures brainstorming and discussion	▪ Attendance ▪ Written and oral exams ▪ Quiz and Small Projects
a1-	Recognize sterile products such injectable and ocular preparations according the cGMP regulation.		
a2-	Explain knowledge of radiopharmaceutical formulations		
a3	Recognize the role of formulation design and additives in maintaining the stability of the dosage forms and the bioavailability of drug.		
a4	Discuss the quality attributes of the selected products		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills
After completing this program, students will be able to:	**After completing this course, students will be able to:**

B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Select the best liquid forms, additives and packaging to enhance the stability of pharmaceutical solutions, suspensions and other disperse systems.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered	**b2-**	Predict instability problems in selected products and suggest solutions for these problems.
	pharmaceutical problems and plan the strategies for their solution, to develop the health care. .	**b3-**	Adjust the quality attributes of sterile pharmaceuticals.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, discussion and brain storming	Written , report and oral exams
b1-	Select the best liquid forms, additives and packaging to enhance the stability of pharmaceutical solutions, suspensions and other disperse systems.		
b2-	Predict instability problems in selected products and suggest solutions for these problems.		
b3-	Adjust the quality attributes of sterile pharmaceuticals.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

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Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	c1-	Analyze stable effective liquid dosage form..
		c2-	Examine the best method for sterilization of different pharmaceutical products.
		c3-	Assess the quality attributes of liquid dosage forms and packaging.
		c4-	Examine the necessary quality control tests
			of parenteral and other sterile products according to the cGMP regulation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Problem solving sessions, tutorials, discussion and brain storming	Written and oral exams
c1-	Analyze stable effective liquid dosage form..		
c2-	Examine the best method for sterilization of different pharmaceutical products.		
c3-	Assess the quality attributes of liquid dosage forms and packaging.		
c4-	Examine the necessary quality control tests of parenteral and other sterile products according to the cGMP regulation.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D1-	Practice independent learning needed for continuous professional Development	d1-	Work independently and in groups
D5-	Apply information and communication technology and working effectively in a team	d2	Retrieve and evaluate information from different sources

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures and discussion	Reports, project, Written and oral exams
d1-	Work independently and in groups		
d2	Retrieve and evaluate information from different sources		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to sterile preparations	a1, b1,c1,d1-2	Introduction, Objective, Definitions, Sources of Product Contamination, Aseptic Technique	1	1
2	Parenterals.…	a1, c1, c2,d1-2	Advantages, disadvantages, necessities, Routes of Parenteral Administration in general.	1	1

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3	Parenterals -(IM)….	a2, b2, c2,d1-2	Intramuscular (IM), Factors influencing absorption: In general, Factors influencing absorption from IM route.	**1**	**1**
4	Parenterals-(IV)	a1, a3, b1, c3,d1-2	II- Intravenous (IV), infusion of large volume fluid, Examples of LVP solutions, Common examples.	**1**	**1**
5	Parenterals- Admixture	b1, c3, c4,d1-2	IV admixture, IV Admixture Labels Intra-arterial (IA), Intrathecal, Intra-articular, Intrapleural,	**1**	**1**
6	Parenterals- other sterile preparation	a1, b3, c2, c1,d1-2	Intra-cardial, Intradermal, Sub-cutanous routes, Other sterile preparations, Total Parenteral Nutrition, Cardiologic solutions, Peritoneal dialysis solution, Peritoneal dialysis solutions,	**1**	**1**
7	**Mid-term exam**	a1-3,b1-3,c1-4		**1**	**1**

8	Parenterals-formulation	a1-4,b1-3,c1-4,d1-2	Types of Parenteral Preparation, Solution, Factors should be consider in Formulation of parenterals, Injections, Infusion Fluids, Sterile solids, Parenteral Suspensions, Parenteral Emulsion, Official Types of Injections, Physiological Norms (pH, Tonicity, Pyrogenicity, Sources of pyrogens in sterile preparations, distilled water, injections requiring water free from carbon dioxide, Watermiscible vehicles, Water Immiscible Vehicls,	**1**	**1**
9	Parenterals- additive	a1-4,b1-3,c1-2,d1-2	Additive: To maintain solubility, Stability, sterility, isotonicity,7 to facilitate administration. General Procedure for Preparation of parenteral, Packaging component for parenteral Preparation, glass container, Plastic, Rubber,	**1**	**1**
10	Parenterals-equipment	c4,d1-2	Physical Norms of the parenteral solution, Sterile Preparation Facilities and Equipment, Laminar Flow Hoods, Syringes, Types, Needles, Ampoules, IV bags.	**1**	**1**
11	Parenterals- sterilization	a4,b3,c3,c4,d1-2	Definition Terms Related to Sterilization, Methods of Sterilization, Aseptic Technique, Equipment and	**1**	**1**

			Environment, Hand Washing, Clean Room,		
12	Parenterals-requirements	a1, b3, c4,d1-2	Compounding of Solutions, Labeling, Storage conditions, Industrial Parenteral production, Specific requirements, plant layout planning,	**1**	**1**
13	Ophthalmic Preparations, ocuserts and Contact lenses.	b1, c3,d1-2	Introduction, types, preparation.	**1**	**1**
14	Radio-pharmacy	a2, c2,d1-2	Preparation, compounding, dispensing, packaging.	**1**	**1**
15	Quality Control, of sterile preparations	a4,b3,c3,c4,d1-2	Preparation, compounding, packaging.	**1**	**1**
16	**Final Exam**	a1-4,b1-3,c1-4		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3,d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4,d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation,** Attendance, report, project **and quizzes**	**All weeks**	**5**	10%	a1-4,b1-3,c1-4**,d1-2**
2	**Assignments and** Oral Exam,	4-12	**5**	10%	a1-4,b1-3,c1-4**,d1-2**
3	**Mid-semester exam**	**5**	**10**	20%	a1-3,b1-3,c1-4
5	**Final Exam**	**16**	**30**	70%	a1-4,b1-3,c1-4
	Total		**50**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

&

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Notes on Sterile preparations prepared by the department staff.
2. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
3. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.

3- Electronic Materials and Web Sites *etc*.

http://www.pharmaceutical technology.com
http://www.sciencedirect.com
http://www.pubmed.com http://www.google.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

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XII. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	□ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. □ Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

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The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Sterile Preparations

I. - Information about Faculty Member Responsible for the Course:

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Name of Faculty Member	Prof. Dr. Maged Alwan	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	Course Title:	Sterile Preparations				
2-	Course Number & Code:	Ph2713				
3-	Credit hours: 1hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	-		1
4-	Study level/year at which this course is offered:	4^{th} year/1^{st} semester				
5-	Pre –requisite (if any):	Pharmaceutics I,II,III and IV				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

III. Course description:

Upon successful completion of the course, the students should be able to Recognize liquid dosage forms, sterile products, specification of radiopharmaceutical products, design and additives maintaining the stability, bioavailability of drug and quality attributes of the selected products.

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IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize sterile products such injectable and ocular preparations according the cGMP regulation
2. Explain knowledge of radiopharmaceutical formulations
3. Recognize the role of formulation design and additives in maintaining the stability of the dosage forms and the bioavailability of drug.
4. Discuss the quality attributes of the selected products.
5. Select the best liquid forms, additives and packaging to enhance the stability of pharmaceutical solutions, suspensions and other disperse systems
6. Predict instability problems in selected products and suggest solutions for these problems.
7. Adjust the quality attributes of sterile pharmaceuticals.
8. Analyze stable effective liquid dosage form.
9. Examine the best method for sterilization of different pharmaceutical products.
10. Assess the quality attributes of liquid dosage forms and packaging.
11. Examine the necessary quality control tests of parenteral and other sterile products according to the cGMP regulation.
12. Work independently and in groups
13. Retrieve and evaluate information from different sources.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to sterile preparations	a1, b1,c1,d1-2	Introduction, Objective, Definitions, Sources of Product Contamination, Aseptic Technique	**1**	**1**

2	Parenterals.…	a1, c1, c2,d1-2	Advantages, disadvantages, necessities, Routes of Parenteral Administration in general.	**1**	**1**
3	Parenterals -(IM)….	a2, b2, c2,d1-2	Intramuscular (IM), Factors	**1**	**1**
			influencing absorption: In general, Factors influencing absorption from IM route.		
4	Parenterals-(IV)	a1, a3, b1, c3,d1-2	II- Intravenous (IV), infusion of large volume fluid, Examples of LVP solutions, Common examples.	**1**	**1**
5	Parenterals- Admixture	b1, c3, c4,d1-2	IV admixture, IV Admixture Labels Intra-arterial (IA), Intrathecal, Intra-articular, Intrapleural,	**1**	**1**
6	Parenterals- other sterile preparation	a1, b3, c2, c1,d1-2	Intra-cardial, Intradermal, Sub-cutanous routes, Other sterile preparations, Total Parenteral Nutrition, Cardiologic solutions, Peritoneal dialysis solution, Peritoneal dialysis solutions,	**1**	**1**
7	**Mid-term exam**	a1-3,b1-3,c1-4		**1**	**1**

8	Parenterals-formulation	a1-4,b1-3,c1-4,d1-2	Types of Parenteral Preparation, Solution, Factors should be consider in Formulation of parenterals, Injections, Infusion Fluids, Sterile solids, Parenteral Suspensions, Parenteral Emulsion, Official Types of Injections, Physiological Norms (pH, Tonicity, Pyrogenicity, Sources of pyrogens in sterile preparations, distilled water, injections requiring water free from carbon dioxide, Watermiscible vehicles, Water Immiscible Vehicls,	**1**	**1**
9	Parenterals- additive	a1-4,b1-3,c1-2,d1-2	Additive: To maintain solubility, Stability, sterility, isotonicity,7 to facilitate administration. General Procedure for Preparation of parenteral, Packaging component for parenteral Preparation, glass container, Plastic, Rubber,	**1**	**1**
10	Parenterals-equipment	c4,d1-2	Physical Norms of the parenteral solution, Sterile Preparation Facilities and Equipment, Laminar Flow Hoods, Syringes, Types, Needles, Ampoules, IV bags.	**1**	**1**

11	Parenterals- sterilization	a4,b3,c3,c4,d1-2	Definition Terms Related to Sterilization, Methods of Sterilization, Aseptic Technique, Equipment and Environment, Hand Washing, Clean Room,	**1**	**1**
12	Parenterals-requirements	a1, b3, c4,d1-2	Compounding of Solutions, Labeling, Storage conditions, Industrial Parenteral production, Specific requirements, plant layout planning,	**1**	**1**
13	Ophthalmic Preparations, ocuserts and Contact lenses.	b1, c3,d1-2	Introduction, types, preparation.	**1**	**1**
14	Radio-pharmacy	a2, c2,d1-2	Preparation, compounding, dispensing, packaging.	**1**	**1**
15	Quality Control, of sterile preparations	a4,b3,c3,c4,d1-2	Preparation, compounding, packaging.	**1**	**1**
16	**Final Exam**	a1-4,b1-3,c1-4		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3,d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4,d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation,** Attendance, report, project **and quizzes**	**All weeks**	**5**	10%	a1-4,b1-3,c1-4,**d1-2**
2	**Assignments and** Oral Exam,	4-12	**5**	10%	a1-4,b1-3,c1-4,**d1-2**
3	**Mid-semester exam**	**5**	**10**	20%	a1-3,b1-3,c1-4
5	**Final Exam**	**16**	**30**	70%	a1-4,b1-3,c1-4
	Total		**50**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

4. Notes on Sterile preparations prepared by the department staff.

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	5. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London. 6. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.
6- Recommended Readings and Reference Materials	
	3. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London. 4. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.
7- Electronic Materials and Web Sites *etc*.	
	http://www.pharmaceutical technology.com http://www.sciencedirect.com http://www.pubmed.com http://www.google.com
8- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

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7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

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	The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Medicinal Chemistry II

I. Course Identification and General Information:

1	**Course Title**	Medicinal Chemistry II				
2	**Course Number & Code:**	Ph579				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	4th level /1st semester				
5	**Pre –requisite (if any):**	Pharmaceutical analytical chemistry I&II and pharmaceutical organic chemistry I, II& III and Medicinal Chemistry I				
6	**Co –requisite (if any):**	Pharmacology III				
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of pharmacy- Sana`a University				
11	**Prepared by:**	Associate Prof. Tawfeek Ahmed Alobaidy				
12	**Date of approval:**					

II. Course description:

The course is concerned with the providing of fundamental knowledge about the synthesis, metabolism, physicochemical properties and their effect on pharmacokinetic and pharmacodynamic profile of drug. The practical part includes the qualitative and quantitative determination and synthesis of some drugs in this course.

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II. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the structural mechanism of action of studied classes of drugs
2. Recognize the synthesis of some studied classes of drugs
3. Illustrate the structure activity relationship (SAR) of each category in the course.
4. Discuss the metabolism and toxicity of studied classes of drugs**.**
5. Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.
6. Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.
7. Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.
8. Analyze the result of experimental tests that is practiced for some studied drugs
9. Design and evaluate qualitative and quantitative analysis of some drugs
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Carry out synthesis some drugs.
12. Determine the quantitative analysis of some drugs.
13. Practice the qualitative analysis of some drugs.
14. Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.
15. Implement writing and presentation skills and demonstrate creativity and time management.
16. Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.

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IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the mechanism of action of studied classes of drugs
		a2-	Recognize the synthesis of some studied classes of drugs
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a3-**	Illustrate the structure activity relationship (SAR) of each category in the course.
		a4-	Discuss the metabolism and toxicity of studied classes of drugs**.**
		a5-	

A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.		Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Explain the mechanism of action of studied classes of drugs	Lecture method , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Recognize the synthesis of some studied classes of drugs		
a3-	Illustrate the structure activity relationship (SAR) of each category in the course.		
a4-	Discuss the metabolism and toxicity of studied classes of drugs**.**		
a5-	Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

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Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b2-**	Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.
		b3-	Analyze the result of experimental tests that is practiced for some studied drugs
		b4-	Design and evaluate qualitative and quantitative analysis of some drugs

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions and brainstorming.	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.		

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b3-	Analyze the result of experimental tests that is practiced for some studied drugs		
b4-	Design and evaluate qualitative and quantitative analysis of some drugs		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical	**c1-**	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
	products according to GLP, GSP and cGMP guidelines.		
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c2-**	Carry out synthesis some drugs.
		c3-	Determine the quantitative analysis of some drugs
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c4-**	Practice the qualitative analysis of some drugs

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
c1-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.	Lecture method, Practical sessions, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Carry out synthesis some drugs.		
c3-	Determine the quantitative analysis of some drugs		
c4-	Practice the qualitative analysis of some drugs		

(D) General / Transferable Skills:	
Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills	
Program Intended Learning Outcomes (PILOs) in	**Course Intended Learning Outcomes**

General / Transferable skills		(CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3 -	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.

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D5 -	Apply information and communication technology and working effectively in a team.	**d2-**	Implement writing and presentation skills and demonstrate creativity and time management.
		d3-	Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		Teaching strategies/methods to be used.	Methods of assessment
d1 -	Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.	Small group discussions, Tutorials, brainstorming and Practical sessions.	Homework, and reports.
d2 -	Implement writing and presentation skills and demonstrate creativity and time management.		
d3 -	Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

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1.	**Cardiovascular drugs**	a1, a3,a4, a5, b1,b2, d1, d3	**Antihypertensive agents:** centrally and peripherally acting drugs, ACEIs, B-blockers, CCB	1	2
2.		a2, a4, b1,b2, d1,d2	Antiarrhythmic drugs: calss I, calss II, calss III & calss IV.	1	2
3.		a1,a2, a4, b1,b2, d1,d2,d3	Anti-anginal drugs & Antihyperlipidemic agents.	1	2
4.		a1,a2,a3,a4, a5, b1,b2, d1,d2	Anti-coagulant, Haemostatics & Cardiotonics.	1	2
5.	**Diuretics**	a2,a3,a4, b1,b2, d1,d2,d3	Osmotics, CAI, Thiazides, Loop and K-Sparing Diuretics.	1	2
6.	**CNS Depressant** I	a1,a2,a3,a4, b1 d1, d2	Sedatives and hypnotics	1	2
7.	**Mid Exam**	a1-5, b1-2		1	2
8.	**CNS Depressant** II	a1,a2, b1,b2,d3	Skeletal Muscle Relaxants & anticonvulsants	1	2
9.	**CNS Depressant** III	a1, a2,a3,a4, a5, b1,b2, d1,d3	Anti-psychotic drugs [Neuroleptics] [Major tranquilizer]	1	2
10.	**CNS Stimulant**	a1 a3 ,a4, a5, b1,b2, d1,d2	- Antidepressants agents & antiparkinsonism - Analeptics - Methylxanthines - Psychomotor stimulants	2	4
11.	**Anti-inflammatory agents**	a1,a2,a3, a4 a5, b2 ,d1,d3	Salicylates, anthranilates arylacetic acic, arylpropionic acid pyrazolididiones, oxicames , cox-II inhibitor, analgesics antipyretics and anti-gout	2	4

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12.	**Opiods and Local Anasthetics**	a1,a3, a4, a5, b1,b2, d1,d2, d3	**Opiods** Classification, opoid receptor SAR,	1	2
			Local Anasthetics, -Mechanism of action -Ester local anesthetic: synthesis, SAR - Amide local anesthetic: synthesis, SAR		
13.	**Final Exam**	a1-5, b1, b2		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1)	Quantitative estimation of Warfarin sodium tab	**b3, b4, c1, c3, d1, d2, d3**	1	2
2)	Assay of Phenobarbitone by non aqueous titrimetry	**b3,b4, c1,c2,c4,d1,d2,d3,d4**	1	2
3)	Qualitative and Quantitative analysis of chloral hydrate	**b3,b4, c1,c2, c3,c4,d1,d2,d3**	1	2
4)	**Assay of aminophyllin tab**	**b3, b4, c1, c3, d1, d2, d3**	1	2
5)	Synthesis of Barbituric Acid from Diethyl Malonate	**c1,c2, d1,d2, d3**		
6)	Mid-Exam	**c1,c2, c3**	1	2
7)	Identification of aspirin	**b3, b4, c1,c4, d1,d2, d3**	1	2

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8)	Assay of aspirin	**b3, b4, c1, c3, d1, d2, d3**	1	2
9)	**Synthesis of aspirin**	**c1,c2, d1,d2, d3**	1	2
10)	**Assay of ibuprofen tab**	**b3,c1,c2,c3 ,d3,d4**	1	2
11)	**Synthesis of acetaminophen**	**c1,c2, d1,d2, d3**	1	2
12)	**Assay of indomethacin tab**	**b3, b4, c1, c3, d1, d2, d3**	1	2
13)	**Specific absorpation of acetaminophen**	**b3, b4, c1,c4, d1,d2, d3**	1	2
14)	**Synthesis of phenylbutazone**	**c1,c2, d1,d2, d3**	1	2
15)	Determination of Procaine or Benzocaine by diazotization	**b3, b4, c1, c3, d1, d2, d3**	1	2
16)	Final Exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

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II. Assignments:				
No.	**Assignments**	**Aligned CILOs (symbols)**	**Week Due**	**Mark**
1	Homework Assignments	**a1, a3, a5, b2, b2-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

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III. Schedule of Assessment Tasks for Students During the Semester:					
No.	**Assessment Method**	**Week Due**	**Mark**	**Proportion of Final Assessment**	**Aligned Course Learning Outcomes (CILOs symbols)**
1.	**Attendance, Participation and reports**	**All Weeks**	10	7%	a1-5,b1-3, d1-3
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1,a3, a5, b2-4, d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	c1-3
5.	**Theoretical mid-semester exam**	7th	30	20%	
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-2
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4

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	Total	**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold. Lippincott Williams and Wilkins, a Wolters Kluwer Company, Philadelphia.

2- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

1- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approac edition, Oxford University Press, Inc., New York.

2- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia. 3- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

4- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

5- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

6- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1- http://www.chemaxon/marvin

2 - http://www.webmolecules.com

3-http://www.acdlabs.com

4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

XI. Facilities Required:

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1- Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2- Computing resources:	Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative

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	assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Medicinal Chemistry II

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Tawfeek A. Al-Obaidy	Office Hours					
Location & Telephone No.	770507931	SAT	SUN	MON	TUE	WED	THU
E-mail	Tawfik_93@yahoo.com		4h				

II- Course Identification and General Information:

1-	Course Title:	Medicinal Chemistry II				
2-	Course Number & Code:	Ph579				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	4th level /1st semester				
5-	Pre –requisite (if any):	General Pharmaceutical chemistry, Pharmaceutical analytical chemistry I&II, pharmaceutical organic chemistry I, II& III and Medicinal Chemistry I				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of pharmacy				
8-	Language of teaching the course:	English				

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9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

The course is concerned with the providing of fundamental knowledge about the synthesis, metabolism, physicochemical properties and their effect on pharmacokinetic and pharmacodynamic profile of drug. The practical part includes the qualitative and quantitative determination and synthesis of some drugs in this course.

IV- Intended learning outcomes (ILOs) of the course:

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At the end of this course the students should be able to:

1- Recognize the structural mechanism of action of studied classes of drugs
2- Recognize the synthesis of some studied classes of drugs
3- Illustrate the structure activity relationship (SAR) of each category in the course.
4- Discuss the metabolism and toxicity of studied classes of drugs**.**
5- Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.
6- Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.
7- Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.
8- Analyze the result of experimental tests that is practiced for some studied drugs
9- Design and evaluate qualitative and quantitative analysis of some drugs
10- Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11- Carry out synthesis some drugs.
12- Determine the quantitative analysis of some drugs.
13- Practice the qualitative analysis of some drugs.
14- Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.
15- Implement writing and presentation skills and demonstrate creativity and time management.
16- Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

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Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1)	**Cardiovascular drugs**	a1, a3,a4, a5, b1,b2, d1, d3	**Antihypertensive agents:** centrally and peripherally acting drugs, ACEIs, B-blockers, CCB	1	2
2)		a2, a4, b1,b2, d1,d2	Antiarrhythmic drugs: calss I, calss II, calss III & calss IV.	2	2
3)		a1,a2, a4, b1,b2, d1,d2,d3	Anti-anginal drugs & Antihyperlipidemic agents.	3	2
4)		a1,a2,a3,a4, a5, b1,b2, d1,d2	Anti-coagulant, Haemostatics & Cardiotonics.	4	2
5)	**Diuretics**	a2,a3,a4, b1,b2, d1,d2,d3	Osmotics, CAI, Thiazides, Loop and K-Sparing Diuretics.	5	2
6)	**CNS Depressant** I	a1,a2,a3,a4, b1 d1, d2	Sedatives and hypnotics	6	2
7)	**Mid Exam**	a1-5, b1-2		7	2
8)	**CNS Depressant** II	a1,a2, b1,b2,d3	Skeletal Muscle Relaxants & anticonvulsants	8	2
9)	**CNS Depressant** III	a1, a2,a3,a4, a5, b1,b2, d1,d3	Anti-psychotic drugs [Neuroleptics] [Major tranquilizer]	9	2
10)	**CNS Stimulant**	a1 a3 ,a4, a5, b1,b2, d1,d2	- Antidepressants agents & antiparkinsonism - Analeptics - Methylxanthines - Psychomotor stimulants	10,11	4

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11)	**Anti-inflammatory agents**	a1,a2,a3, a4 a5, b2 ,d1,d3	Salicylates, anthranilates arylacetic acic, arylpropionic acid pyrazolididiones, oxicames , cox-II inhibitor, analgesics antipyretics and anti-gout	12,13	4
12)	**Opiods and Local Anasthetics**	a1,a3, a4, a5, b1,b2, d1,d2, d3	**Opiods** Classification, opoid receptor SAR, **Local Anasthetics,** -Mechanism of action -Ester local anesthetic: synthesis, SAR - Amide local anesthetic: synthesis, SAR	14,15	4
13)	**Final Exam**	a1-5, b1, b2		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1-	Quantitative estimation of Warfarin sodium tab	**b3, b4, c1, c3, d1, d2, d3**	1	2
2-	Assay of Phenobarbitone by non aqueous titrimetry	**b3,b4, c1,c2,c4,d1,d2,d3,d4**	2	2
3-	Qualitative and Quantitative analysis of chloral hydrate	**b3,b4, c1,c2, c3,c4,d1,d2,d3**	3	2
4-	**Assay of aminophyllin tab**	**b3, b4, c1, c3, d1, d2, d3**	4	2
5-	Synthesis of Barbituric Acid from Diethyl Malonate	**c1,c2, d1,d2, d3**	5	

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6-	Mid-Exam	**c1,c2, c3**	6	2
7-	Identification of aspirin	**b3, b4, c1,c4, d1,d2, d3**	7	2
8-	Assay of aspirin	**b3, b4, c1, c3, d1, d2, d3**	8	2
9-	**Synthesis of aspirin**	**c1,c2, d1,d2, d3**	9	2
10-	**Assay of ibuprofen tab**	**b3,c1,c2,c3 ,d3,d4**	10	2
11-	**Synthesis of acetaminophen**	**c1,c2, d1,d2, d3**	11	2
12-	**Assay of indomethacin tab**	**b3, b4, c1, c3, d1, d2, d3**	12	2
13-	**Specific absorpation of acetaminophen**	**b3, b4, c1,c4, d1,d2, d3**	13	2
14-	**Synthesis of phenylbutazone**	**c1,c2, d1,d2, d3**	14	2
15-	Determination of Procaine or Benzocaine by diazotization	**b3, b4, c1, c3, d1, d2, d3**	15	2
16-	Final Exam	**c1-4**	16	2
Number of Weeks /and Units Per Semeste			**16**	**32**

VI- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

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Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII- Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1, a3, a5, b2, b2-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, reports and Participation**	**All Weeks**	10	7%	a1-5, b2-4, d1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1, a3, a5, b2-4, d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	c1-3
12.	**Theoretical mid-semester exam**	6th	30	20%	a1-5, b1-2
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-2
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4

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	Total	**150**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X- Learning Resources:

1- Required Textbook(s) (maximum two).

3- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

4- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

7- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approach edition, Oxford University Press, Inc., New York.

8- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia. 9- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

10- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

11- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

12- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

2- http://www.chemaxon/marvin

2 - http://www.webmolecules.com

3-http://www.acdlabs.com

4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

XI- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII- **Course Improvement Processes:**

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6- Strategies for obtaining student feedback on effectiveness of teaching
▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.
▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.
▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement
▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement

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ا.م.د.توفيق العبيدي	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Pharmaceutical Instrumental Analysis II

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Instrumental Analysis II				
2	**Course Number & Code:**	Ph5710				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	4th level / 1st semester				
5	**Pre –requisite (if any):**	Pharmaceutical Analytical Chemistry I & II and Pharmaceutical Instrumental Analysis I				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy				
11	**Prepared by:**	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamidaddin				
12	**Date of approval:**					

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Mention the basic principle of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.
2. Explain the advantages and disadvantages of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.
3. Recognize the pharmaceutical applications of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis
4. Select the appropriate methods of analysis for different pharmaceutical substances and pharmaceutical preparations.
5. Develop new methods for analysis of pharmaceutical substances and pharmaceutical preparations.
6. Interpret and analyze the results of methods of analysis.
7. Operate different pharmaceutical instruments and equipments in the lab.
8. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
9. Practice immunoassay, electrophoresis, electrochemical and chromatographic methods for analysis of pharmaceutical substances and pharmaceutical preparations.
10. Communicate and cooperate effectively with the others as a team work to perform the report on the results of method of analysis.
11. Apply the information technology skills, such as word processing and internet communication and online searches.
12. Manage the time in work effectively.

II. Course description:

The course is concerned with the fundamental knowledge about the basic principles of some instrumental methods of analysis including, electrochemical, chromatographic, immunoassay and electrophoresis. The course will also cover the applications of these methods for some pharmaceutical substances.

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IV. Intended learning outcomes (ILOs) of the course:	
(A) Knowledge and Understanding:	
Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.	
Program Intended Learning Outcomes (Sub- PILOs) in: **Knowledge and Understanding**	**Course Intended Learning Outcomes (CILOs) in:** **Knowledge and Understanding**

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After completing this program, students would be able to:		After participating in the course, students would be abl to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Mention the basic principle of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development	**a2-**	Explain the advantages and disadvantages of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.
		a3-	Recognize the pharmaceutical applications of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Mention the basic principle of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
a2-	Explain the advantages and disadvantages of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.		
a3-	Recognize the pharmaceutical applications of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Select the appropriate methods of analysis for different pharmaceutical substances and pharmaceutical preparations.
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Develop new methods for analysis of pharmaceutical substances and pharmaceutical preparations.
		b3-	Interpret and analyze the results of methods of analysis

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Select the appropriate methods of analysis for different pharmaceutical substances and pharmaceutical preparations.	Lectures method, group discussion and tutorial	Oral Exam, homework, report, Quizzes, Short answers and Written exam
b2-	Develop new methods for analysis of pharmaceutical substances and pharmaceutical preparations.		

b3-	Interpret and analyze the results of methods of analysis		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills			
Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Operate different pharmaceutical instruments and equipments in the lab.
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c2-**	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
		c3-	Practice immunoassay, electrophoresis, electrochemical and chromatographic methods for analysis of pharmaceutical substances and pharmaceutical preparations.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.		
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		
Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Operate different pharmaceutical instruments and equipments in the lab.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, and Written exam
c2-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.		
c3-	Practice immunoassay, electrophoresis, electrochemical and chromatographic methods for analysis of pharmaceutical substances and pharmaceutical preparations.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.
D5-	Apply information and communication technology and working effectively in a team.	d2-	Manage the time in work effectively.
		d3-	Apply the information technology skills, such as word processing and internet communication and online searches.

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Communicate and cooperate effectively with the others as a team work to perform the report on the results of an analytical method.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short
d2-	Manage the time in work effectively.		answers and Written exam
d3-	Apply the information technology skills, such as word processing and internet communication and online sear		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1.	**Electrochemical methods**	a1-3, b1-3, d1-3	**Electrochemical methods** **1.Potentiometry** Definition, principles, instrumentation, pharmaceutical applications **2.Polarography:** Definition, principles, instrumentation, pharmaceutical applications **2.Conductometry:** Definition, principles, instrumentation, pharmaceutical applications **3.Voltammetry:** Definition, principles, instrumentation, pharmaceutical applications	3	6
2.	**Introduction to Chromatography**	a1-3, b1-3, d1-3	- Introduction, Definitions ,classifications principles -Theory of column effeciency	1	2
3.	**Thin layer chromatography**	a1-3, b1-3, d1-3	Definition, principles, stationary phase, mobile phases, sample application, elution, detection, quantitative measurement and pharmaceutical applications	1	2
4.	**Column, Ion exchange and Size Exclusion Chromatography**	a1-3, b1-3, d1-3	Definition, principles, instrumentation, pharmaceutical applications	1	2
5.	**Mid Exam**	a1-3, b1-3		1	2
6.	**High performance liquid Chromatography (HPLC)**	a1-3, b1-3, d1-3	Definition, principles, classification, instrumentation, stationary phase, mobile phases, detectors, pharmaceutical applications	2	4
7.	**Gas Chromatography**	a1-3, b1-3, d1-3	Definition, principles, stationary phase, mobile phases, derivatization of sample, temperature selection, pharmaceutical applications	2	4

8.	**Immunoassay method for analysis**	a1-3, b1-3, d1-3	Definition, principles, instrumentation, pharmaceutical applications	2	4
9.	**Electrophoresis**	a1-3, b1-3, d1-3	Definition, principles, types, instrumentation, pharmaceutical applications	1	2
10.	**Final Exam**	a1-3, b1-3		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1)	Potentiometric determination of chlorides in natural water	c1,c2, c3**, d1-3**	1	2
2)	**Conductometric determination of water sample**	c1,c2, c3**, d1-3**	1	2
3)	**Voltammetric determination of ciprofloxacin**	c1,c2, c3**, d1-3**	1	2
4)	**Determination the** R_f of some pharmaceutical substances.	c1,c2, c3**, d1-3**	2	4
5)	Paper chromatographic determination of ephedrine HCl	c1,c2, c3**, d1-3**	1	2
6)	TL chromatographic determination of ephedrine HCl	c1,c2, c3**, d1-3**	1	2
7)	Mid-Exam	c1,c2, c3	1	2
8)	**Separation of mixture of** pharmaceutical substances **using chromatographic technique**	c1,c2, c3**, d1-3**	2	4
9)	Immunoassay method for analysis **of amikacin in biological fluids**	c1,c2, c3**, d1-3**	1	2
10)	Immunoassay method for analysis **of gentamycin in biological fluids**	c1,c2, c3**, d1-3**	1	2

11)	Immunoassay method for analysis **of cyclosporins in biological fluids**	c1,c2, c3**, d1-3**	1	2
12)	Practice electrophoresis method for some pharmaceutical substances	c1,c2, c3**, d1-3**	1	2
13)	**Review**	c1,c2, c3**, d1-3**	1	2
14)	Final Exam	**c1-3**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures method, Discussions, Small group discussions, Tutorials and Practice session.

VII. Assignments:

- Homework
- Reports

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1, b1,b2, d1-3

2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2, a3, b1, b3, d1-3
3	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	20%	c1-3
5	**Theoretical mid-semester exam**	7th	30	20%	a1-3, b1, b2, b3
6	**Final Exam (theoretical)**	**16th**	50	33%	a1-3, b1, b2, b3
7	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004. Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

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د. يحيى الدخين ا.د. محمود البريهي ا.م.د.توفيق العبيدي د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس د. محمد عباس

2- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.

1- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York,

2- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York.

3- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada.

4- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg.

5- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1. Talanta.
2. Plos1
3. The Analyst;
4. J. Pharm. & Biomed. Anal.
5. J. Assoc. off Anal. Chem.
6. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)
7. The Analytical Forum on ChemWeb (http://analytical.
8. chemweb.com/search/search.exe)

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I. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

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4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Instrumental Analysis II

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:		
1-	Course Title:	Pharmaceutical Instrumental Analysis II

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2-	**Course Number & Code:**	Ph5710				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	4th level /1st semester				
5-	**Pre –requisite (if any):**	Pharmaceutical analytical chemistry I&II and Pharmaceutical Instrumental Analysis I				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course is concerned with the fundamental knowledge about the basic principles of some instrumental methods of analysis including, electrochemical, chromatographic, immunoassay and electrophoresis. The course will also cover the applications of these methods for some pharmaceutical substances.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

13. Mention the basic principle of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.
14. Explain the advantages and disadvantages of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis.
15. Recognize the pharmaceutical applications of immunoassay, electrophoresis, electrochemical and chromatographic methods of analysis
16. Select the appropriate methods of analysis for different pharmaceutical substances and pharmaceutical preparations.
17. Develop new methods for analysis of pharmaceutical substances and pharmaceutical preparations.
18. Interpret and analyze the results of methods of analysis.
19. Operate different pharmaceutical instruments and equipments in the lab.
20. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
21. Practice immunoassay, electrophoresis, electrochemical and chromatographic methods for analysis of pharmaceutical substances and pharmaceutical preparations.
22. Communicate and cooperate effectively with the others as a team work to perform the report on the results of method of analysis.
23. Apply the information technology skills, such as word processing and internet communication and online searches.
24. Manage the time in work effectively.

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V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
11.	**Electrochemical methods**	a1-3, b1-3, d1-3	**Electrochemical methods** **1.Potentiometry** Definition, principles, instrumentation, pharmaceutical applications **2.Polarography:** Definition, principles, instrumentation, pharmaceutical applications **2.Conductometry:** Definition, principles, instrumentation, pharmaceutical applications **3.Voltammetry:** Definition, principles, instrumentation, pharmaceutical applications	1-3	6
12.	**Introduction to Chromatography**	a1-3, b1-3, d1-3	- Introduction, Definitions ,classifications principles -Theory of column effeciency	4	2
13.	**Thin layer chromatography**	a1-3, b1-3, d1-3	Definition, principles, stationary phase, mobile phases, sample application, elution, detection, quantitative measurement and pharmaceutical applications	5	2

14.	**Column, Ion exchange and Size Exclusion Chromatography**	a1-3, b1-3, d1-3	Definition, principles, instrumentation, pharmaceutical applications	6	2
15.	**Mid Exam**	a1-3, b1-3		7	2
16.	**High performance liquid Chromatography (HPLC)**	a1-3, b1-3, d1-3	Definition, principles, classification, instrumentation, stationary phase, mobile phases, detectors, pharmaceutical applications	8,9	4
17.	**Gas Chromatography**	a1-3, b1-3, d1-3	Definition, principles, stationary phase, mobile phases, derivatization of sample, temperature selection, pharmaceutical applications	10,11	4
18.	**Immunoassay method for analysis**	a1-3, b1-3, d1-3	Definition, principles, instrumentation, pharmaceutical applications	12,13	4
19.	**Electrophoresis**	a1-3, b1-3, d1-3	Definition, principles, types, instrumentation, pharmaceutical applications	14,15	4
20.	**Final Exam**	a1-3, b1-3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
15)	Potentiometric determination of chlorides in natural water	c1,c2, c3**, d1-3**	1	2
16)	**Conductometric determination of water sample**	c1,c2, c3**, d1-3**	2	2
17)	**Voltammetric determination of ciprofloxacin**	c1,c2, c3**, d1-3**	3	2

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18)	**Determination the** R_f of some pharmaceutical substances.	c1,c2, c3**, d1-3**	4,5	4
19)	Paper chromatographic determination of ephedrine HCl	c1,c2, c3**, d1-3**	6	2
20)	TL chromatographic determination of ephedrine HCl	c1,c2, c3**, d1-3**	7	2
21)	Mid-Exam	c1,c2, c3	8	2
22)	**Separation of mixture of** pharmaceutical substances **using chromatographic technique**	c1,c2, c3**, d1-3**	9,10	4
23)	Immunoassay method for analysis **of amikacin in biological fluids**	c1,c2, c3**, d1-3**	11	2
24)	Immunoassay method for analysis **of gentamycin in biological fluids**	c1,c2, c3**, d1-3**	12	2
25)	Immunoassay method for analysis **of cyclosporins in biological fluids**	c1,c2, c3**, d1-3**	13	2
26)	Practice electrophoresis method for some pharmaceutical substances	c1,c2, c3**, d1-3**	14	2
27)	**Review**	c1,c2, c3**, d1-3**	15	2
28)	Final Exam	**c1-3**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- Teaching strategies of the course:

Lectures method, Discussions, Small group discussions, Tutorials and Practice session.

VII- Assignments:

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- Homework
- Reports

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1, b1,b2, d1-3
2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a2, a3, b1, b3, d1-3
3	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	20%	c1-3
5	**Theoretical mid-semester exam**	7th	30	20%	a1-3, b1, b2, b3
6	**Final Exam (theoretical)**	**16th**	50	33%	a1-3, b1, b2, b3
7	**Final Exam (practical)**	**16th**	20	13%	c1-3
	Total		**150**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)

Two contact hours per week	None

X- Learning Resources:

1- Required Textbook(s) (maximum two).

3- Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. 2004. Fundamentals of Analytical Chemistry,,8th edition ,Thomson Brooks/Cole, Belmont, USA.

4- G H Jeffery, J Bassatt, J Mendham, R C Denny, 1979.Vogel's Textbook of qualitative chemical analysis, 5th edition, Longman group UK Limited, London, England.

3-F.W. Fifield and D. Kealey, 2000, "Principles and Practice of Analytical Chemistry" 5thEdition, Blackwell Science, London.

2- Recommended Books and Reference Materials.	
	6- DEAN'S , 2004. Analytical Chemistry Handbook, 2nd edition, McGraw-Hill Handbooks, New York, 7- Gary, D.C, 1986., Analytical Chemistry, 4th ed. John Wiley and Sons, New York. 8- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication,Canada. 9- K. Danzer, 2007. Analytical Chemistry Theoretical and Metrological Fundamentals, ,SpringerVerlag Berlin Heidelberg. 10- Lectures Notes and Practical Manual.
3- Electronic Materials and Web Sites *etc*.	
	9. Talanta. 10. Plos1 11. The Analyst; 12. J. Pharm. & Biomed. Anal. 13. J. Assoc. off Anal. Chem. 14. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm) 15. The Analytical Forum on ChemWeb (http://analytical. 16. chemweb.com/search/search.exe)

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III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

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9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification Phytochemistry-II

I. Course Identification and General Information:							
1	Course Title:	Phytochemistry-II					
2	Course Number & Code:	*Ph*385					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2				2	
4	Study level/ semester at which this course is offered:	4th level /2nd semester					
5	Pre –requisite (if any):	Botany, pharmacognosy, phytochemistry I					
6	Co –requisite (if any):	None					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Department of Pharmacognosy					
10	Location of teaching the course:	Faculty of Pharmacy					
11	Prepared by:	Dr. Bushra Moharam					
12	Date of approval:						

II. Course description:

This course provides information and discus of naturally occurring products from their chemical, pharmaceutical and therapeutic applications. It deals with their extraction, isolation, detection, pharmacological and toxicological effects. Phytochemical components in this course including; glycosides, volatile oils, tannins and phenylpropanoids.

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I. Intended learning outcomes (ILOs) of the course:

1. Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.
2. Clarify physico-chemical properties of substances
3. Recognize the methods of extraction, separation and purification of the constituents of natural products
4. Describe the chemical structure of phytochemical substances of different alkaloids, steroids and terpens, their biological properties and contraindications of them.
5. Propose the possible leads to new drugs depending on natural product templates
6. Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity
7. Determine suitable methods for extraction; isolation of different compounds from natural origin
8. Perform suitable methods for extraction; isolation of alkaloids, terpenoids and steroids
9. Carry out different methods for quantitative determination of alkaloids, terpenoids and steroids in their origin or preparations
10. Identify different groups of glycosides, volatile oils, tannins and phenylpropanoids.
11. Collaborate in the write reports about the chemistry natural products such as alkaloids, terpenoids, steroids and their isolation and present them.
12. Collaborate effectively with other people, work in teamwork, team planning and manage times
13. Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.

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A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to	**a2-**	Clarify physico-chemical properties of substances
		a3-	Recognize the methods of extraction, separation and purification of the constituents of natural products
	GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a4-**	Describe the chemical structure of phytochemical substances of different glycosides, volatile oils, tannins and phenylpropanoids., their biological properties and contraindications of them.
		a5-	

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures tutorial and group discussion.	Written exam, Quizzes, homework and participation.
a1-	Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.		
a2-	Clarify physico-chemical properties of substances		
a3-	Recognize the methods of extraction, separation and purification of the constituents of natural products		
a4-	Describe the chemical structure of phytochemical substances, their biological properties and contraindications of them.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills

After completing this program, students will be able to:		After completing this course, students will be able to:	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	propose the possible leads to new drugs depending on natural product templates
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing .	**b2-**	Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity
		b3-	determine suitable methods for extraction; isolation of different compounds from natural origin

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Solving Problem, Discussions, methods	Oral presentation, Written exam, Quizzes, and participation
b1-	propose the possible leads to new drugs depending on natural product templates		
b2-	Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity		
b3-	determine suitable methods for extraction; isolation of different compounds from natural origin		

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(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c1-**	Design different methods for determination of glycosides, volatile oils, tannins and phenylpropanoids in their origin or preparations
C3-	Extract, isolate, purify, identify and formulate the	**c2-**	Identify different groups of glycosides, volatile oils, tannins and phenylpropanoids.
	natural products and assure their rational use.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures ,Laboratory work, independent study.	Practical works and reports, presentations and homework.
c1-	Design different methods for determination of glycosides, volatile oils, tannins and phenylpropanoids in their origin or preparations		
c2-	Identify different groups of glycosides, volatile oils, tannins and phenylpropanoids.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	Collaborate in the write reports about the chemistry natural products such as glycosides, volatile oils, tannins and phenylpropanoids and their isolation and present them.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d2-	Collaborate effectively with other people, work in teamwork, team planning and manage times
		d3-	Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:			Reports, presentations and
		Lectures, small group discussions and practical classes	communication with the lecturer and his colleagues.
d1-	Collaborate in the write reports about the chemistry natural products such as glycosides, volatile oils, tannins and phenylpropanoids and their isolation and present them.		
d2-	Collaborate effectively with other people, work in teamwork, team planning and manage times		
d3-	Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.		

IV. Course Content:

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1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Glycosides	a1-4, b1-4, c1-2, d1-3	**Introduction**; Definition, distribution, properties, classification and nomenclature,	**1**	**2**
2	Glycosides	a1-4, b1-4, c1-2, d1-3	definition, classification, distribution, extraction, chemical and physical properties, characterization biological and pharmacological properties, drugs of Phenolic glycosides; **Simple phenolic glycosides (**arbutin, salicin, Coniferin) **Anthracene glycosides**; senna, rubarb, frangula, cascara, aloes, **Flavonoids glycosides** (a)Flavone (*b*)	**3**	**6**
			Flavonol,(*c*) Flavanone *d*) Chalcone (*e*) Isoflavonoid (*f*) Anthocyanidin **Coumarin** glycosides,		
3	Glycosides	a1-4, b1-4, c1-3, d1-3	definition, classification, distribution, extraction, chemical and physical properties, characterization biological and pharmacological of **Cardiac glycosides; digitalis , Strophanthus gly, Squill**	**1**	**2**

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4	Glycosides	a1-4, b1-4, c1-2, d1-3	definition, classification, distribution, extraction, chemical and physical properties, characterization biological and pharmacological of **Cyanogenic glycosides;** Amygdalin, Linamarin **thioGLYCOSIDES; Sinigrin, sinalbin**	**1**	**2**
4	**Mid exam**	a1-4, b1-3		**1**	**2**
5	Volatile oils	a1-4, b1-4, c1-2, d1-3	Introduction: Definition, distribution, physical properties, method of isolation, chemical composition, Pharmacological properties,	**1**	**2**
6	Volatile oils	a1-4, b1-4, c1-2, d1-3	Drugs containing v.o. used as counter irritant agents, drug containing v.o. used as expectorants,	**1**	**2**
7	Volatile oils	a1-4, b1-4, c1-2, d1-3	Drugs containing v.o. used as diuretic, drug containing v.o. used as stomachic and carminative.	**1**	**2**
8	Tannins	a1-4, b1-4,	Definition**,** classification, structure, hydrolysable- and	**2**	**4**
		c1-2, d1-3	condensed-, complex and pseudo-tannins, distribution, biosynthesis, physico-chemical properties, extraction, characterization, biological properties, drug containing tannin		

9	Phenylpropanoids	a1-4, b1-4, c1-2, d1-3	definition**,** classification, , biosynthesis**, phenols and phenolic acids**: , structure, physico-chemical properties, characterization , extraction, biological properties, drug containing phenols and phenolic acids .	**1**	**2**
10	Phenylpropanoids	a1-4, b1-4, c1-2, d1-3	**Lignans**; definition**,** classification, biological properties, uses, drug containing lignans. **Lignin:** definition**,** structure, biological and pharmacological properties of some lignins	**1**	**2**
11	**Revision**	a1-4, b1-3		**1**	**2**
12	**Final exam**	a1-4, c1-2, b1-3		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

V. Teaching strategies of the course:

Lectures, Practice session, Small group discussions, Tutorials and Practical classes

-

3-Assessment Methods:

Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations

VI. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Present/Absent	1-16	10	10%	a1,a3, a4, b1-2
3	Class activities	1-16	10	10%	c1-2
6	Midterm written Exam	7th	20	20%	a1-4, c1-2, b1-3
	Final Exam (theoretical)	16th	60	60%	a1-4, c1-2, b1-3
	Total		**100**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi
- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevier, New York

2- Recommended Readings and Reference Materials

	1- Steven M. Colegate and Russell J. Molyneux. (2008); "Bioactive natural products : detection, isolation, and structural determination" 2nd ed,. 2- Cordell G.A. (2002); "The alkaloids: Chemistry and Biology" Volume 59, Elsevier, New York 3- Lectures Notes and Practical Manual.
3- Essential References	
4- Electronic Materials and Web Sites *etc*.	
	www.biomedcentral.com www.medscape.com http://www.sciencedirect.com/ http://www.ncbi.nlm.nih.gov/
5- Other Learning Material:	
	-

IX. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Phytochemistry-II

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Bushra Moharam	Office Hours					
Location & Telephone No.	730010755	SAT	SUN	MON	TUE	WED	THU
E-mail	bushramoharam@yahoo.com.	1		1			

II. Course Identification and General Information:						
1-	Course Title:	Pharmacognosy I				
2-	Course Number & Code:	***Ph*385**				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	4^{th} level /2^{nd} semester				
5-	Pre –requisite (if any):	Botany, pharmacognosy				
6-	Co –requisite (if any):	None				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				

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9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III. Course Description:

This course provides information and discus of naturally occurring products from their chemical, pharmaceutical and therapeutic applications. It deals with their extraction, isolation, detection, pharmacological and toxicological effects. Phytochemical components in this course including; glycosides, volatile oils, tannins and phenylpropanoids.

IV. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

1. Identify different phytochemicals of biologically active compounds of natural origin and their distribution in nature and classification.
2. Clarify physico-chemical properties of substances
3. Recognize the methods of extraction, separation and purification of the constituents of natural products
4. Describe the chemical structure of phytochemical substances of different alkaloids, steroids and terpens, their biological properties and contraindications of them.
5. Propose the possible leads to new drugs depending on natural product templates
6. Correlate the chemical structure of natural products with their pharmacological activity and predict of structural changes that modify the biological activity
7. Determine suitable methods for extraction; isolation of different compounds from natural origin
8. Perform suitable methods for extraction; isolation of alkaloids, terpenoids and steroids
9. Carry out different methods for quantitative determination of alkaloids, terpenoids and steroids in their origin or preparations
10. Identify different groups of glycosides, volatile oils, tannins and phenylpropanoids.
11. Collaborate in the write reports about the chemistry natural products such as alkaloids, terpenoids, steroids and their isolation and present them.
12. Collaborate effectively with other people, work in teamwork, team planning and manage times
13. Evaluate information from different sources, demonstrate critical thinking, problem solving and decision making abilities.

XI. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Glycosides	a1-4, b1-4, c1-2, d1-3	**Introduction**; Definition, distribution, properties, classification and nomenclature,	**1**	**2**
2	Glycosides	a1-4, b1-4, c1-2, d1-3	definition, classification, distribution, extraction, chemical and physical properties, characterization biological and pharmacological properties, drugs of Phenolic glycosides; **Simple phenolic glycosides (**arbutin, salicin, Coniferin) **Anthracene glycosides**; senna, rubarb, frangula, cascara, aloes, **Flavonoids glycosides** (a)Flavone (*b*) Flavonol,(*c*) Flavanone *d*) Chalcone (*e*) Isoflavonoid (*f*) Anthocyanidin **Coumarin** glycosides,	**2-4**	**6**
3	Glycosides	a1-4, b1-4, c1-3, d1-3	definition, classification, distribution, extraction, chemical and physical properties, characterization biological and pharmacological of **Cardiac glycosides; digitalis , Strophanthus gly, Squill**	**5**	**2**

4	Glycosides	a1-4, b1-4, c1-2, d1-3	definition, classification, distribution, extraction, chemical and physical properties, characterization biological and pharmacological of **Cyanogenic glycosides;** Amygdalin, Linamarin **thioGLYCOSIDES; Sinigrin, sinalbin**	**6**	**2**
4	**Mid exam**	a1-4, b1-3		**7**	**2**
5	Volatile oils	a1-4, b1-4, c1-2, d1-3	Introduction: Definition, distribution, physical properties, method of isolation, chemical composition, Pharmacological properties,	**8**	**2**
6	Volatile oils	a1-4, b1-4, c1-2, d1-3	Drugs containing v.o. used as counter irritant agents, drug containing v.o. used as expectorants,	**9**	**2**
7	Volatile oils	a1-4, b1-4, c1-2, d1-3	Drugs containing v.o. used as diuretic, drug containing v.o. used as stomachic and carminative.	**10**	**2**
8	Tannins	a1-4, b1-4, c1-2, d1-3	Definition**,** classification, structure, hydrolysable- and condensed-, complex and pseudo-tannins, distribution, biosynthesis, physico-chemical properties, extraction, characterization, biological properties, drug containing tannin	**11,12**	**4**

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9	Phenylpropanoids	a1-4, b1-4, c1-2, d1-3	definition**,** classification, , biosynthesis**, phenols and phenolic acids**: , structure, physico-chemical properties, characterization	**13**	**2**
			, extraction, biological properties, drug containing phenols and phenolic acids .		
10	Phenylpropanoids	a1-4, b1-4, c1-2, d1-3	**Lignans**; definition**,** classification, biological properties, uses, drug containing lignans. **Lignin:** definition**,** structure, biological and pharmacological properties of some lignins	**14**	**2**
11	**Revision**	a1-4, b1-3		**15**	**2**
12	**Final exam**	a1-4, c1-2, b1-3		**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

V. Teaching strategies of the course:

Lectures, Practice session, Small group discussions, Tutorials and Practical classes

VI. Assessment Methods:

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Present/Absent	All	10	10%
2	Class activities	All	10	10%
3	Midterm written Exam	7th	20	20%

4	Final Exam (theoretical)	16th	60	60%
5	**Total**		**100**	**100%**

VII. Learning Resources:

1- Required Textbook(s) (maximum two).

- Jarald E.E. and Jarald S. E., (2009); "Textbook of Pharmacognosy and Phytochemistry" CBS Publishers & Distributors, New Delhi
- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy" 16th ed. Elsevier, New York

2- Essential References.

3- Electronic Materials and Web Sites *etc.*

www.biomedcentral.com www.medscape.com
http://www.sciencedirect.com/ http://www.ncbi.nlm.nih.gov/

VIII. Course Policies:

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1 Class Attendance:

- Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
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7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmacology IV

I. Course Identification and General Information:

1.	**Course Title**	Pharmacology IV				
2.	**Course Number & Code:**	Ph4810				
3.	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4.	**Study level/ semester at which this course is offered:**	4th level /2nd semester				
5.	**Pre –requisite (if any):**	▪ Anatomy and histology ▪ Physiology I, II ▪ General Pathology ▪ Pharmacology I & II& III				
6.	**Co –requisite (if any):**	-				
7.	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8.	**Language of teaching the course:**	English				
9.	**The department in which the course is offered:**	-				
10.	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
11.	**Prepared by:**	Associate Prof. Fahmy M. Al-Wasei				
12.	**Date of approval:**					

II. Course description:

The course also deals with the study of pharmacodynamics and pharmacokinetics of drugs for endocrine glands disorders& drugs affecting central nervous system (CNS) and analgesic drugs.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & Drugs for endocrine glands disorders& drug posology of drugs affecting central nervous systems and analgesic drugs.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of Drugs for endocrine glands disorders and drugs affecting central nervous systems and analgesic drugs.
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify drugs affecting central nervous systems and analgesics into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs.
7. Predict drug limitations on the basis of Drug MOA.
8. Select an appropriate drug for patients based on drug benefits and limitation.
9. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
10. Carry out appropriate techniques and measurements in experimental pharmacology.
11. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
12. Prepare critical, scientific and referenced reports 13. Share successfully in team-work.
14. Show respect to life.
15. Demonstrate time management and self-learning during performing practical and professional works and assignments.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a1-	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & Drugs for endocrine glands disorders& drug posology of drugs affecting central nervous systems and analgesic drugs.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.	a2-	Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of Drugs for endocrine glands disorders and drugs affecting central nervous systems and analgesic drugs.
		a3-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & Drugs for endocrine glands disorders& drug posology of drugs affecting central nervous systems and analgesic drugs.	Lectures methods , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of Drugs for endocrine glands disorders and drugs affecting central nervous systems and analgesic drugs.		
a3-	Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the	b1-	Classify drugs affecting central nervous systems and analgesics into various categories

	pharmacophores of the structure and their effect on the stability,pharmacokinetic and	**b2-**	Compare between therapeutically related drugs
	pharmacodynamic profiles of the drug.		based on drug benefits (in particular efficacy and potency) and drug limitations.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Relate drug indications to MAO of drugs.
		b4-	Predict drug limitations on the basis of Drug MOA.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b5-**	Select an appropriate drug for patients based on drug benefits and limitation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Classify drugs affecting central nervous systems and analgesics into various categories	Lectures methods, Group Discussion, Problem solving sessions**,** brainstorming and Computer based teaching and learning	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.		
b3-	Relate drug indications to MAO of drugs.		
b4-	Predict drug limitations on the basis of drug MOA**.**		
b5-	Select an appropriate drug for patients based on drug benefits and limitation.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
		c2-	Carry out appropriate techniques and measurements in experimental pharmacology.
		c3-	Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c4-**	Prepare critical, scientific and referenced reports .
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.	Lectures methods, practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Carry out appropriate techniques and measurements in experimental pharmacology.		
c3-	Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.		
c4-	Prepare critical, scientific and referenced reports		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **General and Transferable skills**

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	Share successfully in team-work.
D5-	Apply information and communication technology and working effectively in a team.	d2-	Show respect to life.
		d3-	Demonstrate time management and selflearning during performing practical and professional works and assignments.

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Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Share successfully in team-work.	Small group discussions, Tutorials and Practical session	Homework and reports.
d2-	Show respect to life.		
d3-	Demonstrate time management and self-learning during performing practical and professional works and assignments.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	**Drugs for endocrine glands disorders (Hormones)**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d2	Introduction to the Hormones in the body and expline how to work and illustration the Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of sub topics of drugs for endocrine glands:	1	2
			Anterior and posterior pituitary hormones	1	2

			Antidiabetic drugs: insulin, oral hypoglycemics	1	2
			Drugs for thyroid gland disorders	1	2
			• Corticoteroids • Estrogens, progesterons, hormonal contraceptives and antiestrogens Androgens and antiandrogens	2	4
2.	**Midterm exam**	a1-3, b1-5		1	2
3.	**CNS drugs**	a1, a2, a3,	• Introduction to the chemical neurotransmitter in the central nervous system • Illustration the	1	
		b1, b2, b3, b4, b5, d1, d3	pharmacokinetics, pharmacodynamics [drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of the sub topics of CNS		2
			General anaesthetics	1	2
			Local anesthetics	1	2
			Sedatives, hypnotics	2	4
			Antiepileptics	1	2

4.	**Analgesics**	a1, a2, a3, b1, b2, b3, b4, b5, d13	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of Analgesic Narcotic analgesics& opioids and hypnotics.	2	4
5.	**Final Exam**	a1-3, b1-5		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	Drugs for thyroid gland disorders in the rabbits animals	c1-c4, d1-d3	**2**	**4**
2.	Antidiabetic drugs: insulin, oral hypoglycemics in the rabbits animals	c1-c4, d1-d3	**2**	**4**
5	Study of phenobarbitone induced hypnosis (Demonstration)	c1-c4, d1-d3	**1**	**2**
6	Study of antidepressant property of drugs using poleclimbing apparatus.	c1-c4, d1-d3	**1**	**2**
7	Study of the anticonvulsant effect of phenytoin against maximal electroshock induced convulsion in mice	c1-c4, d1-d3	**1**	**2**
8	Mid-Exam	c1-c4, d1-d3	1	2
9	General anaesthetics test in the rats and mice animals	c1-c4, d1-d3	1	2

10	Study of the anticonvulsant property of diazepam on pentylenetetrazole induced convulsions in mice **Or**	c1-c4, d1-d3	1	2
11	Study of CNS stimulants and depressants using photoactometer	c1-c4, d1-d3	1	2
12	Study of the analgesic effect of morphine against acetic acid-induced writhing in mice.	c1-c4, d1-d3	1	2
13	Use of computer simulated CDs or Video cassettes for pharmacology practical whenever possible.	c1-c4, d1-d3	3	6
14	Final Exam	c1-c4	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

I. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-4,b1-4, d1-3
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-4, b2-5, d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	7th	30	20%	a1, a2, a3, b1, b3
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill
2- Rang, Dale and Ritter. Pharmacology, (2007), Churchill Livingstone.

2- Recommended Books and Reference Materials.

1. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
2. Udaykumar. Text book of medical pharmacology
3. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

www.en.wikipedia.org/

IV. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmacology IV

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Fahmy M. Al-Wasei	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail			2h				

II- Course Identification and General Information:

1-	Course Title:	Pharmacology IV				
2-	Course Number & Code:	Ph4810				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	4th level /2nd semester				
5-	Pre –requisite (if any):	▪ Anatomy and histology ▪ Physiology I, II ▪ General Pathology ▪ Pharmacology I & II& III				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

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III- Course description:

The course also deals with the study of pharmacodynamics and pharmacokinetics of drugs for endocrine glands disorders& drugs affecting central nervous system (CNS) and analgesic drugs.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & Drugs for endocrine glands disorders& drug posology of drugs affecting central nervous systems and analgesic drugs.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of Drugs for endocrine glands disorders and drugs affecting central nervous systems and analgesic drugs.
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify drugs affecting central nervous systems and analgesics into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs.
7. Predict drug limitations on the basis of Drug MOA.
8. Select an appropriate drug for patients based on drug benefits and limitation.
9. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.
10. Carry out appropriate techniques and measurements in experimental pharmacology.
11. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.
12. Prepare critical, scientific and referenced reports 13. Share successfully in team-work.
14. Show respect to life.
15. Demonstrate time management and self-learning during performing practical and professional works and assignments.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
6.	**Drugs for endocrine glands disorders (Hormones)**	a1, a2, a3, b1, b2, b3, b4, b5, d1, d2	Introduction to the Hormones in the body and expline how to work and illustration the Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of sub topics of drugs for endocrine glands:	1	2
			Anterior and posterior pituitary hormones	2	2
			Antidiabetic drugs: insulin, oral hypoglycemics	3	2
			Drugs for thyroid gland disorders	4	2
			• Corticoteroids • Estrogens, progesterons, hormonal contraceptives and antiestrogens Androgens and antiandrogens	5,6	4
7.	**Midterm exam**	a1-3, b1-5		7	2

8.	**CNS drugs**	a1, a2, a3,	• Introduction to the chemical neurotransmitter in the central nervous system • Illustration the	8	
		b1, b2, b3, b4, b5, d1, d3	pharmacokinetics, pharmacodynamics [drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of the sub topics of CNS		2
			General anaesthetics	9	2
			Local anesthetics	10	2
			Sedatives, hypnotics	11,12	4
			Antiepileptics	13	2
9.	**Analgesics**	a1, a2, a3, b1, b2, b3, b4, b5, d13	Pharmacokinetics, Pharmacodynamics [drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of Analgesic Narcotic analgesics& opioids and hypnotics.	14,15	4
10.	**Final Exam**	a1-3, b1-5		16	2

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Number of Weeks /and Units Per Semester	16	32

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	Drugs for thyroid gland disorders in the rabbits animals	c1-c4, d1-d3	1,2	4
2.	Antidiabetic drugs: insulin, oral hypoglycemics in the rabbits animals	c1-c4, d1-d3	3,4	4
5	Study of phenobarbitone induced hypnosis (Demonstration)	c1-c4, d1-d3	5	2
6	Study of antidepressant property of drugs using poleclimbing apparatus.	c1-c4, d1-d3	6	2
7	Study of the anticonvulsant effect of phenytoin against maximal electroshock induced convulsion in mice	c1-c4, d1-d3	7	2
8	Mid-Exam	c1-c4, d1-d3	8	2
9	General anaesthetics test in the rats and mice animals	c1-c4, d1-d3	9	2
10	Study of the anticonvulsant property of diazepam on pentylenetetrazole induced convulsions in mice **Or**	c1-c4, d1-d3	10	2
11	Study of CNS stimulants and depressants using photoactometer	c1-c4, d1-d3	11	2
12	Study of the analgesic effect of morphine against acetic acid-induced writhing in mice.	c1-c4, d1-d3	12	2
13	Use of computer simulated CDs or Video cassettes for pharmacology practical whenever possible.	c1-c4, d1-d3	13-15	6
14	Final Exam	c1-c4	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation, reports and quizzes**	**All Weeks**	10	7%	a1-4,b1-4, d1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1-4, b2-5, d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	c1-4

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12.	**Theoretical mid-semester exam**	7th	30	20%	a1, a2, a3, b1, b3
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-5
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Katzung–Basic and Clinical Pharmacology, (2007), McGraw-Hill

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5. Udaykumar. Text book of medical pharmacology
6. Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

www.en.wikipedia.org/

IX. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

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- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmacy Management

I. Course Identification and General Information:							
1	Course Title:	Pharmacy Management					
2	Course Number & Code:	Ph2814					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1				1	
4	Study level / semester at which course is offered:	Level: - Fourth Year / Second Semester					
5	Pre –requisite (if any):	Pharmaceutics I_IV					
6	Co –requisite (if any):						
7	Programs in which course is offered:	Bachelor of pharmacy					
8	Language of teaching the course:	English					
9	Department in which course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy- Sana`a university					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

This course Provides students with a working knowledge of important and fundamental aspects of pharmacy practice leadership including, but not limited to: management, strategic planning, motivational theories, and employment issues.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the administration, leadership, purpose of a business plan, role of business in society, operations management & its' essential tasks.
2. Understand the importance of personal, business, and personnel management in pharmacy.
3. Plan and organize pharmaceutical services.
4. Construct drug planning to all pharmacy practice including a hospital pharmacy.
5. Control and regular stock
6. Differentiate between pharmaceutical administration and other department.
7. Implement the policy of receiving and distribution of drugs and other medical instruments.
8. Train how to buy his supplies.
9. Apply administration and management process to professional activities.
10. Evaluate a management plan for pharmacy administration.
11. Great a management plan for drug stores.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care..	a1-	Define the administration, leadership, purpose of a business plan, role of business in society, operations management & its' essential tasks.
		a2-	Understand the importance of personal, business, and personnel management in pharmacy.

		a3-	Plan and organize pharmaceutical services

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures brainstorming and discussion	▪ Attendance ▪ Written and oral exams ▪ Quiz and Small Projects
a1-	Define the administration, leadership, purpose of a business plan, role of business in society, operations management & its' essential tasks.		
a2-	Understand the importance of personal, business, and personnel management in pharmacy.		
a3-	Plan and organize pharmaceutical services		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b1-**	Construct drug planning to all pharmacy practice including a hospital pharmacy.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Control and regular stock

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures, discussion and brain storming	Written , report and oral exams
b1-	Construct drug planning to all pharmacy practice including a hospital pharmacy.		
b2-	Control and regular stock		

(C) Professional and Practical Skills:			
Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills			
Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c1-**	Differentiate between pharmaceutical administration and other department
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes	**c2-**	Implement the policy of receiving and distribution of drugs and other medical instruments.
		c3-	Train how to buy his supplies

Teaching And Assessment Methods For Achieving Learning Outcomes:		
Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:		
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:	Lectures, Problem solving sessions,	Written and oral exams

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c1-	Differentiate between pharmaceutical administration and other department	tutorials, discussion and brain storming	
c2-	Implement the policy of receiving and distribution of drugs and other medical instruments.		
c3-	Train how to buy his supplies		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Apply administration and management process to professional activities
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2**	Evaluate a management plan for pharmacy administration
		d3-	Great a management plan for drug stores

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures and discussion	Reports, project, Written and oral exams
d1-	Apply administration and management process to professional activities		
d2	Evaluate a management plan for pharmacy administration		
d3-	Great a management plan for drug stores		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to study pharmacy management	a1, b1, c1, d1-3	- Value the role management skills play in improving patients' health outcomes	1	1
2	Management function & Managing time	a1, d1, d1-3	- Understand the terms 'manager', 'management' and apply theories & approaches to time management	1	1
3	Organizational structure and behavior and Ensuring good customer service	a2, a3, d1	- Recognize the role of teams in organizations - Understand and apply principles for ensuring good customer service	1	1
4	Human resource management functions and Motivational theories	a2,b1,c1, d1-3	- Apply motivational theories to pharmacy practice	1	1
5	Leadership theories	a3, b1, c2, d1-3	- Define, apply and describe leadership roles within the profession & community for students & pharmacists	1	1
6	Ensuring quality in pharmacy operations	a1,d1	- Value the importance of quality in pharmacy practice	1	1
7	**Mid-exam.**	a1-3, b1, c1-2		1	1

8	Strategic planning in pharmacy operations and business planning for pharmacy programs	a3, b1, d1	- Describe the purpose of strategic planning - Define and Discuss component and communicating & implementing a business plan	**1**	**1**
9	Outcomes evaluation of pharmacy operations	a3,b1-2, c1-3,d1-3	- Understand the term 'outcomes evaluations and apply different outcomes measures to assess success/failure of service.	**1**	**1**
10	Operations management	a1,b1-2, c1-3,d1-3	- Define the role of business in society & the role of profits and operations management & its' essential tasks.	**1**	**1**
11	Purchasing/inventory management & negotiation	a2,a3,b1-2, c1-3,d1-3	- Understand purchasing objectives, Value the importance, management process and inventory management objectives for a pharmacy.	**1**	**1**
12	Managing risks in pharmacy practice	a1,b1-2, c1-3,d1-3	Describe the role of risk management and identify components of pure risk	**1**	**1**
13	-Communicating Effectively in the Workplace -Professional networking & personal continuous quality	b1-2, c1-3,d1-3	- Understand why effective communication is critical in the workplace - Value personal continuous	**1**	**1**
	improvement.		quality improvement.		
14	Time to work on business plans	b1-2, c1-3,d1-3	In classroom or at home	**1**	**1**
15	Revision	a1-3, b1-2, c1-3,d1-3		**1**	**1**

16	**Final exam**	a1-3, b1-2, c1-3		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a-Teaching strategies of the course:

1. Lectures using white board and data show.
2. Practical session using laboratory equipment
3. Project tasks for groups of students (10 each) to prepare a report related to the topics lectured and make presentation for that report.

b-Assessment Methods:

1- Written mid-term exam to assess understanding, intellectual, professional and ability of students to follow-up the course subjects.
2- Oral exam to assess the ability of students in expressing their knowledge, understanding, intellectual skills, general skills and confidence
3- Written final exam to assess the overall outcomes.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-2,d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3,d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation, Assignments and quizzes**	**1-14**	**5**	10%	a1-3, b2, c3**,d1-3**
2	**Mid-semester exam**	**7**	**10**	20%	a1-3, b1, c1-2

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ا.د. القاسم محمد عباس	ا.م.د. هدى العماد	د.خالد الشوبة	ا.د.ماجد علوان	ا.د. محمود البريهي	ا.د.ماجد علوان

3	**Final Exam**	**16**	**35**	70%	a1-3, b1-2, c1-3
	Total		**50**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

&

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

Allison M, Marie A, Chisholm-Burns, ,2012,Pharmacy Management, Leadership, Marketing, and Finance, 2nd edition Marv Shepherd Vaillancourt. ،

2- Recommended Readings and Reference Materials

Required: Pharmacy Management: Essentials for All Practice Settings/[edited by] Shane P. Desselle, David P. Zgarrick, Greg L. Alston. 3rd ed

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
3. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

ادارة أعمال الصيدليات الاصدار 8 pdf.

3- Electronic Materials and Web Sites *etc*.

www. google.com www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

6- Course development plans

- Conducting regular workshops for the staff for improving their course specification skills.
- Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmacy Management

I. - Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Prof. Dr. Maged Alwan	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	Course Title:	Pharmacy Management				
2-	Course Number & Code:	Ph2814				
3-	Credit hours: 1hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	-		1
4-	Study level/year at which this course is offered:	4th year/Second semester				
5-	Pre –requisite (if any):	**Pharmaceutics I_IV**				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

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III. Course description:

This course Provides students with a working knowledge of important and fundamental aspects of pharmacy practice leadership including, but not limited to: management, strategic planning, motivational theories, and employment issues.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

12. Define the administration, leadership, purpose of a business plan, role of business in society, operations management & its' essential tasks.
13. Understand the importance of personal, business, and personnel management in pharmacy.
14. Plan and organize pharmaceutical services.
15. Construct drug planning to all pharmacy practice including a hospital pharmacy.
16. Control and regular stock
17. Differentiate between pharmaceutical administration and other department.
18. Implement the policy of receiving and distribution of drugs and other medical instruments.
19. Train how to buy his supplies.
20. Apply administration and management process to professional activities.
21. Evaluate a management plan for pharmacy administration.
22. Great a management plan for drug stores.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Introduction to study pharmacy management	a1, b1, c1, d1-3	- Value the role management skills play in improving patients' health outcomes	**1**	**1**
2	Management function & Managing time	a1, d1, d1-3	- Understand the terms 'manager', 'management' and apply theories & approaches to time management	**1**	**1**
3	Organizational structure and behavior and Ensuring good customer service	a2, a3, d1	- Recognize the role of teams in organizations - Understand and apply principles for ensuring good customer service	**1**	**1**
4	Human resource management functions and Motivational theories	a2,b1,c1, d1-3	- Apply motivational theories to pharmacy practice	**1**	**1**
5	Leadership theories	a3, b1, c2, d1-3	- Define, apply and describe leadership roles within the profession & community for students & pharmacists	**1**	**1**
6	Ensuring quality in pharmacy operations	a1,d1	- Value the importance of quality in pharmacy practice	**1**	**1**
7	**Mid-exam.**	a1-3, b1, c1-2		**1**	**1**
8	Strategic planning in pharmacy operations and business planning for pharmacy programs	a3, b1, d1	- Describe the purpose of strategic planning - Define and Discuss component and communicating & implementing a business plan	**1**	**1**

9	Outcomes evaluation of pharmacy operations	a3,b1-2, c1-3,d1-3	- Understand the term 'outcomes evaluations and apply different outcomes measures to assess success/failure of service.	**1**	**1**
10	Operations management	a1,b1-2, c1-3,d1-3	- Define the role of business in society & the role of profits and operations management & its' essential tasks.	**1**	**1**
11	Purchasing/inventory management & negotiation	a2,a3,b1-2, c1-3,d1-3	- Understand purchasing objectives, Value the importance, management process and inventory management objectives for a pharmacy.	**1**	**1**
12	Managing risks in pharmacy practice	a1,b1-2, c1-3,d1-3	Describe the role of risk management and identify components of pure risk	**1**	**1**
13	-Communicating Effectively in the Workplace -Professional networking & personal continuous quality	b1-2, c1-3,d1-3	- Understand why effective communication is critical in the workplace - Value personal continuous	**1**	**1**
	improvement.		quality improvement.		
14	Time to work on business plans	b1-2, c1-3,d1-3	In classroom or at home	**1**	**1**
15	Revision	a1-3, b1-2, c1-3,d1-3		**1**	**1**
16	**Final exam**	a1-3, b1-2, c1-3		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

VI. a-Teaching strategies of the course:

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1. Lectures using white board and data show.
2. Practical session using laboratory equipment
3. Project tasks for groups of students (10 each) to prepare a report related to the topics lectured and make presentation for that report.

b-Assessment Methods:

1- Written mid-term exam to assess understanding, intellectual, professional and ability of students to follow-up the course subjects.
2- Oral exam to assess the ability of students in expressing their knowledge, understanding, intellectual skills, general skills and confidence
3- Written final exam to assess the overall outcomes.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-2,d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3,d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation, Assignments and quizzes**	**1-14**	**5**	10%	a1-3, b2, c3,**d1-3**
2	**Mid-semester exam**	**7**	**10**	20%	a1-3, b1, c1-2
3	**Final Exam**	**16**	**35**	70%	a1-3, b1-2, c1-3
	Total		**50**	**100%**	

IX. Students' Support:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

&

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

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www. google.com www.pubmed.com
http://www.sciencedirect.com

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

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10- Procedures for periodically reviewing of course effectiveness and planning for improvement

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ا.د.ماجد علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others
	will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmacokinetics

I. Course Identification and General Information:							
1	Course Title:	Pharmacokinetics					
2	Course Number & Code:	Ph2815					
3	Credit hours: 3 hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	2			3	
4	Study level/ semester at which this course is offered:	Fourth year/ Second semester					
5	Pre –requisite (if any):	Pharmaceutics I-IV - biopharmaceutics,					
6	Co –requisite (if any):	Advanced Drug Delivery Systems					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof Dr / Mahmoud Mahyoob Alburyhi					
12	Date of approval:						

II. Course description:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

This course aims to provide the students with a comprehensive theoretical foundation of estimating pharmacokinetic parameters. Mathematical background for modeling of the concentration time relationships for the different routes of administration. Designing dosing regimens by relating plasma concentration of drugs to their pharmacological and toxicological action, Individualization of therapy for patients. Designing therapeutic drug monitoring plans for drugs with narrow therapeutic index or high toxicity.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the pharmacokinetic model of a specified drug and recognize the pharmacokinetic parameters.
2. Understand the features of elimination rates, orders of pk, one & two compartment model.
3. Demonstrate the proper dose when shift form iv to oral, nonlinear pk and nonlinear pk.
4. Demonstrate the proper dose in liver and kidney disorders.
5. Demonstrate the proper therapy and therapeutic drug monitoring for each patient and dose selection for narrow therapeutic drugs.
6. Conduct pharmacokinetic parameter protocols for the pharmacological testing of new drugs.
7. Utilization of mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body for dosage optimization.
8. Developing dosing regimens for the individualization of therapy for the patient.
9. Fitting concentration time profiles and estimating pharmacokinetic parameters, drug dose and protocol of therapy.
10. Calculate practically the difference between pharmacokinetics compartment models.
11. Apply dosing regimens for specific population patients, renal and hepatic dysfunction.
12. Demonstrate bioequivalence studies
13. Assess the difference between linear & nonlinear PK.
14. Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.
15. Retrieve information from a variety of sources, including libraries, databases and internet.
16. Work effectively in a team and demonstrate time management skills.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**			
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Define the pharmacokinetic model of a specified drug and recognize the pharmacokinetic parameters.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Understand the features of elimination rates, orders of pk, one & two compartment model.
A4	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research	**a3-**	Demonstrate the proper dose when shift form iv to oral, linear pk and nonlinear pk.
A5	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care	**a4-**	Demonstrate the proper dose in liver and kidney disorders.
		a5-	Demonstrate the proper therapy and therapeutic drug monitoring for each patient and dose selection for narrow therapeutic drugs.
Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			

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Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures, and group discussion	Attendance, Written, oral exams and small projects
a1-	Define the pharmacokinetic model of a specified drug and recognize the pharmacokinetic parameters.		
a2-	Understand the features of elimination rates, orders of pk, one & two compartment model.		
a3-	Demonstrate the proper dose when shift form iv to oral, linear pk and nonlinear pk.		
a4-	Demonstrate the proper dose in liver and kidney disorders.		
a5-	Demonstrate the proper therapy and therapeutic drug monitoring for each patient and dose selection for narrow therapeutic drugs.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Conduct pharmacokinetic parameter protocols for the pharmacological testing of new drugs.

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B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Utilization of mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body for dosage optimization.
B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b3-**	Developing dosing regimens for the individualization of therapy for the patient.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, solving problem brainstorming and group discussion	Project, homework, Written, oral exams and small projects
b1-	Conduct pharmacokinetic parameter protocols for the pharmacological testing of new drugs.		
b2-	Utilization of mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body for dosage optimization.		
b3-	Developing dosing regimens for the individualization of therapy for the patient.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills

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After completing this program, students will be able to:		After completing this course, students will be able to:	
C1	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	c1-	Fitting concentration time profiles and estimating pharmacokinetic parameters, drug dose and protocol of therapy.
C3	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c2-	Calculate practically the difference between pharmacokinetics compartment models.
		c3-	Apply dosing regimens regimens for specific population patients, renal and hepatic dysfunction.
C4	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	c4-	Demonstrate bioequivalence studies
C5	Conduct research studies and utilize the results in different pharmaceutical fields.	c5-	Assess the difference between linear & nonlinear PK.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
c1-	Fitting concentration time profiles and estimating pharmacokinetic parameters, drug dose and protocol of therapy.		
c2-	Calculate practically the difference between pharmacokinetics compartment models.		
c3-	Apply dosing regimens for specific population patients, renal and hepatic dysfunction.		
c4-	Demonstrate bioequivalence studies		
c5-	Assess the difference between linear & nonlinear PK.		

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(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2**	Retrieve information from a variety of sources, including libraries, databases and internet.
D4	Take responsibility for adaptation to change needs in pharmacy practice.	**d3**	Work effectively in a team and demonstrate time management skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures , practical, discussion and brain storm	Written, practical, oral exams, report, project and observation.
d1-	Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.		
d2-	Retrieve information from a variety of sources, including libraries, databases and internet.		
d3	Work effectively in a team and demonstrate time management skills.		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	Introduction to basic pharmacokinetics, elimination rates and orders PK)	**a1, b1, d1,d2,d3**	basic pharmacokinetics, ADME-system, pharmacodynamics, toxicokinetics Pharmacokinetic models	**1**	**2**
2.	Pharmacokinetic parameters models, equations and order kinetics	**a2, b3, d1,d2,d3**	Define various models representing rates and order of reactions and calculate pharmacokinetic parameters (eg, zero- and first-order) from experimental data based on these models.	**1**	**2**
3.	The one-compartment open model with an intravenous bolus dose	**a2,a3, b3, d1,d2,d3**	PK parameters after I.V. dose bolus(plasma data) and (urine data)	**1**	**2**

4.	The one-compartment open model with an intravenous infusion	**a3, b2, b3, d1,d2,d3**	PK parameters, Steady state during constant rate infusion	**1**	**2**
5.	The one-compartment open model with absorption and elimination: (Extravascular PK).	**a1, a2,a3, b2, d1,d2,d3**	Absorption rate and elimination rate PK parameters after extravascular administration, e.g. oral dose.	**1**	**2**
6.	The one-compartment open model with multiple dosing kinetics: multiple dosing	**a4,b1, b2, b3, d1,d2,d3**	volume of distribution, drug clearance, and halflife can be affected by protein binding and PK parameters after multiple dosing	**1**	**2**
7.	Mid-term exam	**a1-4, b1-3**		**1**	**2**
8.	Bioavailability and bioequivalence	**a3, b2, b3, d1,d2,d3**	PK parameters, half-life AUC, AUMC	**2**	**4**
9.	The two-compartment open model with intravenous administration	**a2,b3, d1,d2,d3**	PK parameters half-life Cp, Vd, Cl, t1/2 A, B, a, b, K12, K21, K, AUC	**1**	**2**
10.	Metabolites and urinary excretion Dose adjustment in renal disorder	**a4,a5, b2,b3, d1,d2,d3**	Clinical PK parameters Kr, Km, Clr, Clm K & Cl	**1**	**2**
11.	Distribution and drug binding	**a2,a3, b2,b3, d1,d2,d3**	Clinical PK parameters	**1**	**2**
12.	pharmacokinetic of drugs follows Michaelis–Menton kinetics and Non-linear PK model.	**a2,a3,a4,a5, b2,b3, d1,d2,d3**	PK parameters	**1**	**2**

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13.	Clinical pharmacokinetics Dosage regimen, age, and diseases state	**a3,a4,a5, b2,b3, d1,d2,d3**	Clinical PK parameters Application specific populations, the Pediatric Patients, the Obese Patients and the Geriatric Patients	**2**	**4**
14.	final-term exam	**a1-5, b1-3**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Calculate the pharmacokinetic parameters of some drugs that follow zero order.	**c1, d1,d2,d3**	**1**	**2**
2.	Calculate the pharmacokinetic parameters of some drugs that follow first order.	**c1, d1,d2,d3**	**1**	**2**
3.	The one-compartment open model with an intravenous bolus dose: calculating pharmacokinetic parameters from plasma data	**c1,c2, d1,d2,d3**	**1**	**2**
4.	The one-compartment open model with an intravenous bolus dose: calculating pharmacokinetic parameters from urinary data	**c1,c2,c3, d1,d2,d3**	**1**	**2**
5.	The one-compartment open model with an intravenous infusion: calculating pharmacokinetic parameters from continues infusion, infusion with a bolus dose, post infusion data.	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
6.	Calculate the steady-state C max and C min after multiple IV bolus dosing of drugs.	**c1,c2,c3, d1,d2,d3**	**1**	**2**
7.	Mid-term exam	**c1-4**	**1**	**2**
8.	The one-compartment open model with absorption and elimination: calculating	**c1,c2,c3,c4, d1,d2,d3**	**2**	**2**

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	pharmacokinetic parameters from plasma data(Extravascular PK).			
9.	The one-compartment open model with multiple dosing kinetics: multiple dosing IV	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
10.	The one-compartment open model with multiple dosing kinetics: multiple dosing oral (Extravascular PK).	**c1,c2,c3,c4,c5, d1,d2,d3**	**1**	**2**
11.	The two-compartment open model with intravenous administration.	**c1,c2,c3,c4,c5, d1,d2,d3**	**1**	**2**
12.	Designing dosing regimens and Sources of variation in intrinsic clearance	**c1,c2,c3,c4,c5, d1,d2,d3**	**1**	**2**
13.	Calculating pharmacokinetic parameters from Michaelis–Menton kinetics and Non-linear PK model.	**c5, d1,d2,d3**	**1**	**2**
14.	Estimating clinical pharmacokinetic parameters, dosage regimen according to age, and diseases state.	**c5, d1,d2,d3**	**1**	**2**
15.	final-term exam	**c1-5**	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, Written exam, Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-5, d1-3**		

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VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	**a1-5,b1-3,** d1-3
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	**a1-5, b1-3,** d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	**c1-5**
4.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
5.	**Theoretical mid-semester exam**	7th	30	20%	**a1-4, b1-3**
6.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-3**
7.	**Final Exam (practical)**	**16th**	20	13%	**c1-5**
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

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1- Required Textbook(s) (maximum two)	
	1-A book prepared by the staff members 2-Shargel, L and Yu, ABC., 2016, *Applied Biopharmaceutics & pharmacokinetics*, 7th edition,
	McGraw-Hill Education, New York. 3-Bauer, LA, 2008, *Applied clinical pharmacokinetics*, 2nd edition, McGraw-Hill Companies, Inc, New York.
2- Recommended Readings and Reference Materials	
	1-Rowland M, Tozer T, 1995, Clinical Pharmacokinetics—Concepts and Applications, 3rd ed, Lea & Febiger, Philadelphia. 2-Levine RR, 1990, Drug Actions and Reactions, 4th ed., Little, Brown, Boston. 3- Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia.
3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com/
4- Other Learning Material:	
	J Pharmacokinet Biopharm J Pharm Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, etc. - Well-equipped laboratories with all required equipment and slide.

2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

6- Course development plans

- Conducting regular workshops for the staff for improving their course specification skills.
- Regular revision of course specification and syllabus items.

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II.	Course Policies:
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** ▪ Non-reasonable frequent tardiness will be allowed and is considered as absence from the lectures/
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty.
I	▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmacokinetics

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof Dr/ Mahmoud Mahyoob Alburyhi	Office Hours					
Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:						
1-	Course Title:	Pharmacokinetics				
2-	Course Number & Code:	Ph2815				
3-	Credit hours: 3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	Fourth year/Second semester				
5-	Pre –requisite (if any):	Pharmaceutics I-IV, Biopharmaceutics				
6-	Co –requisite (if any):	Advanced Drug Delivery Systems				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				

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10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University

III. Course description:

This course aims to provide the students with a comprehensive theoretical foundation of estimating pharmacokinetic parameters. Mathematical background for modeling of the concentration time relationships for the different routes of administration. Designing dosing regimens by relating plasma concentration of drugs to their pharmacological and toxicological action, Individualization of therapy for patients. Designing therapeutic drug monitoring plans for drugs with narrow therapeutic index or high toxicity.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the pharmacokinetic model of a specified drug and recognize the pharmacokinetic parameters.
2. Understand the features of elimination rates, orders of pk, one & two compartment model.
3. Demonstrate the proper dose when shift form iv to oral, nonlinear pk and nonlinear pk.
4. Demonstrate the proper dose in liver and kidney disorders.
5. Demonstrate the proper therapy and therapeutic drug monitoring for each patient and dose selection for narrow therapeutic drugs.
6. Conduct pharmacokinetic parameter protocols for the pharmacological testing of new drugs.
7. Utilization of mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body for dosage optimization.
8. Developing dosing regimens for the individualization of therapy for the patient.
9. Fitting concentration time profiles and estimating pharmacokinetic parameters, drug dose and protocol of therapy.
10. Calculate practically the difference between pharmacokinetics compartment models.
11. Apply dosing regimens for specific population patients, renal and hepatic dysfunction.
12. Demonstrate bioequivalence studies
13. Assess the difference between linear & nonlinear PK.
14. Communicating the dosage adjustment with physicians, suggesting therapeutic monitoring plans for physicians and use different information sources to solve medication problems.
15. Retrieve information from a variety of sources, including libraries, databases and internet.
16. Work effectively in a team and demonstrate time management skills.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	Introduction to basic pharmacokinetics, elimination rates and orders PK)	**a1, b1, d1,d2,d3**	basic pharmacokinetics, ADME-system, pharmacodynamics, toxicokinetics Pharmacokinetic models	**1**	**2**
2.	Pharmacokinetic parameters models, equations and order kinetics	**a2, b3, d1,d2,d3**	Define various models representing rates and order of reactions and calculate pharmacokinetic parameters (eg, zero- and first-order) from experimental data based on these models.	**1**	**2**
3.	The one-compartment open model with an intravenous bolus dose	**a2,a3, b3, d1,d2,d3**	PK parameters after I.V. dose bolus(plasma data) and (urine data)	**1**	**2**
4.	The one-compartment open model with an intravenous infusion	**a3, b2, b3, d1,d2,d3**	PK parameters, Steady state during constant rate infusion	**1**	**2**
5.	The one-compartment open model	**a1, a2,a3, b2,**	Absorption rate and	**1**	**2**

	with absorption and elimination: (Extravascular PK).	**d1,d2,d3**	elimination rate PK parameters after extravascular administration, e.g. oral dose.		
6.	The one-compartment open model with multiple dosing kinetics: multiple dosing	**a4,b1, b2, b3, d1,d2,d3**	volume of distribution, drug clearance, and halflife can be affected by protein binding and PK parameters after multiple dosing	**1**	**2**
7.	Mid-term exam	**a1-4, b1-3**		**1**	**2**
8.	Bioavailability and bioequivalence	**a3, b2, b3, d1,d2,d3**	PK parameters, half-life AUC, AUMC	**2**	**4**
9.	The two-compartment open model with intravenous administration	**a2,b3, d1,d2,d3**	PK parameters half-life Cp, Vd, Cl, t1/2 A, B, a, b, K12, K21, K, AUC	**1**	**2**
10.	Metabolites and urinary excretion Dose adjustment in renal disorder	**a4,a5, b2,b3, d1,d2,d3**	Clinical PK parameters Kr, Km, Clr, Clm K & Cl	**1**	**2**
11.	Distribution and drug binding	**a2,a3, b2,b3, d1,d2,d3**	Clinical PK parameters	**1**	**2**
12.	pharmacokinetic of drugs follows Michaelis–Menton kinetics and Non-linear PK model.	**a2,a3,a4,a5, b2,b3, d1,d2,d3**	PK parameters	**1**	**2**
13.	Clinical pharmacokinetics Dosage regimen, age, and diseases state	**a3,a4,a5, b2,b3, d1,d2,d3**	Clinical PK parameters Application specific populations, the Pediatric Patients, the Obese Patients and the Geriatric Patients	**2**	**4**

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14.	final-term exam	**a1-5, b1-3**		**1**	**2**

Number of Weeks /and Units Per Semester			**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1.	Calculate the pharmacokinetic parameters of some drugs that follow zero order.	**c1, d1,d2,d3**	**1**	**2**
2.	Calculate the pharmacokinetic parameters of some drugs that follow first order.	**c1, d1,d2,d3**	**1**	**2**
3.	The one-compartment open model with an intravenous bolus dose: calculating pharmacokinetic parameters from plasma data	**c1,c2, d1,d2,d3**	**1**	**2**
4.	The one-compartment open model with an intravenous bolus dose: calculating pharmacokinetic parameters from urinary data	**c1,c2,c3, d1,d2,d3**	**1**	**2**
5.	The one-compartment open model with an intravenous infusion: calculating pharmacokinetic parameters from continues infusion, infusion with a bolus dose, post infusion data.	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
6.	Calculate the steady-state C max and C min after multiple IV bolus dosing of drugs.	**c1,c2,c3, d1,d2,d3**	**1**	**2**
7.	Mid-term exam	**c1-4**	**1**	**2**
8.	The one-compartment open model with absorption and elimination: calculating pharmacokinetic parameters from plasma data(Extravascular PK).	**c1,c2,c3,c4, d1,d2,d3**	**2**	**2**
9.	The one-compartment open model with multiple dosing kinetics: multiple dosing IV	**c1,c2,c3,c4, d1,d2,d3**	**1**	**2**
10.	The one-compartment open model with multiple dosing kinetics: multiple dosing oral (Extravascular PK).	**c1,c2,c3,c4,c5, d1,d2,d3**	**1**	**2**

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11.	The two-compartment open model with intravenous administration.	**c1,c2,c3,c4,c5, d1,d2,d3**	**1**	**2**
12.	Designing dosing regimens and Sources of variation in intrinsic clearance	**c1,c2,c3,c4,c5, d1,d2,d3**	**1**	**2**
13.	Calculating pharmacokinetic parameters from Michaelis–Menton kinetics and Non-linear PK	**c5, d1,d2,d3**	**1**	**2**
	model.			
14.	Estimating clinical pharmacokinetic parameters, dosage regimen according to age, and diseases state.	**c5, d1,d2,d3**	**1**	**2**
15.	final-term exam	**c1-5**	**1**	**2**
Number of Weeks /and Units P r Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, Written exam, Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-5, d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	**a1-5,b1-3,** d1-3
9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	**a1-5, b1-3,** d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	**c1-5**
11.	**Practical mid-semester exam**	7th	15	10%	**c1-4**
12.	**Theoretical mid-semester exam**	7th	30	20%	**a1-4, b1-3**
13.	**Final Exam (theoretical)**	**16th**	50	33%	**a1-5, b1-3**
14.	**Final Exam (practical)**	**16th**	20	13%	**c1-5**
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

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	1-A book prepared by the staff members 2-Shargel, L and Yu, ABC., 2016, *Applied Biopharmaceutics & pharmacokinetics*, 7th edition, McGraw-Hill Education, New York. 3-Bauer, LA, 2008, *Applied clinical pharmacokinetics*, 2nd edition, McGraw-Hill Companies, Inc, New York.
6- Recommended Readings and Reference Materials	
	1-Rowland M, Tozer T, 1995, Clinical Pharmacokinetics—Concepts and Applications, 3rd ed, Lea & Febiger, Philadelphia. 2-Levine RR, 1990, Drug Actions and Reactions, 4th ed., Little, Brown, Boston. 3- Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia.
7- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com/
8- Other Learning Material:	
	J Pharmacokinet Biopharm J Pharm Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, etc. - Well-equipped laboratories with all required equipment and slide.
2 - Computing resources:	- Computer laboratory with internet facilities.

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XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

6- Course development plans

- Conducting regular workshops for the staff for improving their course specification skills.
- Regular revision of course specification and syllabus items.

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II.	Course Policies:
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardiness:** ▪ Non-reasonable frequent tardiness will be allowed and is considered as absence from the lectures/
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:**

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	▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Community Pharmacy Practice (II)

I. Course Identification and General Information:							
1	**Course Title:**	**Community Pharmacy Practice (II)**					
2	**Course Number & Code:**	Ph2816					
3	**Credit hours:**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		2	2		-	3	
4	**Study level/ semester at which this course is offered:**	Fourth year, second Semester					
5	**Pre –requisite (if any):**	Pharmaceutical Care (I) and Community Pharmacy Practice (I)					
6	**Co –requisite (if any):**	4th level/ second semester					
7	**Program (s) in which the course is offered:**	Bachelor degree of pharmacy					
8	**Department (s) in which the course is offered:**	Pharmaceutics					
9	**Language of teaching the course:**	English					
10	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University					
11	**Prepared by:**	Prof. Dr. Ahmed Mohamed Sabati					
12	**Date of approval:**						

II. Course Description:

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The course includes the activities of the community pharmacist in processing prescription, care of patients or clinical pharmacy, monitoring and utilization, small-scale manufacture of medicines, responding to symptoms of minor ailments (OTC drug), informing health care professionals and the public health promotion. **Overall Aims of Course:**
Diagnose and treatment of some minor illness

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Identify the High-Risk Groups
2. Describe prescription and symptoms of some minor ailments.
3. Choose rationally the optimal adjuvant OTC drugs for some minor ailments
4. Differentiate the symptoms of different conditions 5. Relate the High-Risk Groups to OTC products.
6. Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders
7. Diagnose and treat of some minor illnesses
8. Monitor and dispense the drug prescription
9. Manage the drug adverse effect or drug interaction.
10. Practice OTC For treat different conditions
11. Interact effectively with patients, the public and health professionals.
12. Reflect on the use of communication skills in counter prescribing.
13. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

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Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of social, behavioral, health and, pharmaceutical sciences.	**a1-**	Identify the High-Risk Groups.
A3	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of	**a2-**	Describe prescription and symptoms of some minor ailments.
	patient's medication, rationalize drug use and overall health needs.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods , Computer based teaching and learning, group discussion, case study and tutorial exam.	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written ailments.
a1-	Identify the High-Risk Groups.		
a2-	Describe prescription and symptoms of some minor		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub- PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able		After completing this course, students will be able to: to:	
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered	**b1-**	Choose rationally the optimal adjuvant OTC drugs for some minor ailments

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pharmaceutical problems and plan the strategies for their solution, to develop the health care.

b2- Differentiate the symptoms of different conditions **b3-** Relate the High-Risk Groups to OTC products.

b4- Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.	Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:	Lectures methods, Group Discussion, Problem solving sessions, brainstorming and	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, OTC drugs for some minor ailments
b1- Choose rationally the optimal adjuvant		
b2- Differentiate the symptoms of different conditions	Computer based teaching and learning	homework, and Written exam.
b3- Relate the High-Risk Groups to OTC products.		
b4- Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Diagnose and treat of some minor illnesses.
		c2-	Monitor and dispense the drug prescription.

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C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3-**	Manage the drug adverse effect or drug interaction.
		c4-	Practice OTC For treat different conditions

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming, case study and group discussion	Practical works, homework, practical exam and practical reports.
c1-	Diagnose and treat of some minor illnesses.		
c2-	Monitor and dispense the drug prescription.		
c3-	Manage the drug adverse effect or drug interaction.		
c4-	Practice OTC For treat different conditions		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Interact effectively with patients, the public and health professionals.
D4	Take responsibility for adaptation to change needs in pharmacy practice.	**d2**	Reflect on the use of communication skills in counter prescribing.
D5-	Apply information and communication technology and working effectively in a team.	**d3**	Explore and use internet resources to search for up-todate information in the areas of interest and solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

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Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Interact effectively with patients, the public and health professionals.		
d2	Reflect on the use of communication skills in counter prescribing.		
d3	Explore and use internet resources to search for up-todate information in the areas of interest and solve emerging problems.		

V.	VI. Course Content:				
	1 – Course Topics/Items:				
	a – Theoretical Aspect				
Week	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Number of weeks**	**Contact hours**
1	Respiratory .T.I.	a2, a3,b1-3, c1-3, d1-3	OTC products for Allergy	1	2
2	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC products for Hay-fever	1	2
3	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC for Common cold	1	2

4	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC products for Coughs	1	2
5	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC products for Sore Throat	1	2
6	Hemorrhoids	a2, a3,b1-3, c1-3, d1-3	OTC products for hemorrhoids	1	2
7	Skin Conditions	a2, a3,b1-3, c1-3, d1-3	OTC For athelot's foot.	1	2
8	Nappy rash	a2, a3,b1-3, c1-3, d1-3	OTC products For nappy rash	1	2
9	Candidiasis	a2, a3,b1-3, c1-3, d1-3	OTC For Candidiasis	1	2
10	Acne vulgaris	a2, a3,b1-3, c1-3, d1-3	OTC For Acne vulgaris	1	2
11	Acne vulgaris	a2, a3,b1-3, c1-3, d1-3	OTC For Acne vulgaris	1	2
12	Psoriasis	a2, a3,b1-3, c1-3, d1-3	OTC products for Psoriasis	1	2
13	Topical pain	a2, a3,b1-3, c1-3, d1-3	OTC For anesthetics	1	2
14	Topical pain	a2, a3,b1-3, c1-3, d1-3	OTC Oral analgesics	1	2
Number of Weeks /and Units Per Semester				**14**	**28**

Note: 2 practical hours equal one credit hour

b- Practical Aspect:

Week	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	OTC products for Allergy	c1-4	**1**	**2**
2	OTC products for Hay-fever	c1-4	**1**	**2**

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3	OTC for Common cold	c1-4	**1**	**2**
4	OTC products for Coughs	c1-4	**1**	**2**
5	OTC products for Sore Throat	c1-4	**1**	**2**
6	OTC products for hemorrhoids	c1-4	**1**	**2**
7	OTC For athelot's foot.	c1-4	**1**	**2**
8	OTC products For nappy rash	c1-4	**1**	**2**
9	OTC For Candidiasis	c1-4	**1**	**2**
10	OTC For Acne vulgaris	c1-4	**1**	**2**
11	OTC For Acne vulgaris	c1-4	**1**	**2**
12	OTC products for Psoriasis	c1-4	**1**	**2**
13	OTC For anesthetics	c1-4	**2**	**4**
Number of Weeks /and Units Per Semester			**14**	**28**

I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

I. Schedule of Assessment Tasks for Students During the Semester:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.احمد
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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-2,b1-2, c1-3
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-3, b3, c1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	8th	30	20%	a1-3,b1-3, c1-3
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-3,b1-3, c1-3
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)

VIII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)	
	1- Handbook of Non-Prescription drugs

2- Recommended Readings and Reference Materials	
	Pharmaceutical Practice, Winfield, 4th edition
3- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
4- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
5- Other Learning Material:	
	-

II. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

III. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Community Pharmacy Practice (II)

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member		Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Community Pharmacy Practice (II)				
2-	Course Number & Code:	Ph2816				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	4th level /2nd semester				
5-	Pre –requisite (if any):	Pharmaceutical Care (I) and Community Pharmacy Practice (I)				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor degree of pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

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III- Course Description:

The course includes the activities of the community pharmacist in processing prescription, care of patients or clinical pharmacy, monitoring and utilization, small-scale manufacture of medicines, responding to symptoms of minor ailments (OTC drug), informing health care professionals and the public health promotion. **Overall Aims of Course:**

Diagnose and treatment of some minor illness

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Identify the High-Risk Groups
2. Describe prescription and symptoms of some minor ailments.
3. Choose rationally the optimal adjuvant OTC drugs for some minor ailments
4. Differentiate the symptoms of different conditions
5. Relate the High-Risk Groups to OTC products.
6. Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders
7. Diagnose and treat of some minor illnesses
8. Monitor and dispense the drug prescription
9. Manage the drug adverse effect or drug interaction.
10. Practice OTC For treat different conditions
11. Interact effectively with patients, the public and health professionals.
12. Reflect on the use of communication skills in counter prescribing.
13. Explore and use internet resources to search for up-to-date information in the areas of interest and solve emerging problems

14	**V- Course Content:**				
	1 – Course Topics/Items:				
	a – Theoretical Aspect				
Week	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Week due**	**Contact hours**

1	Respiratory .T.I.	a2, a3,b1-3, c1-3, d1-3	OTC products for Allergy	1	2
2	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC products for Hay-fever	2	2
3	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC for Common cold	3	2
4	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC products for Coughs	4	2
5	Respiratory .T.I	a2, a3,b1-3, c1-3, d1-3	OTC products for Sore Throat	5	2
6	Hemorrhoids	a2, a3,b1-3, c1-3, d1-3	OTC products for hemorrhoids	6	2
7	Skin Conditions	a2, a3,b1-3, c1-3, d1-3	OTC For athelot's foot.	7	2
8	Med Exam	a1-3,b1-3, c1-3		8	2
9	Nappy rash	a2, a3,b1-3, c1-3, d1-3	OTC products For nappy rash	9	2
10	Candidiasis	a2, a3,b1-3, c1-3, d1-3	OTC For Candidiasis	10	2
11	Acne vulgaris	a2, a3,b1-3, c1-3, d1-3	OTC For Acne vulgaris	11	2
12	Acne vulgaris	a2, a3,b1-3, c1-3, d1-3	OTC For Acne vulgaris	12	2
13	Psoriasis	a2, a3,b1-3, c1-3, d1-3	OTC products for Psoriasis	13	2
14	Topical pain	a2, a3,b1-3, c1-3, d1-3	OTC For anesthetics	14	2
15	Topical pain	a2, a3,b1-3,	OTC Oral analgesics	15	2
		c1-3, d1-3			
16	**Final Term Exam**	a1-3,b1-3, c1-3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

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b- Practical Aspect:

Week	Training Tasks	CILOs (symbols)	Week due	Contact hours
1	OTC products for Allergy	c1-4	**1**	**2**
2	OTC products for Hay-fever	c1-4	**2**	**2**
3	OTC for Common cold	c1-4	**3**	**2**
4	OTC products for Coughs	c1-4	**4**	**2**
5	OTC products for Sore Throat	c1-4	**5**	**2**
6	OTC products for hemorrhoids	c1-4	6	**2**
7	OTC For athelot's foot.	c1-4	**7**	**2**
8	Med Term Training Exam	c1-4	**8**	**2**
9	OTC products For nappy rash	c1-4	**9**	**2**
10	OTC For Candidiasis	c1-4	**10**	**2**
11	OTC For Acne vulgaris	c1-4	**11**	**2**
12	OTC For Acne vulgaris	c1-4	**12**	**2**
13	OTC products for Psoriasis	c1-4	**13**	**2**
14	OTC For anesthetics	c1-4	**14**	**2**
15	OTC products for Allergy	c1-4	**,15**	**2**
	Final exam	c1-4	**16**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

II. a-Teaching strategies of the course:

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Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

IV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-2,b1-2, c1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-3, b3, c1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	8th	30	20%	a1-3,b1-3, c1-3
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-3,b1-3, c1-3
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

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VI- Students' Support:	
Office Hours/week	**Other Procedures (if any)**

VII- Learning Resource (MLA style or APA style)S:	
6- Required Textbook(s) (maximum two)	
	1- Handbook of Non-Prescription drugs
7- Recommended Readings and Reference Materials	
	Pharmaceutical Practice, Winfield, 4th edition
8- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
9- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
10- Other Learning Material:	
	-

V. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

VI. Course Improvement Processes:
6- Strategies for obtaining student feedback on effectiveness of teaching

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	□ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. □ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Advanced Drug Delivery Systems

I. Course Identification and General Information:							
1	**Course Title:**	Advanced Drug Delivery Systems					
2	**Course Number & Code:**	**Ph2817**					
3	**Credit hours: 2hrs**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		2				**2**	
4	**Study level/ semester at which this course is offered:**	Fourth year/Second semester					
5	**Pre –requisite (if any):**	Pharmaceutics I-IV- Biopharmaceutics					
6	**Co –requisite (if any):**	Pharmacokinetics					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy					
8	**Language of teaching the course:**	English					
9	**The department in which the course is offered:**	Pharmaceutics and Industrial Pharmacy					
10	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University					
11	**Prepared by:**	**Prof Dr/ Mahmoud Mahyoob Alburyhi**					
12	**Date of approval:**						

II. Course description:

This course aims to provide the students to introduce the different technologies that have been investigated recently to enhance the drug accumulation at their target sites. Describe the characters and formulation of drug delivery dosage forms.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the different terminology as sustain, control, drug targeting, novel drug delivery….etc
2. Acquire the knowledge of drug delivery systems.
3. Define the theoretical background of drug release utilized for drug targeting
4. Describe the characters and formulation of drug delivery dosage forms
5. Estimate the differences between methods of formulations for various controlled and colloidal drug new delivery systems in a safe and effective way
6. Relate polymeric structure and properties with the desired drug delivery systems.
7. Identify the methods of achieving drug delivery systems.
8. Illustrate the basic concepts of controlled drug delivery and targeting
9. Monitor the methods of development of colloidal carriers for targeting of drugs
10. Be able to work in industry in either production or quality control of drug delivery systems.
11. Acquire good, scientific knowledge so his counseling abilities to patients improve health
12. Communicate effectively with patients and health care professionals

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Define the different terminology as sustain, control, drug targeting, novel drug delivery.etc

A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of	**a2-**	Acquire the knowledge of drug delivery systems.
	therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.		
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a3-**	Define the theoretical background of drug release utilized for drug targeting
		a4-	Describe the characters and formulation of drug delivery dosage forms

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures and group discussion	Attendance, Written, oral exams and small projects
a1-	Define the different terminology as sustain, control, drug targeting, novel drug delivery….etc		
a2-	Acquire the knowledge of drug delivery systems.		
a3-	Define the theoretical background of drug release utilized for drug targeting		
a4-	Describe the characters and formulation of drug delivery dosage forms		

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(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and	**b1-**	Estimate the differences between methods of
	physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.		formulations for various controlled and colloidal drug new delivery systems in a safe and effective way
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Relate polymeric structure and properties with the desired drug delivery systems.
		b3-	Identify the methods of achieving drug delivery systems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams project, and small projects
b1-	Estimate the differences between methods of formulations for various controlled and colloidal drug new delivery systems in a safe and effective way		
b2-	Relate polymeric structure and properties with the desired drug delivery systems.		

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محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

b3-	Identify the methods of achieving drug delivery systems.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines	**c1-**	Illustrate the basic concepts of controlled drug delivery and targeting
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c2-**	Monitor the methods of development of colloidal carriers for targeting of drugs
		c3-	Be able to work in industry in either production or quality control of drug delivery systems.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
c1-	Illustrate the basic concepts of controlled drug delivery and targeting		

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c2	Monitor the methods of development of colloidal carriers for targeting of drugs		
c3	Be able to work in industry in either production or quality control of drug delivery systems.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Acquire good, scientific knowledge so his counseling abilities to patients improve health
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	**d2**	Communicate effectively with patients and health care professionals
D5-	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, brainstorming and group discussion	Written, oral exams, report, project and observation.
d1-	Acquire good, scientific knowledge so his counseling abilities to patients improve health		
d2-	Communicate effectively with patients and health care professionals		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to advanced drug delivery and Targeting	**a1,a2,a3, b1, b2, b3, c3, d2**	Drug Delivery: The Basic Concepts Biopharmaceutical, Physiological, and Clinical Considerations	**1**	**2**
2	Types of DDS Physicochemical properties of drugs	**a1, a2, c1, c3, d1, d2**	Factors Controlling Pharmacokinetics of DDS, Drug carriers	**1**	**2**
3	Biological factors influencing design and performance of sustained/controlled release	**a3,a4, b2,b3, c1, c2, d1**	Definition factors Classification	**1**	**2**
	products				
4	Delivery principles and Use of polymers	**a4, b2, b3, c1, d1**	Nasal drug delivery, colorectal drug delivery, pulmonary drug delivery, cardiovascular drug delivery	**1**	**2**
5	Drug targeting	**a4, b2, d1, d2**	Human intestinal cellular characteristics and drug permeability, targeted drug delivery to tumor cells	**1**	**2**

6	Routes of drug delivery Oral DDS	**a4, b3, d1, d2**	Softgel Formulations, Improving Drug Release Mechanisms of Oral Preparations, Oral trans-mucosal drug delivery	**1**	**2**
7	**Mid-term exam**	**a1-4, b1-3, c1-3**		**1**	**2**
8	Transdermal DDS	**a3, a4,b1, c1, c3, d1,d2**	Local application, carriers, formulations, Penetration enhancers, future prospectives	**1**	**2**
9	Parenteral DDS	**a4, b3, c3, d1, d2**	Formulations, carriers	**1**	**2**
10	Targeting to different sites	**a4, b1, b2, b3, c3**	Polymeric Carriers for Drug Delivery	**1**	**2**
11	Design of targeting carriers	**a4, b3, c3, d1, d2**	Receptor-Mediated Targeted Drug Delivery	**1**	**2**
12	Microencapsulation and Bioadhesion	**a4, b2,b3,c3, d1, d2**	formulations for extended-release matrices	**1**	**2**
13	Microemulsions	**a4, b3, d1, d2**	Types, application	**1**	**2**
14	Nanoparticles as controlled drug delivery systems.	**a2,a3, b1, b2, b3, c3, d2**	technology application in pulmonary delivery of proteins, Polymer nanoparticles in drug	**1**	**2**
			delivery system		
15	Future directions of drug delivery and targeting	**a3, b1, b2, b3, c3, d2**	Novel carriers and formulations for drug delivery Novel approaches	**1**	**2**
16	Final-term exam	**a1-4, b1-3, c1-3**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

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Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.
b-Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation, Homework, reports	All weeks	**10**	10%	**a1-4, b1-3, c1-3, d1-2**
2	Written Mid exam, Oral exam, projects	2-14	**30**	30%	**a1-4, b1-3, c1-3**
3	Written Final exam	16th	**60**	60%	**a1-4, b1-3, c1-3**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

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X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. A book prepared by the staff members
2. Taylor and Francis (2001) Drug Delivery and Targeting, first edition, London and New York.
3. Chien, Y.W. (ed.) (1991) Novel Drug Delivery Systems, 2nd edn. Marcel Dekker, New Yor

2- Recommended Readings and Reference Materials

1. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea & Febiger; Philadelphia; London.
2. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th edition Churchill Livingstone, Edinburgh.
3. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
4. Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia.
5. Florence, A.T. and Attwood D. (1998) Physicochemical Principles of Pharmacy, 3rd edn. Macmillan London.

6.Robinson, J.R. and Lee, V.L. (eds) (1987) Controlled Drug Delivery: Fundamentals and Applicat 2nd edn. Marcel Dekker, New York.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com

4- Other Learning Material:

International journal of drug delivery
J. Pharm. Sci
Published articles related to the discussed topics

	United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Advanced Drug Delivery systems

I. - Information about Faculty Member Responsible for the Course:		
Name of Faculty Member	**Prof Dr/ Mahmoud Mahyoob Alburyhi**	**Office Hours**

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محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:

1-	**Course Title:**	**Advanced Drug Delivery Systems**				
2-	**Course Number & Code:**	Ph2817				
3-	**Credit hours: 2hrs**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	-		2
4-	**Study level/year at which this course is offered:**	Fourth year/Second semester				
5-	**Pre –requisite (if any):**	Pharmaceutics I-IV- Biopharmaceutics				
6-	**Co –requisite (if any):**	Pharmacokinetics				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

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This course aims to provide the students to introduce the different technologies that have been investigated recently to enhance the drug accumulation at their target sites. Describe the characters and formulation of drug delivery dosage forms.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Define the different terminology as sustain, control, drug targeting, novel drug delivery….etc
2. Acquire the knowledge of drug delivery systems.
3. Define the theoretical background of drug release utilized for drug targeting
4. Describe the characters and formulation of drug delivery dosage forms
5. Estimate the differences between methods of formulations for various controlled and colloidal drug new delivery systems in a safe and effective way
6. Relate polymeric structure and properties with the desired drug delivery systems.
7. Identify the methods of achieving drug delivery systems.
8. Illustrate the basic concepts of controlled drug delivery and targeting
9. Monitor the methods of development of colloidal carriers for targeting of drugs
10. Be able to work in industry in either production or quality control of drug delivery systems.
11. Acquire good, scientific knowledge so his counseling abilities to patients improve health
12. Communicate effectively with patients and health care professionals

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Introduction to advanced drug delivery and Targeting	**a1,a2,a3, b1, b2, b3, c3, d2**	Drug Delivery: The Basic Concepts Biopharmaceutical, Physiological, and Clinical Considerations	**1**	**2**
2	Types of DDS Physicochemical properties of drugs	**a1, a2, c1, c3, d1, d2**	Factors Controlling Pharmacokinetics of DDS, Drug carriers	**1**	**2**
3	Biological factors influencing design and performance of sustained/controlled release products	**a3,a4, b2,b3, c1, c2, d1**	Definition factors Classification	**1**	**2**
4	Delivery principles and Use of polymers	**a4, b2, b3, c1, d1**	Nasal drug delivery, colorectal drug delivery, pulmonary drug delivery, cardiovascular drug delivery	**1**	**2**
5	Drug targeting	**a4, b2, d1, d2**	Human intestinal cellular characteristics and drug permeability, targeted drug delivery to tumor cells	**1**	**2**
6	Routes of drug delivery Oral DDS	**a4, b3, d1, d2**	Softgel Formulations, Improving Drug Release Mechanisms of Oral Preparations, Oral trans-mucosal drug delivery	**1**	**2**
7	**Mid-term exam**	**a1-4, b1-3, c1-3**		**1**	**2**
8	Transdermal DDS	**a3, a4,b1, c1, c3, d1,d2**	Local application, carriers, formulations, Penetration enhancers, future prospectives	**1**	**2**
9	Parenteral DDS	**a4, b3, c3, d1, d2**	Formulations, carriers	**1**	**2**

10	Targeting to different sites	**a4, b1, b2, b3, c3**	Polymeric Carriers for Drug Delivery	**1**	
					2
11	Design of targeting carriers	**a4, b3, c3, d1, d2**	Receptor-Mediated Targeted Drug Delivery	**1**	**2**
12	Microencapsulation and Bioadhesion	**a4, b2,b3,c3, d1, d2**	formulations for extended-release matrices	**1**	**2**
13	Microemulsions	**a4, b3, d1, d2**	Types, application	**1**	**2**
14	Nanoparticles as controlled drug delivery systems.	**a2,a3, b1, b2, b3, c3, d2**	technology application in pulmonary delivery of proteins, Polymer nanoparticles in drug delivery system	**1**	**2**
15	Future directions of drug delivery and targeting	**a3, b1, b2, b3, c3, d2**	Novel carriers and formulations for drug delivery Novel approaches	**1**	**2**
16	Final-term exam	**a1-4, b1-3, c1-3**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

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No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-3, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation, Homework, reports	All weeks	**10**	10%	**a1-4, b1-3, c1-3, d1-2**
2	Written Mid exam, Oral exam, projects	2-14	**30**	30%	**a1-4, b1-3, c1-3**
3	Written Final exam	16th	**60**	60%	**a1-4, b1-3, c1-3**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

4. A book prepared by the staff members
5. Taylor and Francis (2001) Drug Delivery and Targeting, first edition, London and New York.
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2- Recommended Readings and Reference Materials	
	6. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea & Febiger; Philadelphia; London. 7. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th edition Churchill Livingstone, Edinburgh. 8. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
	9. Gibaldi, M. (1991) Biopharmaceutics and Clinical Pharmacokinetics, 4th edn. Lea & Febiger, Philadelphia. 10. Florence, A.T. and Attwood D. (1998) Physicochemical Principles of Pharmacy, 3rd edn. Macmillan London. 6.Robinson, J.R. and Lee, V.L. (eds) (1987) Controlled Drug Delivery: Fundamentals and Applicat 2nd edn. Marcel Dekker, New York.
3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com
4- Other Learning Material:	
	International journal of drug delivery J. Pharm. Sci Published articles related to the discussed topics United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD. British Pharmacopoeia (latest edition), HMSO. London. Martindale, W. (latest edition) The Extra Pharmacopoeia., Royal Pharmaceutical Society of Great Britain, London.

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

XII. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the
	Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	

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محمود البريهي	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Medicinal Chemistry III

I. Course Identification and General Information:

1	**Course Title**	Medicinal Chemistry III				
2	**Course Number & Code:**	Ph5811				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	4th level /2nd semester				
5	**Pre –requisite (if any):**	Pharmaceutical analytical chemistry I&II and pharmaceutical organic chemistry I, II & III and Medicinal Chemistry I				
6	**Co –requisite (if any):**	Pharmacology IV				
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
11	**Prepared by:**	Associate Prof. Tawfeek Ahmed Alobaidy Associate Prof. Shada H. Yassin				
12	**Date of approval:**					

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II. Course description:

The course is concerned with the fundamental knowledge about the synthesis, metabolism, physicochemical properties and their effect on drug profile. The practical part will be devoted to tutorials and studying on the qualitative and quantitative analysis and synthesis of some drugs in this course.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the structural mechanism of action of studied classes of drugs
2. Outline the synthesis of some studied classes of drugs
3. Illustrate the SAR of each category in the course.
4. Discuss the metabolism and toxicity of studied classes of drugs**.**
5. Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.
6. Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.
7. Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.
8. Design and evaluate qualitative and quantitative analysis of some drugs
9. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
10. Carry out synthesis some drugs.
11. Determine the quantitative analysis of some drugs.
12. Practice the qualitative analysis of some drugs.
13. Analyze the result of experimental tests that is practiced for some studied drugs
14. Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.
15. Implement writing and presentation skills and demonstrate creativity and time management.

16. Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-	Course Intended Learning Outcomes (CILOs)

PILOs) in: Knowledge and Understanding		in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize the mechanism of action of studied classes of drugs
		a2-	Recognize the synthesis of some studied classes of drugs
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR),	a3-	Illustrate the SAR of each category in the course.
	toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a4-	Discuss the metabolism and toxicity of studied classes of drugs.
		a5-	Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Explain the mechanism of action of studied classes of drugs		Quizzes, Attendance, Participation, Short

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a2-	Recognize the synthesis of some studied classes of drugs	Lecture method , Computer based teaching and learning, group discussion and tutorial	answers, reports, homework, and Written exam.
a3-	Illustrate the SAR of each category in the course.		
a4-	Discuss the metabolism and toxicity of studied classes of drugs**.**		
a5-	Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b2-**	Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.
		b3-	Design and evaluate qualitative and quantitative analysis of some drugs

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions and brainstorming	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.		
b3-	Design and evaluate qualitative and quantitative analysis of some drugs		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C2-		**c2-**	Carry out synthesis some drugs.

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	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c3-**	Determine the quantitative analysis of some drugs
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c4-**	Practice the qualitative analysis of some drugs
		c5-	Analyze the result of experimental tests that is practiced for some studied drugs

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be	Methods of assessment
After participating in the course, students would be able to:		**used**	
c1-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.	Lecture method, Practical sessions, Problem solving sessions and brainstorming	Practical works, homework, practical exam and practical reports.
c2-	Carry out synthesis some drugs.		
c3-	Determine the quantitative analysis of some drugs		
c4-	Practice the qualitative analysis of some drugs		
c5-	Analyze the result of experimental tests that is practiced for some studied drugs		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Implement writing and presentation skills and demonstrate creativity and time management.
		d3-	Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		Teaching strategies/methods to be used.	Methods of assessment
d1-	Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.	Small group discussions, Tutorials and Practical sessions.	Homework, and reports.
d2-	Implement writing and presentation skills and demonstrate creativity and time management.		
d3-	Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	**Antibacterial agents**	a1, a2, a3,a4, b1,b2, d1,d2, d3	**Sulfonamides;** - Classification, - Mechanism of action - SAR, - Synthesis, - Metabolism,	1	2
2.	**Antibiotics I**	a1, a2,a3,a4, a5 b1,b2, b3, d1,d2, d3	**Penicillins;** - Mechanism of action - SAR - Stereochemistry - Orally and injectable Penicillins - Long acting Penicillins - β- Lactamase sensitive and resistant Penicillins - Broad spectrum Penicillins - Allergy to Penicillins	1	2
3.		a1, a2,a3,a4, a5	**A. Cephalosopins**; - Mechanism of action	1	2

	Antibiotics II	b1,b2, d1,d2, d3	- SAR - Stereochemistry - 1st generation, - 2nd generation, - 3rd generation, - 4th generation and - 5th generation **B.** Monolactam and carbapenam.		
4.	**Antibiotics III**	a1, a3,a4, b1,b2, b3, d1,d2, d3	- Tetracyclines, and - Aminoglycosides	1	2
5.	**Antibiotics IV**	a1, a2,a3,a4, a5 b1,b2, b3d1,d2, d3	- Lincosamide, - Macrolide & - Chlormphenicol	1	2
6.	**Quinolones**	a1, a3,a4, a5 b1,b2, b3, d1,d2, d3	- 1st Generation **Quinolones** - 2nd Generation **Quinolones** and - 3rd Generation **Quinolones**	1	2
7.	**Mid Exam**	a1-5, b1-2		1	2
8.	**Anti Mycobacterial Agents**	a1, a2,a3,a4, a5 b1,b2, b3d1,d2, d3	- Anti T.B: 1st line Anti T.B 2nd line Anti T.B - Antileprosy	1	2
9.	**Anti-infective agents**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	Alcohols, phenols, oxidizing agents, iodine, chlorine compound, cationic surfactants, medicinal dyes, mercury compound preservatives	1	2

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10.	**Antifungal Agent**	a1, a3,a4, a5 b1,b2, d1,d2, d3	- Types of Fungi - Antibiotics, - Azoles, - Allylamines and morpholines - Antimetabolites, - Fatty acids and dyes	2	4
11.	**Antiviral agent**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	- Types viruses, - DNA viral replication, - The building blocks of DNA nucleosides, - Agents interfere with viral nucleic acid replication - Anti-Retroviral [AntiHIV] Agents - Agents inhibit the uncoating process, Neuraminidase - Inhibitors, Non-Nucleoside Reverse Transcriptase [RT] Inhibitors. - HIV Protease Inhibitors	2	4
12.	**Anticancer I**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	- Types of Neoplasm - Mechanism of Cancer formation - Chemotherapeutic Agents Alkylating agents. Anti-metabolites [Specific S]	1	2
13.	**Anticancer II**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	DNA intercalating agents. Antibiotics. Antimitotic agents [Specific M]. Hormones. Miscellaneous compounds.	1	2
14.	**Antihistamines**	a1, a3,a4, a5 b1,b2, d1,d2, d3	- 1st generation, 2nd generation H_1-antihistamines - H_2- antihistamines	2	4

15.	**Final Exam**	a1-5, b1, b2		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect				
Order	**Tasks/ Experiments**	**CILOs (symbols)**	**Number of Weeks**	**Contact Hours**
1	Hydrolytic cleavage of Sulfacetamide	**b3, c1,c2, c5, d1-3**	1	2
2	Crystallization and Identification of Some Sulfa drugs	**b3, c1, c2, c3, c5,**	1	2

		d1-3		
3	Synthesis of Diazonium salt of Sulfanilamide	**b3, c1,c2, c5, d1-3**	1	2
4	Quantitative estimation of Sulfamethoxazole and Trimethoprim in Tab	**b3,c1, c3, c5, d1-3**	1	2
5	Qualitative determination of **Penicillin**	**b3, c1, c3, c5, d1-3**	1	2
6	Mid-Exam	**b3, c1,c2, c3, c5**	1	2
7	Quantitative estimation of **Penicillin capsules** by spectrophotometric method	**b3, c1 ,c3, c5, d1-3**	1	2
8	Quantitative estimation of **Penicillin** by redox method	**b3, c1, c3, c5, d1-3**	1	2
9	Quantitative estimation of **Tetracycline cap.**	**b3, c1, c3, c5,d1-3**	1	2
10	**Spectrophotometric determination of Chloamphenicol eye ointment**	**b3, c1, c4, c5,d1-3**	1	2
11	Quantitative estimation of Nalidixic acid	**b3, c1 ,c3, c5,d1-3**	1	2
12	Quantitative estimation of INH	**b3, c1 ,c3, c5,d1-3**	1	2
13	Quantitative estimation of **Busulfan**	**b3, c1 ,c3, c5,d1-3**	1	2
14	**Identification of Chloroquine**	**b3, c1, c4, c5,d1-3**	1	2
15	**Assay of Chloroquine**	**b3, c1, c3, c5, d1-3**	1	2
16	Final Exam	**b3, c1-5**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam
Practical works, practical exam and practical reports.

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VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1,a3, a5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-3**		

I- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, reports and Participation**	**All Weeks**	10	7%	a1-5, b2-3, d1-3
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1,a3, a5, b1-3, d1-3
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	8th	15	10%	b3,c1-3
5.	**Theoretical mid-semester exam**	7th	30	20%	a1-5, b1-2
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-2
7.	**Final Exam (practical)**	**16th**	20	13%	b3, c1-5
	Total		**150**	**100%**	

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I. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

II. Learning Resources:

1- Required Textbook(s) (maximum two).

1- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

2- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

1- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approach edition, Oxford University Press, Inc., New York.

2- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia. 3- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

4- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

5- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

6- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

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	1- http://www.chemaxon/marvin 2- http://www.webmolecules.com 3-http://www.acdlabs.com 4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Medicinal Chemistry III

II- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Tawfeek A. Al-Obaidy Shada H. Yassin	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail	Tawfik_93@yahoo.com		4h				

III- Course Identification and General Information:

1-	Course Title:	Medicinal Chemistry III				
2-	Course Number & Code:	Ph5811				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	4th level / 2nd semester				

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5-	**Pre –requisite (if any):**	General Pharmaceutical chemistry, Pharmaceutical analytical chemistry I&II , Pharmaceutical organic chemistry I,II&III and Medicinal Chemistry I
6-	**Co –requisite (if any):**	Pharmacology IV
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy
8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

IV- Course description:

The course is concerned with the fundamental knowledge about the synthesis, metabolism, physicochemical properties and their effect on drug profile. The practical part will be devoted to tutorials and studying on the qualitative and quantitative analysis and synthesis of some drugs in this course.

V- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the structural mechanism of action of studied classes of drugs
2. Outline the synthesis of some studied classes of drugs
3. Illustrate the SAR of each category in the course.
4. Discuss the metabolism and toxicity of studied classes of drugs**.**
5. Recognize the stereochemistry in drug structure and their effect on pharmacokinetic and pharmacodynamic profile of the drugs.
6. Identify the pharmacophores and toxicophores in the structure and their effect on pharmacokinetic and pharmacodynamic properties of the drugs.
7. Predict the metabophores in the drug structure that are responsible for metabolism in the biological system.
8. Design and evaluate qualitative and quantitative analysis of some drugs
9. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
10. Carry out synthesis some drugs.
11. Determine the quantitative analysis of some drugs.
12. Practice the qualitative analysis of some drugs.
13. Analyze the result of experimental tests that is practiced for some studied drugs
14. Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.
15. Implement writing and presentation skills and demonstrate creativity and time management.
16. Use technology and technology efficiently to perform the required tasks in field of medicinal chemistry.

VI- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect					
Order	**Topic List / Units**	**CILOs (symbols)**	**Sub-topic List**	**Week Due**	**Contact hours**
1-	**Antibacterial agents**	a1, a2, a3,a4, b1,b2, d1,d2, d3	**Sulfonamides;** - Classification, - Mechanism of action - SAR, - Synthesis, - Metabolism,	1	2
2-	**Antibiotics I**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	**Penicillins;** - Mechanism of action - SAR - Stereochemistry - Orally and injectable Penicillins - Long acting Penicillins - β- Lactamase sensitive and resistant Penicillins - Broad spectrum Penicillins - Allergy to Penicillins	2	2
3-	**Antibiotics II**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	**C. Cephalosopins**; - Mechanism of action - SAR - Stereochemistry - 1st generation, - 2nd generation, - 3rd generation, - 4th generation and - 5th generation **D.** Monolactam and carbapenam.	3	2
4-	**Antibiotics III**	a1, a3,a4, b1,b2, d1,d2, d3	- Tetracyclines, and - Aminoglycosides	4	2

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5-	**Antibiotics IV**	a1,	- Lincosamide,	5	2
		a2,a3,a4, a5 b1,b2, d1,d2, d3	- Macrolide & - Chlormphenicol		
6-	**Quinolones**	a1, a3,a4, a5 b1,b2, d1,d2, d3	- 1st Generation **Quinolones** - 2nd Generation **Quinolones** and - 3rd Generation **Quinolones**	6	2
7-	**Mid Exam**	a1-5, b1-2		7	2
8-	**Anti Mycobacterial Agents**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	- Anti T.B: 1st line Anti T.B 2nd line Anti T.B - Antileprosy	8	2
9-	**Anti-infective agents**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	Alcohols, phenols, oxidizing agents, iodine, chlorine compound, cationic surfactants, medicinal dyes, mercury compound preservatives	9	2
10-	**Antifungal Agent**	a1, a3,a4, a5 b1,b2, d1,d2, d3	- Types of Fungi - Antibiotics, - Azoles, - Allylamines and morpholines - Antimetabolites, - Fatty acids and dyes	10	2

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11-	**Antiviral agent**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	- Types viruses, - DNA viral replication, - The building blocks of DNA nucleosides, - Agents interfere with viral nucleic acid replication - Anti-Retroviral [AntiHIV] Agents - Agents inhibit the uncoating process, Neuraminidase - Inhibitors, Non-Nucleoside Reverse Transcriptase [RT] Inhibitors. - HIV Protease Inhibitors	11	2
12-	**Anticancer I**	a1, a2,a3,a4, a5	- Types of Neoplasm - Mechanism of Cancer formation	12	2
		b1,b2, d1,d2, d3	- Chemotherapeutic Agents Alkylating agents. Anti-metabolites [Specific S]		
13-	**Anticancer II**	a1, a2,a3,a4, a5 b1,b2, d1,d2, d3	DNA intercalating agents. Antibiotics. Antimitotic agents [Specific M]. Hormones. Miscellaneous compounds.	13	2
14-	**Antihistamines**	a1, a3,a4, a5 b1,b2, d1,d2, d3	- 1st generation, 2nd generation H_1- antihistamines - H_2- antihistamines	14,15	4
15-	**Final Exam**	a1-5, b1, b2		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours

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1	Hydrolytic cleavage of Sulfacetamide	**b3, c1,c2, c5, d1-3**	1	2
2	Crystallization and Identification of Some Sulfa drugs	**b3, c1, c2, c3, c5, d1-3**	2	2
3	Synthesis of Diazonium salt of Sulfanilamide	**b3, c1,c2, c5, d1-3**	3	2
4	Quantitative estimation of Sulfamethoxazole and Trimethoprim in Tab	**b3,c1, c3, c5, d1-3**	4	2
5	Qualitative determination of **Penicillin**	**b3, c1, c3, c5, d1-3**	5	2
6	Mid-Exam	**b3, c1,c2, c3, c5**	6	2
7	Quantitative estimation of **Penicillin capsules** by spectrophotometric method	**b3, c1 ,c3, c5, d1-3**	7	2
8	Quantitative estimation of **Penicillin** by redox method	**b3, c1, c3, c5, d1-3**	8	2

9	Quantitative estimation of **Tetracycline cap.**	**b3, c1, c3, c5,d1-3**	9	2
10	**Spectrophotometric determination of Chloamphenicol eye ointment**	**b3, c1, c4, c5,d1-3**	10	2
11	Quantitative estimation of Nalidixic acid	**b3, c1 ,c3, c5,d1-3**	11	2
12	Quantitative estimation of INH	**b3, c1 ,c3, c5,d1-3**	12	2
13	Quantitative estimation of **Busulfan**	**b3, c1 ,c3, c5,d1-3**	13	2
14	**Identification of Chloroquine**	**b3, c1, c4, c5,d1-3**	14	2
15	**Assay of Chloroquine**	**b3, c1, c3, c5, d1-3**	15	2
16	Final Exam	**b3, c1-5**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VII- a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam
Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1,a3, a5, b1-4, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-5, d1-3**		

VII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, reports and Participation**	**All Weeks**	10	7%	a1-5, b2-3, d1-3
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1,a3, a5, b1-3, d1-3
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	8th	15	10%	b3,c1-3
12.	**Theoretical mid-semester exam**	7th	30	20%	a1-5, b1-2
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-5, b1-2
14.	**Final Exam (practical)**	**16th**	20	13%	b3, c1-5
	Total		**150**	**100%**	

VIII- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

IX- Learning Resources:

1- Required Textbook(s) (maximum two).

3- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

4- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University

Press Inc, New York.

2- Recommended Books and Reference Materials.

7- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approach edition, Oxford University Press, Inc., New York.

8- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia.

9- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

10- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

11- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

12- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc.*

16- http://www.chemaxon/marvin

2- http://www.webmolecules.com

3-http://www.acdlabs.com

4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

X- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XI- Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.

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	▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmaceutical Biostatistics

I. Course Identification and General Information:

1	**Course Title**	Pharmaceutical Biostatistics				
2	**Course Number & Code:**	Ph2818				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		1				**1**
4	**Study level/ semester at which this course is offered:**	4th level /2nd semester				
5	**Pre –requisite (if any):**	-				
6	**Co –requisite (if any):**	-				
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of pharmaceutics				
10	**Location of teaching the course:**	Faculty of Pharmacy				
11	**Prepared by:**	Prof. Abdulwali A. Saif				
12	**Date of approval:**					

II. Course description:

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The course is concerned with the basic knowledge about the pharmaceutical biostatistics including the basic principles for the collection, analysis, interpretation of research results and presentation of data in all fields of pharmaceutical sciences. The application of statistics program in analysis of data is also demonstrated.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principles of statistics.
2. Define the important statistical terms and parameters.
3. Explain concepts of probability, random variation, sampling, design the experiments estimation and confidence intervals.
4. Select appropriate statistical tests for analysis of pharmaceutical and medical data.
5. Evaluate and interpret the statistical procedures and graphics it in a health population context.
6. Apply assumptions and limitations of common statistical tests.
7. Apply numerical, tabular, and graphical descriptive techniques for the pharmaceutical data.
8. Apply some statistical program in analysis of data.
9. Calculate appropriate sample size in different types of pharmaceutical studies.
10. Work independently or collaboratively to prepare seminars/ presentations or write reports.
11. Demonstrate critical thinking, decision-making abilities and life-long learning.
12. Effectively use internet resources to search for up-to-date information to solve emerging problems.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A5-		a1-	Recognize principles of inferential statistics.

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	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health	**a2-**	Define the important statistical terms and parameters.
	care.		
		a3-	Explain concepts of probability, random variation, sampling, design the experiments estimation and confidence intervals

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize principles of inferential statistics.	Lecture method, computer based teaching and learning, group discussion.	Oral exam, Quizzes, Attendance, participation, Short answers, reports, homework, and Written exam.
a2-	Define the statistical terms and parameters.		
a3-	Explain concepts of probability, random variation, sampling, design the experiments Estimation and Confidence Intervals.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills
After completing this program, students would be able to:	After participating in the course, students would be able to:

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B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Select appropriate statistical tests for analysis of pharmaceutical and medical data.
		b2-	Evaluate and interpret the statistical procedures and graphics it in a health population context.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.		
		b3-	Apply assumptions and limitations of common statistical tests.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Select appropriate statistical tests for analysis of pharmaceutical and medical data.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions	Oral Exam, Quizzes, attendance, participation, Short answers, reports, and Written exam.
b2-	Evaluate and interpret the statistical procedures and graphics it in a health population context.		
b3-	Apply assumptions and limitations of common statistical tests.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Apply numerical, tabular, and graphical descriptive techniques for the pharmaceutical data.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		
		c2-	Apply some statistical program in analysis of data.
		c3-	Calculate appropriate sample size in different types of pharmaceutical studies.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Apply numerical, tabular, and graphical descriptive techniques for the pharmaceutical data.	Lecture method and group discussion	Homework and reports.
c2-	Apply some statistical program in analysis of data.		
c3-	Calculate appropriate sample size in different types of pharmaceutical studies.		

(D) General / Transferable Skills:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
عبدالولي احمد	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Work independently or collaboratively to prepare seminars/ presentations or write reports.
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2-**	Demonstrate critical thinking, decision making abilities and life-long learning.

D5-	Apply information and communication technology and working effectively in a team.	**d3-**	Effectively use internet resources to search for up-to-date information to solve emerging problems.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Work independently or collaboratively to prepare seminars/ presentations or write reports.	Small group discussions and Tutorials.	Homework, and reports.
d2-	Demonstrate critical thinking, decision making abilities and life-long learning.		
d3-	Effectively use internet resources to search for up-to-date information to solve emerging problems.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	**Introduction**	a1, c3, d1, d2	- Definitions, - Data Visualization - Stem-and-Leaf Plot - Samples and Populations	1	2
2.	**Location Parameters**	a1, a2, d1, d3	- Mode, Median, Mean, - Spread Parameters: range, variance, covariance, frequency distributions, bias, precision, and accuracy	1	2

3.	**Design of Experiments and Collection of Data**	a1, a3, c3, b3, d1-3	- Sampling by questionnaire - Sampling in the chemical laboratory - Sampling in biological and clinical experiments	1	2
4.	**Design and Conduct Of Clinical Trials**	a1, a3, b3, c1,d1-3	- Allocation of patients in randomized design - crossover design	2	4
5.	**Mid Exam**	a1-3, b3		1	2
6.	**The binomial and normal probability distributions**	a3, b1, b3, c1,d13	- The binomial distribution, - The normal distribution, - Computing probabilities from the normal distribution, - Normal approximation to the binomial distribution	1	2

7.	**Estimation and statistical inference and data transformations**	a3, b1, b3, c1, d1-3	- Estimation and confidence intervals - Statistical inference and the T distribution t - test - Construct a null hypothesis - Construct an alternative hypothesis - Choose the level of significance - Beta error and power - Choose a sample - Determine whether the test should be one- or two-sided - Make observations and construct a t test - Two independent sample T test - Paired t test	6	12
			- Tests for proportions - Chi-square test - The F distribution and tests of significance - Analysis of variance (ANOVA) and experimental design - Multiple comparisons in ANOVA, other ANOVA designs common to pharmaceutical problems - Crossover design - Nonparametric tests of significance - Exact tests - Rejection of aberrant observations.		

8.	**Applications of some statistical program**	a1, b2, c2, d1-3	Using of some statistical program in analysis of pharmaceutical data	2	4
9.	**Final Exam**	a1-3, b1-3, c1, c3		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials and brainstorming

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b2-3,d1-3**	Sporadic through the semester	**5**
2	Reports	**c1-3 ,d1-3**		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

1	**Attendance, Participation, Homework, Reports and quizzes**	**All Weeks**	10	10%	a1-3, b2-3, c1-3, d1-3
2	**Theoretical mid-semester exam**	6th	20	20%	a1-3, b3
3	**Final Exam (theoretical)**	**16th**	70	70%	a1-3, b1-3, c1, c3
	Total		**100**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Wayne W.D. 2004, Biostatistics : A foundation for Analysis in the health sciences 8th edition.

2- Essential Medical Statistics, 2003, 2nd ed. Blackwell Publishing company.

2- Recommended Books and Reference Materials.

1- Linda A. Felton,, 2013, Remington Essentials of Pharmaceutics, 1st edition, Pharmaceutical Press Lambeth High Street, London SE1 7JN, UK.

3- Electronic Materials and Web Sites *etc*.

http/ : en. Wikpedia. Org / wiki/ Biostatistics.

IV. Facilities Required:

	- Well-equipped lecture halls with data show facilities, whiteboards
1 - **Accommodation:**	net connection, etc.
	- Well-equipped laboratories with all required equipment and reagents
2 - **Computing resources:**	- Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Biostatistics

I- Information about Faculty Member Responsible for the Course:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
عبدالولي احمد	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Name of Faculty Member	Prof. Abdulwali A. Saif	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Pharmaceutical Biostatistics				
2-	Course Number & Code:	Ph2818				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	1		1
4-	Study level/year at which this course is offered:	4th level / 2nd semester				
5-	Pre –requisite (if any):	-				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course is concerned with the basic knowledge about the pharmaceutical biostatistics including the basic principles for the collection, analysis, interpretation of research results and presentation of data in all fields of pharmaceutical sciences. The application of statistics program in analysis of data is also demonstrated.

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IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principles of statistics.
2. Define the important statistical terms and parameters.
3. Explain concepts of probability, random variation, sampling, design the experiments estimation and confidence intervals.
4. Select appropriate statistical tests for analysis of pharmaceutical and medical data.
5. Evaluate and interpret the statistical procedures and graphics it in a health population context.
6. Apply assumptions and limitations of common statistical tests.
7. Apply numerical, tabular, and graphical descriptive techniques for the pharmaceutical data.
8. Apply some statistical program in analysis of data.
9. Calculate appropriate sample size in different types of pharmaceutical studies.
10. Work independently or collaboratively to prepare seminars/ presentations or write reports.
11. Demonstrate critical thinking, decision-making abilities and life-long learning.
12. Effectively use internet resources to search for up-to-date information to solve emerging problems.

13. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours

10.	**Introduction**	a1, c3, d1, d2	- Definitions, - Data Visualization - Stem-and-Leaf Plot - Samples and Populations	1	2
11.	**Location Parameters**	a1, a2, d1, d3	- Mode, Median, Mean, - Spread Parameters: range, variance, covariance, frequency distributions, bias, precision, and accuracy	2	2
12.	**Design of Experiments and Collection of Data**	a1, a3, c3, b3, d1-3	- Sampling by questionnaire - Sampling in the chemical laboratory - Sampling in biological and clinical experiments	3	2
13.	**Design and Conduct Of Clinical Trials**	a1, a3, b3, c1,d1-3	- Allocation of patients in randomized design - crossover design	4,5	4
14.	**Mid Exam**	a1-3, b3		6	2
15.	**The binomial and normal probability distributions**	a3, b1, b3, c1,d13	- The binomial distribution, - The normal distribution, - Computing probabilities from the normal distribution, - Normal approximation to the binomial distribution	7	2

16.	**Estimation and statistical inference and data transformations**	a3, b1, b3, c1, d1-3	- - Estimation and confidence intervals - - Statistical inference and the T distribution t - test Construct a null hypothesis Construct an alternative hypothesis	8-13	12
			- Choose the level of significance - Beta error and power - Choose a sample - Determine whether the test should be one- or two-sided - Make observations and construct a t test - Two independent sample T test - Paired t test - Tests for proportions - Chi-square test - The F distribution and tests of significance - Analysis of variance (ANOVA) and experimental design - Multiple comparisons in ANOVA, other ANOVA designs common to pharmaceutical problems - Crossover design - Nonparametric tests of significance - Exact tests - Rejection of aberrant observations.		

17.	**Applications of some statistical program**	a1, b2, c2, d1-3	Using of some statistical program in analysis of pharmaceutical data	14,15	4
18.	**Final Exam**	a1-3, b1-3, c1, c3		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

14. a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials and brainstorming
b- Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b2-3**,d1-2	Sporadic through the semester	**5**
2	Reports	**c1-3 ,d1-2**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

1	**Attendance, Participation, Homework, Reports and quizzes**	**All Weeks**	10	10%	a1-3, b2-3, c1-3,d1-2
2	**Theoretical mid-semester exam**	6th	20	20%	a1-3, b3,d1-2
3	**Final Exam (theoretical)**	**16th**	70	70%	a1-3, b1-3, c1, c3
	Total		**100**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Wayne W.D. 2004, Biostatistics : A foundation for Analysis in the health sciences 8th edition.

4- Essential Medical Statistics, 2003, 2nd ed. Blackwell Publishing company.

2- Recommended Books and Reference Materials.

2- Linda A. Felton,, 2013, Remington Essentials of Pharmaceutics, 1st edition, Pharmaceutical Press Lambeth High Street, London SE1 7JN, UK.

3- Electronic Materials and Web Sites *etc*.

http/ : en. Wikpedia. Org / wiki/ Biostatistics.

IX. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.
عبدالولي احمد	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Clinical Pharmacy & therapeutics I

I. Course Identification and General Information:						
1	**Course Title:**	Clinical Pharmacy & therapeutics (I)				
2	**Course Number & Code:**	Ph2920				
3	**Credit hours:**	**C.H**				**Total**
		Theoretical	**Practical**	**Training**	**Seminar**	
		2	2	-	-	3
4	**Study level/ semester at which this course is offered:**	Fifth year, First Semester				
5	**Pre –requisite (if any):**	Pharmaceutical Care (2)				
6	**Co –requisite (if any):**	Fifth level/ First Semester				
7	**Program (s) in which the course is offered:**	Bachelor degree of pharmacy				
8	**Department (s) in which the course is offered:**	Pharmaceutics				
9	**Language of teaching the course:**	English				
10	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University				
11	**Prepared by:**	Prof. Dr. Ahmed Mohamed Sabati				
12	**Date of approval:**					

II. Course Description:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.احمد
سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

The course deals with selected major disease states and their therapy, especially in the individualization of drug usages. The role of the pharmacist in the provision of optimal patient care through monitoring of patients drug therapy is emphasized. **Overall Aims of Course:**

A- Giving knowledge about the patho-physiology of disease.
B- Explain the symptoms and complications of the diseases.
C- Analysis treatment aims and algorithms, drug interactions, dose calculations, side effects of drugs.
D- Describe the appropriate lifestyle modifications, patient awareness and counseling.
E- Solve the given case according to the correct therapeutic way.

III. Intended earning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.
2. Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.
3. Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.
4. Recognize the special considerations of populations required for designing a treatment plan.
5. Construct an appropriate monitoring plan to assess disease treatment.
6. Recognize recent researches, articles and advanced studies about treatment of diseases.
7. Correlate disease pathophysiology with their manifestations, investigations and physical examinations.
8. Solve the case studies according to the therapeutic way.
9. Interpret patient`s clinical data and features, including patient records held within practice settings.
10. Design and implement patient-specific plan, including monitoring parameters to solve & prevent drug related problems.
11. Evaluate critically observations and measurements, in terms of their significance and theory underlying them.
12. Give advises for the patients and others on the safe and effective use of medicines.
13. Apply acquired skills to diagnose the case studies precisely.
14. Interact effectively with patients, the public and health care professionals; includes communication both written and oral.
15. Solve the problem based on a given information like patient history.
16. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students will be able to:	**After completing this course, students will be able to:**

A1-	Recognize the principles of, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.
		a3	Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.
		a4-	Recognize the special considerations of populations required for designing a treatment plan.
		a5-	Construct an appropriate monitoring plan to assess disease treatment.
		a6-	Recognize recent researches, articles and advanced studies about treatment of diseases.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding	Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Oral Exam, Quizzes,

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سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

a1-	Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.	Lectures methods , Computer based teaching and learning, group discussion, case study and tutorial	Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.		
a3	Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.		
a4-	Recognize the special considerations of populations required for designing a treatment plan.		
a5-	Construct an appropriate monitoring plan to assess disease treatment.		
a6-	Recognize recent researches, articles and advanced studies about treatment of diseases.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b1-**	Correlate disease pathophysiology with their manifestations, investigations and physical examinations.
B4-		**b2-**	Solve the case studies according to the therapeutic way.

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	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing.	b3-	Interpret patient`s clinical data and features, including patient records held within practice settings.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b1-	Correlate disease pathophysiology with their manifestations, investigations and physical examinations.		
b2-	Solve the case studies according to the therapeutic way.		
b3-	Interpret patient`s clinical data and features, including patient records held within practice		
	settings.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	c1-	Design & implement patient-specific plan, including monitoring parameters to solve & prevent drug related problems.

C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Evaluate critically observations and measurements, in terms of their significance and theory underlying them.
		c3-	Give advises for the patients and others on the safe and effective use of medicines.
		c4-	Apply acquired skills to diagnose the case studies precisely.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming, Tutorials, Seminars and Case study	Practical works, homework, practical exam and practical reports.
c1-	Design and implement patient-specific plan, including monitoring parameters to solve & prevent drug related problems.		
c2-	Evaluate critically observations and measurements, in terms of their significance and theory underlying them.		
c3-	Give advises for the patients and others on the safe and effective use of medicines.		
c4-	Apply acquired skills to diagnose the case studies precisely.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Interact effectively with patients, the public and health care professionals; includes communication both written and oral.

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D4	Take responsibility for adaptation to change needs in pharmacy practice.	**d2**	Solve the problem based on a given information like patient history.
D5	Apply information and communication technology and working effectively in a team.	**d3**	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.
		d4	Behave with an ethical attitude and approach.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Interact effectively with patients, the public and health care professionals; includes communication both written and oral.		
d2	Solve the problem based on a given information like patient history.		
d3	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.		
d4	Behave with an ethical attitude and approach.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	No. of week	Contact Hours
1	Introduction and definition of Clinical Pharmacy	a1, a2, d1-3	1	2
2	Interpretation of clinical laboratory tests	a1, b4, d1-3	1	2
3	Anemia's (Iron deficiency anemia)	a1-6, b1-3, c1, c4, d1-3	1	2
4	Anemia's (Megaloblastic and, Pernicious anemia	a1-6, b1-3, c1, c4, d1-3	1	2
5	Anemia's (Hemolytic anemia)	a1-6, b1-3, c1, c4, d1-3	1	2
6	Renal diseases (Nephritic syndrome)	a1-6, b1-3, c1, c4, d1-3	1	2
7	Renal diseases (Acute and Chronic renal failure	a1-6, b1-3, c1, c4, d1-3	1	2
8	Renal diseases (Urinary calculi)	a1-6, b1-3, c1, c4, d1-3	1	2
9	Liver diseases (Hepatitis)	a1-6, b1-3, c1, c4, d1-3	1	2
10	Liver diseases (Liver cirrhosis)	a1-6, b1-3, c1, c4, d1-3	1	2
11	Thyroid disorders (Hypothyroidism + Hyperthyroidism)	a1-6, b1-3, c1, c4, d1-3	1	2
12	Parathyroid disorders (Hypo- + Hyperparathyroidism)	a1-6, b1-3, c1, c4, d1-3	1	2
13	Peptic ulcer	a1-6, b1-3, c1, c4, d1-3	1	2
14	GERD	a1-6, b1-3,	1	2
		c1, c4, d1-3		
Number of Weeks /and Units Per Semester			**14**	**28**

b- Practical Aspect:				
Week	**Case Study on**	**CILOs (symbols)**	**Number of weeks**	**Contact hours**
1	Anemia's (Iron deficiency anemia)	c1, c2, c3, 4c	**1**	**2**
2	Anemia's (Megaloblastic and, Pernicious anemia	c1, c2, c3, 4c	**1**	**2**
3	Anemia's (Hemolytic anemia)	c1, c2, c3, 4c	**1**	**2**
4	Renal diseases (Nephritic syndrome)	c1, c2, c3, 4c	**1**	**2**
5	Renal diseases (Acute and Chronic renal failure	c1, c2, c3, 4c	**1**	**2**
6	Renal diseases (Urinary calculi)	c1, c2, c3, 4c	1	2
7	Anemia's (Iron deficiency anemia)	c1, c2, c3, 4c	1	2
8	Anemia's (Megaloblastic and, Pernicious anemia	c1, c2, c3, 4c	1	2
9	Liver diseases (Hepatitis)	c1, c2, c3, 4c	1	2
10	Liver diseases (Liver cirrhosis)	c1, c2, c3, 4c	1	2
11	Thyroid disorders (Hypothyroidism + Hyperthyroidism)	c1, c2, c3, 4c	1	2
12	Parathyroid disorders (Hypo- + Hyperparathyroidism)	c1, c2, c3, 4c	1	2
13	Peptic ulcer	c1, c2, c3, 4c	1	2
14	GERD	c1, c2, c3, 4c	1	2
Number of Weeks /and Units Per Semester			**14**	**28**

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I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-3,b1-2, c1, c4
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-6, b3, c1, c4
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	7th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	9th	30	20%	a1-6, b1-3, c1, c4
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-6, b1-3, c1, c4
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)

III. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)	
	1-Walker and Edwards (eds). **Clinical Pharmacy and Therapeutics**. 3rd edition (2003).
2- Recommended Readings and Reference Materials	
	Terry L. Schwinghammer & Julia M. Koehler. **Pharmacotherapy Casebook:** A Patient-Focused Approach 7th edition 2009
3- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
4- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
5- Other Learning Material:	
	-

II. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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2 - Computing resources:	- Computer laboratory with internet facilities.

III. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

	☐ Student rating and feedback ☐ Peer rating and feedback ☐ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Clinical Pharmacy & therapeutics (I)

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member		Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:						
1-	Course Title:	Clinical Pharmacy & therapeutics (I)				
2-	Course Number & Code:	Ph2920				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	5th level /1st semester				
5-	Pre –requisite (if any):	Pharmaceutical care (II)				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor degree of pharmacy				

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8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course Description:

The course deals with selected major disease states and their therapy, especially in the individualization of drug usages. The role of the pharmacist in the provision of optimal patient care through monitoring of patients drug therapy is emphasized. **Overall Aims of Course:**

A- Giving knowledge about the patho-physiology of disease.
B- Explain the symptoms and complications of the diseases.
C- Analysis treatment aims and algorithms, drug interactions, dose calculations, side effects of drugs.
D- Describe the appropriate lifestyle modifications, patient awareness and counseling.
E- Solve the given case according to the correct therapeutic way.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.
2. Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.
3. Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.
4. Recognize the special considerations of populations required for designing a treatment plan.
5. Construct an appropriate monitoring plan to assess disease treatment.
6. Recognize recent researches, articles and advanced studies about treatment of diseases.
7. Correlate disease pathophysiology with their manifestations, investigations and physical examinations.
8. Solve the case studies according to the therapeutic way.
9. Interpret patient`s clinical data and features, including patient records held within practice settings.
10. Design and implement patient-specific plan, including monitoring parameters to solve & prevent drug related problems.
11. Evaluate critically observations and measurements, in terms of their significance and theory underlying them.
12. Give advises for the patients and others on the safe and effective use of medicines.
13. Apply acquired skills to diagnose the case studies precisely.
14. Interact effectively with patients, the public and health care professionals; includes communication both written and oral.
15. Solve the problem based on given information like patient history.
16. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.

IV- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	Contact Hours
1	Introduction and definition of Clinical Pharmacy	a1, a2, d1-3	1	2
2	Interpretation of clinical laboratory tests	a1, b4, d1-3	2	2

3	Anemia's (Iron deficiency anemia)	a1-6, b1-3, c1, c4, d1-3	3	2
4	Anemia's (Megaloblastic and, Pernicious anemia	a1-6, b1-3, c1, c4, d1-3	4	2
5	Anemia's (Hemolytic anemia)	a1-6, b1-3, c1, c4, d1-3	5	2
6	Renal diseases (Nephritic syndrome)	a1-6, b1-3, c1, c4, d1-3	6	2
7	Renal diseases (Acute and Chronic renal failure	a1-6, b1-3, c1, c4, d1-3	7	2
8	Renal diseases (Urinary calculi)	a1-6, b1-3, c1, c4, d1-3	8	2
9	Med Term Exam	a1-6, b1-3, c1, c4	9	2
10	Liver diseases (Hepatitis)	a1-6, b1-3, c1, c4, d1-3	10	2
11	Liver diseases (Liver cirrhosis)	a1-6, b1-3, c1, c4, d1-3	11	2
11	Thyroid disorders (Hypothyroidism + Hyperthyroidism)	a1-6, b1-3, c1, c4, d1-3	12	2
13	Parathyroid disorders (Hypo- +	a1-6, b1-3, c1, c4, d1-3	13	2
	Hyperparathyroidism)			
14	Peptic ulcer	a1-6, b1-3, c1, c4, d1-3	14	2
15	GERD	a1-6, b1-3, c1, c4, d1-3	15	2
16	Final Term Exam	a1-6, b1-3, c1, c4	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

Note: 2 clerkship hours equal one credit hour

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b- Practical Aspect:				
Week	**Case Study on**	**CILOs (symbols)**	**Week Due**	**Contact hours**
1	Anemia's (Iron deficiency anemia)	c1, c2, c3, 4c	**1**	**2**
2	Anemia's (Megaloblastic and, Pernicious anemia	c1, c2, c3, 4c	**2**	**2**
3	Anemia's (Hemolytic anemia)	c1, c2, c3, 4c	**3**	**2**
4	Renal diseases (Nephritic syndrome)	c1, c2, c3, 4c	**4**	**2**
5	Renal diseases (Acute and Chronic renal failure	c1, c2, c3, 4c	**5**	**2**
6	Renal diseases (Urinary calculi)	c1, c2, c3, 4c	6	2
7	Med Term Exam	c1, c2, c3, 4c	7	2
8	Anemia's (Iron deficiency anemia)	c1, c2, c3, 4c	8	2
9	Anemia's (Megaloblastic and, Pernicious anemia	c1, c2, c3, 4c	9	2
10	Liver diseases (Hepatitis)	c1, c2, c3, 4c	10	2
11	Liver diseases (Liver cirrhosis)	c1, c2, c3, 4c	11	2
12	Thyroid disorders (Hypothyroidism + Hyperthyroidism)	c1, c2, c3, 4c	12	2
13	Parathyroid disorders (Hypo- + Hyperparathyroidism)	c1, c2, c3, 4c	13	2
14	Peptic ulcer	c1, c2, c3, 4c	14	2
15	GERD	c1, c2, c3, 4c	15	2
16	Final Term Exam	c1, c2, c3, 4c	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

IV. a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-3,b1-2, c1, c4
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-6, b3, c1, c4
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	9th	30	20%	a1-6, b1-3, c1, c4
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-6, b1-3, c1, c4
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

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V. Students' Support:

Office Hours/week	Other Procedures (if any)

VI. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

	1-Walker and Edwards (eds). **Clinical Pharmacy and Therapeutics**. 3rd edition (2003).

7- Recommended Readings and Reference Materials

	Terry L. Schwinghammer & Julia M. Koehler. **Pharmacotherapy Casebook:** A Patient-Focused Approach 7th edition 2009

8- Essential References

	Course notes (lecture notes and practical notes) prepared by teacher of the subject.

9- Electronic Materials and Web Sites *etc*.

	Websites in international network (internet

10- Other Learning Material:

	-

VI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc.

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	- Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

VII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification Phytotherapy

I. Course Identification and General Information:							
1	Course Title:	Phytotherapy					
2	Course Number & Code:	Ph396					
3	Credit hours:	C.H					Total
		Theoretical	Practical	Training	Seminar		
		2	-	-			2
4	Study level/ semester at which this course is offered:	5th level /1st semester					
5	Pre –requisite (if any):	Pharmacognosy, phytochemistry					
6	Co –requisite (if any):	-					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Department of Pharmacognosy					
10	Location of teaching the course:	Faculty of Pharmacy					
11	Prepared by:	Dr. Bushra Moharam					
12	Date of approval:						

II. Course description:

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-The aims of this course is to provide students information about clinical effectiveness of herbs in the prevention and/or treatment of the diseases affecting digestive system, cardiovascular system, respiratory system, , urinary system, rheumatic conditions, cancer. The course provide students with information about botanical or herbal products that will allow them to make judgments about clinical effectiveness and potential for adverse consequences in patients.
-At the end of the course the student should be able to understand ; the fundamental knowledge about herbal medicine including preparation, identity, efficacy, standardization and its relation to conventional medicine, in addition to the use of herbal medications in some common health problems, its toxicological aspects, regulatory laws of production and forensic pharmacognosy.

I. Intended learning outcomes (ILOs) of the course:

1. Know and understand the Professional, ethical and legal practice
2. Acquire good knowledge about herbal medicine as one of the most common alternative therapies
3. Identify pharmacological properties of some herbal medications used and adverse reactions and contraindications of these drugs and the concomitant use of these drugs with conventional medicine 4. Mention the principles of herbal medicine preparation, identification, efficacy and standardization
5. know examples of commonly misused natural drugs and their semisynthetic/synthetic derivatives /analogues
6. Critically evaluate patient problems within the range of Herbal Medicine
7. Design implementation, monitoring, assessment and intervention in drug therapy to obtain the most effective, most safe and economic drug regimen
8. Collect and search for drug information and disseminate gathered information in the precise time to other health care professionals to perform better achievements.
9. contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of medicinal plants and their uses in improving health
10. assess and resolve problems independently react effectively with other health care professionals and patients
11. take Patient history and patient assessment based upon history taken
12. prepare Herbal prescription and treatment plans
13. Develop a plan based on evidence
14. Evaluate treatment plan, with follow-up
15. Communicate effectively with other health care professionals , patients and publics.
16. Work in Teamwork
17. Have good command for information technology skills, both for data recording or for information searching
18. transfer his experience and ideas to others in an acceptable way as well as teach and educate his subordinates.

II. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**			
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Know and understand the Professional, ethical and legal practice
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a2-**	Acquire good knowledge about herbal medicine as one of the most common alternative therapies
		a3	Identify pharmacological properties of some herbal medications used and adverse reactions and contraindications of these drugs and the concomitant use of these drugs with conventional medicine
		a4	Mention the principles of herbal medicine preparation, identification, efficacy and standardization
		a5	know examples of commonly misused natural drugs and their semisynthetic/synthetic derivatives /analogues

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures using computer and data show, Class activity, Reports and group discussion	▪ Written examination , Oral examination
a1-	Know and understand the Professional, ethical and legal practice		
a2-	Acquire good knowledge about herbal medicine as one of the most common alternative therapies		
a3	Identify pharmacological properties of some herbal medications used and adverse reactions and contraindications of these		

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	drugs and the concomitant use of these drugs with conventional medicine		
a4	Mention the principles of herbal medicine preparation, identification, efficacy and standardization		
a5	know examples of commonly misused natural drugs and their semisynthetic/synthetic derivatives /analogues		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Critically evaluate patient problems within the range of Herbal Medicine
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b2-**	Design implementation, monitoring, assessment and intervention in drug therapy to obtain the most effective, most safe and economic drug regimen
		b3-	Collect and search for drug information and disseminate gathered information in the precise time to other health care professionals to perform better achievements.

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		b4	contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of medicinal plants and their uses in improving health

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, problem solving, Tutorials, Case study, Assignments	coursework, clinical assessment, examination and report writing.
b1-	Critically evaluate patient problems within the range of Herbal Medicine		
b2-	Design implementation, monitoring, assessment and intervention in drug therapy to obtain the most effective, most safe and economic drug regimen		
b3-	Collect and search for drug information and disseminate gathered information in the precise time to other health care professionals to perform better achievements.		
b4	contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of medicinal plants and their uses in improving health		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills

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After completing this program, students will be able to:		After completing this course, students will be able to:	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	c1-	assess and resolve problems independently react effectively with other health care professionals and patients
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	c2-	take Patient history and patient assessment based upon history taken
		c3	prepare Herbal prescription and treatment plans
		c4	Develop a plan based on evidence
		c5	Evaluate treatment plan, with follow-up

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Tutorials, Case study, Assignments	- discussion, report writing , assignments, exam
c1-	assess and resolve problems independently react effectively with other health care professionals and patients		
c2-	take Patient history and patient assessment based upon history taken		
c3	prepare Herbal prescription and treatment plans		
c4	Develop a plan based on evidence		
c5	Evaluate treatment plan, with follow-up		

(D) General / Transferable Skills:

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Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **General and Transferable skills**			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Communicate effectively with other health care professionals , patients and publics.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2**	Work in Teamwork
		d3	Have good command for information technology skills, both for data recording or for information searching
		d4	transfer his experience and ideas to others in an acceptable way as well as teach and educate his subordinates.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Group work and exercises, structured learning, practical work	Course work, clinical assessment and examination.
d1-	Communicate effectively with other health care professionals , patients and publics.		
d2-	Work in Teamwork		
d3	Have good command for information technology skills, both for data recording or for information searching		
d4	transfer his experience and ideas to others in an acceptable way as well as teach and educate his subordinates.		

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III. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction	a1-5, b3,b4	Definitions, history, safety of phytotherapies, Standardization of Herbal Medicines, Therapeutic Overview of Galenical Preparations	2	4
2		a1-5, b1-4,c1, c4, d3,4,5	Botanical Drug Preparation, Dosage forms of herbal medicinal products, Herb–drug interactions	1	2
3	Plant and digestive system, liver and biliary system	a1-5, b1-4, c1-5, d14	Stomatitis, Gingivitis, Glossitis, Dyspepsia, Flatulence, Gastritis and Peptic Ulcer Disease, Kinetosis (Seasickness), Constipation, Diarrhea, Irritable Bowel Syndrome , liver and billary tract disorders.	3	6
	Midterm exam	a1-4, b2-4, c3-5		1	2
4	Plant and respiratory system	a1-5, b1-4, c1-5, d14	Rhinitis, Common cold &flu, Bronchial Asthma Bronchitis Cough	2	4

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5	Plants and the renal system	a1-5, b1-4, c1-5, d14	cystitis, Urethritis pyelonephritis	1	2
6	Plants and cardiovascular system	a1-5, b1-4, c1-5, d14	Congestive Heart Failure, angina, hypertension, chronic venous insufficient	2	4
7	Plants and inflammation	a1-5, b1-4, c1-5, d14	rheumatoid arthritis, juvenile arthritis, ankylosing spondylitis, psoriatic arthritis, and osteoarthritis.	2	4
8	Anticancer natural drugs	a1-5, b1-4, c1-5, d14	vinca, taxol	1	2
9	Final exam	a1-4, b2-4, c3-5		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

IV. Teaching strategies of the course:

- Lectures, problem solving, Practice session, Discussions, Small group discussions, Tutorials

3-Assessment Methods:

- Exam, oral discussion, assignments, report,

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Present/Absent	1-16	10	10%	a1-5, b1-4
2	Class activities	1-16	10	10%	c1-5, d1-4
3	Midterm written Exam	7th	20	20%	C1-5, b1-4
5	Final Exam (theoretical)	16th	60	60%	C1-5, b1-4
	Total		**100**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Course note
- FRANCESCO C., TIMOTHY S. G., GIULIANO G., ANGELO A. Izzo. 2003. **Phytotherapy;** A Quick Reference to Herbal Medicine. Springer-Verlag Berlin Heidelberg GmbH

2- Recommended Readings and Reference Materials

-Henrich M., Barens j. and Gibbons S.A. 2004. "Fundamentals of Pharmacognosy and Phytotherapy" , ., Churchill Livingstone, New York
-Iqbal R. Phytotherapies; efficacy, safety, regulation. 2015 by John Wiley & Sons, Inc. Canada

3- Essential References

- Jean Bruneton. 2008. Pharmacognosy, Phytochemistry & Medicinal Plants . 3rd ed
- Brun L. and Cohen M., 2010 "Herbs & Natural Supplements" (2010) 3rd ed., Elsevier, London

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4- Electronic Materials and Web Sites *etc*.	
	1. http/www.Phytomania.org. 2. http/www.medicalbotanyintroduction.html. 3. http/www.botanical.com
5- Other Learning Material:	
	-

VIII. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

IX. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
	▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
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Course Plan of Phytotherapy

I. - Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Bushra Moharam						
Location & Telephone No.	730010755	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	bushramoharam@yahoo.com.	1		1			

II. Course Identification and General Information:

1-	**Course Title:**	**Phytotherapy**				
2-	**Course Number & Code:**	**Ph396**				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	-		2
4-	**Study level/year at which this course is offered:**	5th level /1st semester				
5-	**Pre –requisite (if any):**	Pharmacognosy, phytochemistry				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III. Course Description:

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The aims of this course is to provide students information about clinical effectiveness of herbs in the prevention and/or treatment of the diseases affecting digestive system, cardiovascular system, respiratory system, , urinary system, rheumatic conditions, cancer. The course provide students with information about botanical or herbal products that will allow them to make judgments about clinical effectiveness and potential for adverse consequences in patients.
-At the end of the course the student should be able to understand ; the fundamental knowledge about herbal medicine including preparation, identity, efficacy, standardization and its relation to conventional medicine, in addition to the use of herbal medications in some common health problems, its toxicological aspects, regulatory laws of production and forensic pharmacognosy.

IV. Intended learning outcomes (ILOs) of the course:

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After completing this course, students will be able to:

1. Know and understand the Professional, ethical and legal practice
2. Acquire good knowledge about herbal medicine as one of the most common alternative therapies
3. Identify pharmacological properties of some herbal medications used and adverse reactions and contraindications of these drugs and the concomitant use of these drugs with conventional medicine
4. Mention the principles of herbal medicine preparation, identification, efficacy and standardization
5. know examples of commonly misused natural drugs and their semisynthetic/synthetic derivatives /analogues
6. Critically evaluate patient problems within the range of Herbal Medicine
7. Design implementation, monitoring, assessment and intervention in drug therapy to obtain the most effective, most safe and economic drug regimen
8. Collect and search for drug information and disseminate gathered information in the precise time to other health care professionals to perform better achievements.
9. contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of medicinal plants and their uses in improving health
10. assess and resolve problems independently react effectively with other health care professionals and patients
11. take Patient history and patient assessment based upon history taken
12. prepare Herbal prescription and treatment plans
13. Develop a plan based on evidence
14. Evaluate treatment plan, with follow-up
15. Communicate effectively with other health care professionals , patients and publics.
16. Work in Teamwork
17. Have good command for information technology skills, both for data recording or for information searching
18. transfer his experience and ideas to others in an acceptable way as well as teach and educate his subordinates.

X. Course Content:

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1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Introduction	a1-5, b3,b4	Definitions, history, safety of phytotherapies, Standardization of Herbal Medicines, Therapeutic Overview of Galenical Preparations	1,2	4
2		a1-5, b1-4,c1, c4, d3,4,5	Botanical Drug Preparation, Dosage forms of herbal medicinal products, Herb–drug interactions	3	2
3	Plant and digestive system, liver and biliary system	a1-5, b1-4, c1-5, d14	Stomatitis, Gingivitis, Glossitis, Dyspepsia, Flatulence, Gastritis and Peptic Ulcer Disease, Kinetosis (Seasickness), Constipation, Diarrhea, Irritable Bowel Syndrome , liver and billary tract disorders.	4-6	6
	Midterm exam	a1-4, b2-4, c3-5		7	2
4	Plant and respiratory system	a1-5, b1-4, c1-5, d14	Rhinitis, Common cold &flu, Bronchial Asthma Bronchitis Cough	8,9	4
5	Plants and the renal	a1-5, b1-4, c1-5, d1-	cystitis, Urethritis	10	2

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	system	4	pyelonephritis		
6	Plants and cardiovascular system	a1-5, b1-4, c1-5, d14	Congestive Heart Failure, angina, hypertension, chronic venous insufficient	11,12	4
7	Plants and inflammation	a1-5, b1-4, c1-5, d14	rheumatoid arthritis, juvenile arthritis, ankylosing spondylitis, psoriatic arthritis, and osteoarthritis.	13,14	4
8	Anticancer natural drugs	a1-5, b1-4, c1-5, d14	vinca, taxol	15	2
9	Final exam	a1-4, b2-4, c3-5		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

V. Teaching strategies of the course:

Lectures, problem solving, Practice session, Discussions, Small group discussions, Tutorials

VI. Assessment Methods:

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Present/Absent	All	10	10%
2	Class activities	All	10	10%
3	Midterm written Exam	7th	20	20%
4	Final Exam (theoretical)	16th	60	60%
5	**Total**		**100**	**100%**

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VII. Learning Resources:

1- Required Textbook(s) (maximum two).

- Course note
- FRANCESCO C., TIMOTHY S. G., GIULIANO G., ANGELO A. Izzo. 2003. **Phytotherapy;** A Quick Reference to He Medicine. Springer-Verlag Berlin Heidelberg GmbH

2- Essential References.

- Jean Bruneton. 2008. Pharmacognosy, Phytochemistry & Medicinal Plants . 3rd ed
- Brun L. and Cohen M., 2010 "Herbs & Natural Supplements" (2010) 3rd ed., Elsevier, London

3- Electronic Materials and Web Sites *etc*.

1. http/www.Phytomania.org.
2. http/www.medicalbotanyintroduction.html.
3. http/www.botanical.com

VIII. Course Policies:

1	**Class Attendance:** ▪ **Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.**
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ **Absence from assignments or exams will be dealt with according to the general policy of the university.**

4	**Assignments & Projects**: ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ **Projects: Not applicable.**
5	**Cheating:** ▪ **Punishment of cheating will be according to the general policy of the university in this respect**
6	**Plagiarism:**
	▪ **Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.**
7	**Other policies**: **General policies of the Students' Affairs of the University and the Quality Assurance Unit.**

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Course Specification of Medicinal Chemistry IV

I. Course Identification and General Information:

1	**Course Title**	Medicinal Chemistry IV				
2	**Course Number & Code:**	Ph5912				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		2	**2**			**3**
4	**Study level/ semester at which this course is offered:**	5^{th} level /1^{st} semester				
5	**Pre –requisite (if any):**	Pharmaceutical analytical chemistry I&II and pharmaceutical organic chemistry I, II, & III and Medicinal Chemistry I				
6	**Co –requisite (if any):**	-				
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				
11	**Prepared by:**	Associate Prof. Tawfeek Ahmed Alobaidy				
12	**Date of approval:**					

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II. Course description:

The course is concerned with the fundamental knowledge about the synthesis, metabolism, physicochemical properties and their effect on drug profile. The practical part will be devoted to tutorials and studying on the qualitative and quantitative analysis and synthesis of some drugs that is mentioned in this course.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize different classes of the antimalarial, antiprotozoal and anthelmintics, hypoglycaemic, antithyroid, hormones and vitamins.
2. Relate modification of groups in structure to their effect on biological activity
3. Illustrate the drug metabolism of studied drugs.
4. Characterize the chemistry and function of vitamins in the body.
5. Determine the functional groups and their effect on some pharmaceutical agents.
6. Identify the predicted moieties of drug structure that are metabolized
7. Diagram the schemes that relate the different nucleus with their different activity
8. Predict the role of some functional groups found in some drug structure.
9. Operate different pharmaceutical instrument and equipment in the lab.
10. Practice the quantitative estimation of some dosage form of studied drugs.
11. Carry out the qualitative analysis of some drugs.
12. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
13. Communicate and cooperate effectively with his colleagues and other specialist to prepare a scientific topic.
14. Implement writing and presentation skills to discuss the stereochemistry of some studied drugs.
15. Demonstrate critical thinking and decision making abilities.
16. Work effectively in a team to perform the required tasks in field of medicinal chemistry.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize different classes of the antimalarial, antiprotozoal and anthelmintics, hypoglycaemic, antithyroid, hormones and vitamins.
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	a2-	Relate modification of groups in structure to their effect on biological activity
		a3-	Illustrate the drug metabolism of studied drugs.
		a4-	Characterize the chemistry and function of vitamins in the body.
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
a1-	Recognize different classes of the antimalarial, antiprotozoal and anthelmintics, hypoglycaemic, antithyroid, hormones and vitamins.	Lecture method , brainstorming , Computer based teaching and learning, group discussion and tutorial	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a2-	Relate modification of groups in structure to their effect on biological activity		
a3-	Illustrate the drug metabolism of studied drugs.		
a4-	Characterize the chemistry and function of vitamins in the body.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**	
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills	**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**
After completing this program, students would be able to:	**After participating in the course, students would be able to:**

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B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Determine the functional groups and their effect on some pharmaceutical agents.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action,	**b2-**	Identify the predicted moieties of drug structure that are metabolized
	systemic effect, therapeutic uses, contraindication and toxicity.	**b3-**	Diagram the schemes that relate the different nucleus with their different activity
		b4-	Predict the role of some functional groups found in some drug structure

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Determine the functional groups and their effect on some pharmaceutical agents.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions and brainstorming	Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2-	Identify the predicted moieties of drug structure that are metabolized		
b3-	Diagram the schemes that relate the different nucleus with their different activity		
b4-	Predict the role of some functional groups found in some drug structure		

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(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Operate different pharmaceutical instrument and equipment in the lab.
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c2-**	Practice the quantitative estimation of some dosage form of studied drugs.
		c3-	Carry out the qualitative analysis of some drugs
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c4-**	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Operate different pharmaceutical instrument and equipment in the lab.	Lecture method, Practical sessions and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Practice the quantitative estimation of some dosage form of studied drugs.		
c3-	Carry out the qualitative analysis of some drugs		
c4-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d1-**	Communicate and cooperate effectively with his colleagues and other specialist to prepare a scientific topic.
D5-	Apply information and communication technology and working effectively in a team.	**d2-**	Implement writing and presentation skills to discuss the stereochemistry of some studied drugs.
		d3-	Demonstrate critical thinking and decision making abilities.
		d4-	Work effectively in a team to perform the req tasks in field of medicinal chemistry.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		Teaching strategies/methods to be used.	Methods of assessment
d1-	Communicate and cooperate effectively with his colleagues and other specialist to prepare a scientific topic.	Small group discussions, Tutorials, brainstorming and Practical sessions.	Homework, and reports.
d2-	Implement writing and presentation skills to discuss the stereochemistry of some studied drugs.		

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d3-	Demonstrate critical thinking and decision making abilities.		
d4-	Use available technology and other media to assist with communication as appropriate.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1.	**Antimalarial agents**	a1,a2,a3,a4, b2, d1,d2,	- Life cycle of the parasite, - Naturally occurring Antimalarial agents - Quinolone derivatives, - Tetrahydrofolate synthesis inhibitors, - Biguinides, - polycyclic antimalarial agents - Miscellaneous compounds.	1	2
2.	**Antiprotozoal Agents,**	a1 ,b1,b2,b3,b4, c1,c3,d2-4	- 4-Amino quinolones, - Antibiotics, - Haloacetamides, - 8-Hydroxy quinolones, - Ipecac alkaloids, - 5-Nitro imidazoles, - Organo-arsenicals and - Miscellaneous.	1	2
3.	**Anthelmintic and Antibilharzial Agents**	a3,b1,b2,b3,b4, d3-4	**Anthelmintic**: - Phenols, - Piperazine and - Hetereocyclic compounds	2	4

			Antibilharzial: - Nitrocompounds, - Thioxanthenones, - Miscellaneous compounds		
4.	**Diabetes mellitus, Insulin & Antidiabetic agents**		- **Role of insulin** - **Diabetes mellitus** - **Insulin preprations - Oral hypoglycemic Drugs** **1]** Sulphonylureas **2]** Metaglinides **3]** Biguanides **4]** Thiazolidinediones **5]** □-Glucosidase inhibitors **6]** GLP-1 analogue agonist 7] Dipeptidyl peptidase-4 (dpp4) inhibitors 8] Bile acid sequestrant-Colesevelam 9] Bromocriptine 10] sodium-dependent glucose cotransporter 2 (SGLT2) 11] Glucagon-Like Peptide-1 (Glp-1) Receptor Agonists	1	2
5.		a1,a2,b2,b3,b4, c1	**Female Sex Hormones:** - Estrogen and - Progestrones)	2	4
		a1, a2a3,b1,b2,b3,b4, c1,c3,d1-4	**Male Sex Hormones** - Androgens, - Antiandrogens)	1	2

	Hormones:	a2,a3,b1,b2,b3,b4, c1,c3	**Corticosteroids** - Glucocortisteroids and - Mineralocorticoids)	1	2
		a1 ,b1,b2,b3,b4, d1-4	Peptide, protein hormones and peptidomimetics	1	2
6.	**Mid Exam**	a1-3, b1-4		1	2
7.	**Thyroid hormones and antithyroid drugs**	a2,a3,b1,b2,b3,b4, c1,c3,d3	- Mechanism of thyroid hormones formation - Thyroid drugs Natural thyroid hormone preparations, Synthetic thyroid hormone - Anti-Thyroid Drugs Radioactive iodine, Potassium iodide:, Thioureylenes [Thioamide)	1	2
8.	**Vitamines**	a1,a2, a4 b1,b2,b3,b4,d1-4	- Water soluble viamines and - Fat soluble viamines	3	6
9.	**Final Exam**	a1-4, b1, b2		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	**Assay of Hexamine in some formulated tab**	c1,c2 , c4	1	2
2	**Identification of Albendazole**	c1,c3 , c4	1	2

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3	**Assay of Metronidazole**	c1,c2 , c4	1	2
4	**Assay of Metformine**	c1,c2 , c4	1	2
5	**Colorimetric determination of ethinylestradiol**	c1,c2 , c4	1	2
6	**Non-aqueous titration of Tamoxifen**	c1,c2 , c4	1	2
7	Mid-Exam	**c1,c2, c3, c4**	1	2
8	**Non-aqueous titration of Clomiphen**	c1,c2 , c4	1	2
9	**Spectrophotometric determination of Progesterone**	c1,c2 , c4	1	2
10	Quantitative analysis of **KI**	c1,c2 , c4	1	2
11	**Spectrophotometric determination of** Cyanocobalamine inj.	c1,c2 , c4	1	2
12	**Spectrophotometric determination of** Riboflavin sodium phosphate	c1,c2 , c4	1	2
13	Qualitative analysis of vitamin c	c1,c3 , c4	1	2
14	Quantitative analysis of vitamin c	c1,c2 , c4	1	2
15	Qualitative analysis of Nicotinic acid	c1,c3 , c4	1	2
16	Final Exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. A-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

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b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1, a2, a4, , b1-3, d1-4**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-4**		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and reports**	**All Weeks**	10	7%	a1-5, b1-4, d1-4
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1,a2, a4, b1-3, d1-4
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
4.	**Practical mid-semester exam**	7th	15	10%	c1-3
5.	**Theoretical mid-semester exam**	11th	30	20%	a1-3, b1-4

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6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-4
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

2- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

1- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approach edition, Oxford University Press, Inc., New York.

2- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia. 3- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

4- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

5- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

6- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1- http://www.chemaxon/marvin

2 - http://www.webmolecules.com

3-http://www.acdlabs.com

4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

IV. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

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V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Medicinal Chemistry IV

I- Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Tawfeek A. Al-Obaidy						
Location & Telephone No.	770507931	SAT	SUN	MON	TUE	WED	THU
E-mail	Tawfik_93@yahoo.com		2h				

II- Course Identification and General Information:

1-	Course Title:	Medicinal Chemistry IV				
2-	Course Number & Code:	Ph5812				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	5th level / 1st semester				
5-	Pre –requisite (if any):	Pharmaceutical analytical chemistry I&II , Pharmaceutical organic chemistry I,II&III and Medicinal Chemistry I				
6-	Co –requisite (if any):	-				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				

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11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III- Course description:

The course is concerned with the fundamental knowledge about the synthesis, metabolism, physicochemical properties and their effect on drug profile. The practical part will be devoted to tutorials and studying on the qualitative and quantitative analysis and synthesis of some drugs that is mentioned in this course.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize different classes of the antimalarial, antiprotozoal and anthelmintics, hypoglycaemic, antithyroid, hormones and vitamins.
2. Relate modification of groups in structure to their effect on biological activity
3. Illustrate the drug metabolism of studied drugs.
4. Characterize the chemistry and function of vitamins in the body.
5. Determine the functional groups and their effect on some pharmaceutical agents.
6. Identify the predicted moieties of drug structure that are metabolized
7. Diagram the schemes that relate the different nucleus with their different activity
8. Predict the role of some functional groups found in some drug structure.
9. Operate different pharmaceutical instrument and equipment in the lab.
10. Practice the quantitative estimation of some dosage form of studied drugs.
11. Carry out the qualitative analysis of some drugs
12. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
13. Communicate and cooperate effectively with his colleagues and other specialist to prepare a scientific topic.
14. Implement writing and presentation skills to discuss the stereochemistry of some studied drugs.
15. Demonstrate critical thinking and decision making abilities.
16. Work effectively in a team to perform the required tasks in field of medicinal chemistry.

17. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1.	**Antimalarial agents**	a1,a2,a3,a4, b2, d1,d2,	- Life cycle of the parasite, - Naturally occurring Antimalarial agents - Quinolone derivatives, - Tetrahydrofolate synthesis inhibitors, - Biguinides, - polycyclic antimalarial agents - Miscellaneous compounds.	1	2
2.	**Antiprotozoal Agents,**	a1 ,b1,b2,b3,b4, c1,c3,d2-4	- 4-Amino quinolones, - Antibiotics, - Haloacetamides, - 8-Hydroxy quinolones, - Ipecac alkaloids, - 5-Nitro imidazoles, - Organo-arsenicals and - Miscellaneous.	2	2

3.	**Anthelmintic and Antibilharzial Agents**	a3,b1,b2,b3,b4, d3-4	**Anthelmintic**: - Phenols, - Piperazine and - Hetereocyclic compounds **Antibilharzial:** - Nitrocompounds, - Thioxanthenones, - Miscellaneous compounds	3,4	4
4.	**Diabetes mellitus, Insulin & Antidiabetic**		- **Role of insulin** - **Diabetes mellitus**	5	2
	agents		- **Insulin preprations** - **Oral hypoglycemic** **Drugs** **1]** Sulphonylureas **2]** Metaglinides **3]** Biguanides **4]** Thiazolidinediones **5]** □-Glucosidase inhibitors **6]** GLP-1 analogue agonist 7] Dipeptidyl peptidase-4 (dpp4) inhibitors 8] Bile acid sequestrant-Colesevelam 9] Bromocriptine 10] sodium-dependent glucose cotransporter 2 (SGLT2) 11] Glucagon-Like Peptide-1 (Glp-1) Receptor Agonists		

5.	**Hormones:**	a1,a2,b2,b3,b4, c1	**Female Sex Hormones:** - Estrogen and - Progestrones)	6,7	4
		a1, a2a3,b1,b2,b3,b4, c1,c3,d1-4	**Male Sex Hormones** - Androgens, - Antiandrogens)	8	2
		a2,a3,b1,b2,b3,b4, c1,c3	**Corticosteroids** - Glucocortisteroids and - Mineralocorticoids)	9	2
		a1 ,b1,b2,b3,b4, d1-4	Peptide, protein hormones and peptidomimetics	10	2
6.	**Mid Exam**	a1-3, b1-4		11	2
7.	**Thyroid hormones and antithyroid drugs**	a2,a3,b1,b2,b3,b4, c1,c3,d3	- Mechanism of thyroid hormones formation - Thyroid drugs	12	2
			Natural thyroid hormone preparations, Synthetic thyroid hormone - Anti-Thyroid Drugs Radioactive iodine, Potassium iodide:, Thioureylenes [Thioamide)		
8.	**Vitamines**	a1,a2, a4 b1,b2,b3,b4,d1-4	- Water soluble viamines and - Fat soluble viamines	13-15	6
9.	**Final Exam**	a1-4, b1, b2,b3,b4		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

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Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	**Assay of Hexamine in some formulated tab**	c1,c2 , c4	1	2
2	**Identification of Albendazole**	c1,c3 , c4	2	2
3	**Assay of Metronidazole**	c1,c2 , c4	3	2
4	**Assay of Metformine**	c1,c2 , c4	4	2
5	**Colorimetric determination of ethinylestradiol**	c1,c2 , c4	5	2
6	**Non-aqueous titration of Tamoxifen**	c1,c2 , c4	6	2
7	Mid-Exam	**c1,c2, c3, c4**	7	2
8	**Non-aqueous titration of Clomiphen**	c1,c2 , c4	8	2
9	**Spectrophotometric determination of Progesterone**	c1,c2 , c4	9	2
10	Quantitative analysis of **KI**	c1,c2 , c4	10	2
11	**Spectrophotometric determination of**	c1,c2 , c4	11	2
	Cyanocobalamine inj.			
12	**Spectrophotometric determination of** Riboflavin sodium phosphate	c1,c2 , c4	12	2
13	Qualitative analysis of vitamin c	c1,c3 , c4	13	2
14	Quantitative analysis of vitamin c	c1,c2 , c4	14	2
15	Qualitative analysis of Nicotinic acid	c1,c3 , c4	15	2
16	Final Exam	**c1-4**	16	2

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Number of Weeks /and Units Per Semester	**16**	**32**

18. A-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1, a2, a4, 5b1, b1-3, d1-4**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-4**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and reports**	**All Weeks**	10	7%	a1-5, b1-4, d1-4

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9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a1,a2, a4, b1-3, d1-4
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	c1-3
12.	**Theoretical mid-semester exam**	11th	30	20%	a1-3, b1-4
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-4, b1-4
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

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4- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

2- Recommended Books and Reference Materials.

7- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approach edition, Oxford University Press, Inc., New York.

8- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia.

9- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

10- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition , Taylor & Francis, London.

11- K.-H. Hellwich · C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

12- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

2- http://www.chemaxon/marvin

2 - http://www.webmolecules.com

3-http://www.acdlabs.com

4-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

IX. Facilities Required:

Accommodation: - Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. **1** -

	- Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
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10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

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The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
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Course Specification of Industrial Pharmacy I

I. Course Identification and General Information:							
1	Course Title:	Industrial Pharmacy I					
2	Course Number & Code:	Ph2921					
3	Credit hours:3hrs	C.H					Total
		Theoretical	Practical	Training	Seminar		
		2	1				3
4	Study level / semester at which course is offered:	Level: - Fifth Year /First Semester					
5	Pre –requisite (if any):	Pharmaceutics I,II,III and IV					
6	Co –requisite (if any):						
7	Programs in which course is offered:	Bachelor of pharmacy					
8	Language of teaching the course:	English					
9	Department in which course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy- Sana`a university					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

Course provide students with the necessary knowledge in the area of pharmaceutical technology, and to help them to understand the fundamentals and importance of the unit operations in the manufacture of dosage forms such as mixing, drying, milling and particle size analysis.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Illustrate all parts and importance of pharmaceutical plants
2. Acquire the principles of pharmaceutical unit operations performed in pharmaceutical industry like, mixing, drying, size reduction and evaporation
3. Describe the equipment's of heat transfer, evaporation, drying, mixing, size reduction, size enlargement and size analysis, used in industrial pharmacy with their operation and applications.
4. Select the most appropriate equipment used for certain unit operations.
5. Classify all equipment used in heat transfer, evaporation, mixing ,drying, size reduction, size enlargement and size analysis and pharmaceutical preparation
6. Perform the most important tests in heat transfer, evaporation, mixing, drying, size reduction, enlargement and size analysis.
7. Collect data about different equipment used in pharmaceutical industry and their operation.
8. Conduct research studies and analyze results.
9. Assess the proper storage conditions for raw materials and finished pharmaceutical products.
10. Manage a suitable methodology to operate the different equipment.
11. Solve the problems encountered in the manufacture of dosage forms.
12. Work effectively as a part of team in order to fulfill certain project.
13. Demonstrate critical thinking and problem solving in different theoretical and practical situations. 14. Present industrial data in a graphical form

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**	
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**
After completing this program, students will be able to:	**After completing this course, students will be able to:**

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Illustrate all parts and importance of pharmaceutical plants
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development	**a2**	Acquire the principles of pharmaceutical unit operations performed in pharmaceutical industry like, mixing, drying, size reduction and evaporation
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3**	Describe the equipment's of heat transfer, evaporation, drying, mixing, size reduction, size enlargement and size analysis, used in industrial pharmacy with their operation and applications.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		1. Lectures using white board and data show. 2. Practical session using laboratory equipment 3. Research assignments	**1-Written exam** To assess understanding, intellectual, professional **2-Practical exam** To assess professional and practical skills
a1-	Illustrate all parts and importance of pharmaceutical plants		
a2-	Acquire the principles of pharmaceutical unit		
	operations performed in pharmaceutical industry like, mixing, drying, size reduction and evaporation	4. Case study 5. Discussion session	**3-Oral** To assess Knowledge, understanding, intellectual skills, general skills and confidence **4-Quizzes** To assess Knowledge, understanding, intellectual skills
a3	Describe the equipment's of heat transfer, evaporation, drying, mixing, size reduction, size enlargement and size analysis, used in industrial pharmacy with their operation and applications.		

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			5-Case study To assess the skills of problem-solving and date presentation 6-Reports

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Select the most appropriate equipment used for certain unit operations.
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Classify all equipment used in heat transfer, evaporation, mixing ,drying, size reduction, size enlargement and size analysis and pharmaceutical preparation

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		1.Lecture 2.Practical using laboratory equipment	1.Written exam 2.Oral 3.Quizzes
b1-	Select the most appropriate equipment used for certain unit operations.		
b2-	Classify all equipment used in heat transfer, evaporation, mixing ,drying, size reduction, size enlargement and size analysis and pharmaceutical preparation	3.Research assignments	

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د.ماجد علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C1	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	c1-	Perform the most important tests in heat transfer, evaporation, mixing, drying, size reduction, enlargement and size analysis.
C3	Perform extraction, isolation, purification, identification, standardization, formulation of natural products and assure their rational use.	c2	Collect data about different equipment used in pharmaceutical industry and their operation.
C5	Conduct research studies and utilize the results in different pharmaceutical fields.	c3-	Conduct research studies and analyze results.
		c4	Assess the proper storage conditions for raw materials and finished pharmaceutical products.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		1.Practical session using laboratory equipment 2.Discussion session 3.Research	1.Oral 2.Quizzes 3.Case study
c1-	Classify all equipment used in heat transfer, evaporation, mixing ,drying, size reduction, size enlargement and size analysis and pharmaceutical preparation		
c2-	Collect data about different equipment used in pharmaceutical industry and their operation		
c3-	Conduct research studies and analyze results.		
c4	Assess the proper storage conditions for raw materials and finished pharmaceutical products.		

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Manage a suitable methodology to operate the different equipment.
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d2**	Solve the problems encountered in the manufacture of dosage forms.
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d3**	Work effectively as a part of team in order to fulfill certain project.
D5-	Apply information and communication technology and working effectively in a team.	**d4**	Demonstrate critical thinking and problem solving in different theoretical and practical situations.
		d5	Present industrial data in a graphical form

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		2. Lectures using white board and data show. 2 Practical session 3. Research assignments 4. Discussion session	Oral Case study Quizzes Reports
d1-	Manage a suitable methodology to operate the different equipment.		
d2-	Solve the problems encountered in the manufacture of dosage forms.		
d3	Work effectively as a part of team in order to fulfill certain project.		
d4	Demonstrate critical thinking and problem solving in different theoretical and practical situations		

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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d5	Present industrial data in a graphical form		

V. Course Content:

1 – Course Topics/Items:

B – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Parts of Pharmaceutical Industry and location	**a1-3,b1, d1-5**	Organization Chart of Industries Important department Plant location Factors affecting on plant location Plant layout Factors influencing on layout Objectives of plant layout Principles of plant layout Steps involved in plant layout Classification of plant layout	1	2
2	Plant Design from the Standpoint of Safety	**a1, d1-5**	-Location -Arrangement of building -Overhead clearance -Building & Equipment's -Processes -Special safety protection equipment -Fire protection	1	2
3	Intro. to Ind. Processing	**a2,b2, d1**	-Pharmaceutical Plant Design - Reasons for increasing large scale manufacture. -Breakdown of Processes:	1	2

4	Heat transfer.	**a3**, **b2**, b4, **d2**	Conduction Convection Radiation Fourier's law Units & Conversion Thermal conductivity A-Through a plane wall B-Through a composite wall:	1	2
			C-Through Thin-walled pipes and tubes: D-Through thick-walled pipes and tubes: Thermal insulation: Source of heat energy: Types of steam: Equipment's I- Design of heating equipment Heat exchanger.		
5	Evaporation.	**a3**, **b2**, b4, **d2**	Definition. Factors affecting evaporation. A-Natural circulating evaporators. B-Forced circulation evaporators. C-Film evaporators.	1	2
6	Mixing & mixing Equip.	**a3**, **b2**, b4, **c1**, **d2**	Definition: Objective: Types of Mixing. Classification of mixing. Factors influencing mixing. Mixing Operation: Classification of equipment for mixin Solid-solid, solid-liquid and liquid – liquid mixers.	1	2
7	**Mid Term Exam.**	a1-3,b1-4		1	2

8	Process validation of Semi-solid dosage forms	**a3**, **b1, d3**	General Processes. Process Validation Program. Why, when and who performs it? Validation Protocol. Process Validation Option: Semisolids manuf. consideration I -Flow diagram.	1	2

			II - Unit Operation for semisolid System. III - Filling & Packaging Operation Sampling Plan: Monitoring Output:		
9	Drying and drying Equip.	**a3**, **b2**, b4, **d2**	Definition. Non thermal drying. Importance of drying. Theory of Drying: Relative Humidity. Equilibrium moisture content (EMC): Types of dryers: Dryers for dilute solutions, suspensions and slurries Dryers for damp solid materials Continuous and Batch dryers.	1	2
10	Size Reduction.	**a3**, **b2**, b4, **d2**	Definitions Objective Factors affecting size reduction: Pharmaceutical Application of Size Reduction: METHODS OF SIZE REDUCTION	1	2

11	Size Enlargement.	**a3**, **b2**, b4**, d2**	Objectives. Granulation Techniques of Making Tablets by Pre Compression:	1	2
12	Particle Size Analysis.	**a3**, **b2**, b4**, d2**	Importance: Methods Microscopy. Sieving. Sedimentation techniques Optical and electrical sensing zone method Laser light scattering techniques	1	2
			Cyclone separators Elutriation		
13	Materials used in construction of pharmaceutical industries	**a1, b2, d1-5**	Objective. Metal and metal alloy Glass Fluoropolymers GMP Guidelines WHO / GMP guidelines GMP / FDA guidelines	3	6
14	**Final Exam**	a1-3,b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Mixing with V-shaped & double cone blenders (study the effect of the type of mixer, mixing time and mixing RPM)	c1-3,d1-5	**1**	**2**
2	1. Size reduction (Hammer mill + Ball mill + Cutter mill). 2. Size enlargement (Reciprocating horizontal granulator + Perforated basket granulator). 3. Size enlargement (Chilsonator).	c1-4,d1-5	**2**	**4**

3	1. Wet granulation with planetary mixer. 2. Dry granulation.	c1-4,d1-5	**1**	**2**
4	1. Evaporation (Problems)	c1-4,d1-5	**1**	**2**
5	1. Tableting of granules using a single / a rotary tablet press. 2. Measurement of tablet weight variation, hardness and friability for the prepared tablets and 2 market products.	c1-4,d1-5	**2**	**4**
6	**Mid. Exam**	c1-4	**1**	**2**
7	Heat transfer (Problems,).	c1-4,d1-5	**1**	**2**
8	1. Preparation of a calibration curve of a model drug E.g (Paracetamol). 2. Measurement of tablet disintegration and dissolution.	c1-4,d1-5	**1**	**2**
9	Drying (Fluidized bed dryer + Tray dryer + Lyophilizer + Standard spray dryer) and problems	c1-4,d1-5	**1**	**2**
10	1. Assay of drug content using UV spectrophotometer. 2. Demonstration of HPLC apparatus.	c1-4,d1-5	**1**	**2**
11	1. Particle size analyses, sieving. 2. Capsule feeding process, size, identification,	c1-4,d1-5	**2**	**4**
12	Revision in factory and labs	c1-4,d1-5	**1**	**2**
13	**Final Practical Exam**	c1-4	**1**	**2**
Number of Weeks /and Units P r Semester			**16**	**32**

VI. a. Teaching strategies of the course:

1. Lectures using white board and data show.
2. Practical session using laboratory equipment
3. Project tasks for groups of students (10 each) to prepare a report related to the topics lectured and make presentation for that report.

b- Assessment Methods:

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1- Written exams including the mid- and final-term exams To assess understanding, intellectual, professional 2- Practical exam To assess professional and practical skills
3- Oral To assess Knowledge, understanding, intellectual skills, general skills and confidence
4- Collaborative projects assignment to assess the ability to work in group, solve problems, present data and discussion
5. Quizzes To assess Knowledge, understanding, intellectual skills

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-4, d1-5**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-5**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
2	**Participation and quizzes**	**1-12**	**10**	7%	a1-3,b1-4**, d1-5**
3	**Collaborative projects assignment**	9th week	**10**	7%	a1-3,b1-4**, d1-5**
	Mid practical- exam, reports and attendance	**All weeks**	**30**	20%	c1-4
4	**Mid-semester exam**	**8**	**30**	20%	a1-3,b1-4
	Final practical- exam	**16**	**20**	13%	c1-4
5	**Final theoretical Exam**	**16**	**50**	33%	a1-3,b1-4
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)

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Two contact hours per week	None

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. The Theory and Practice of Industrial Pharmacy 2nd Ed, lea & Febiger , Philadelphia (2002).
2. Sarfaraz K.Niazi ,(2009),Handbooks of Pharmaceutical Manufacturing Formulations 2nd Ed.,

2- Recommended Readings and Reference Materials

Rockville, MD,2008,- United States Pharmacopoeia, The United States Pharmacopeial Convention, Inc.,. , 31st ed., U.S.A.

Reynold, J.E.F., 2000, Martindale, The Extra Pharmacopoeia, The Pharmaceutical Press, 32nd ed., London.

3- Essential References

- Remington:, 2000, The Science and Practice of Pharmacy, Alfonso, R.G. (Ed.), 20th ed. The University of the Sciences in Philadelphia, U.S.A.,

- Allen, L. V., Popovich, N. G., and Ansel, H. C., 2005, Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems, , 8th Edition, Lippincott Williams & Wilkins Publishers,.

4- Electronic Materials and Web Sites *etc*.

Periodicals as Drug Development and Industrial Pharmacy, International Journal of Pharmaceutics.
http:/www.polymerfactory.com, http:/www.capsugel.com Companies home pages
http://www.pharmaceutical technology.com
http://www.sciencedirect.com
http://www.pubmed.com http://www.google.com

5- Other Learning Material:

Study tour : A visit to pharmaceutical industries will be an integrated part of the syllabi

XI. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and
	consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Industrial Pharmacy I

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Maged Alwan	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:		
1-	Course Title:	Industrial Pharmacy I

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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2-	**Course Number & Code:**	**Ph2921**				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	5^{th} year/1^{st} semester				
5-	**Pre –requisite (if any):**	Pharmaceutics I-IV				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

Course provide students with the necessary knowledge in the area of pharmaceutical technology, and to help them to understand the fundamentals and importance of the unit operations in the manufacture of dosage forms such as mixing, drying, milling and particle size analysis.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Illustrate all parts and importance of pharmaceutical plants
2. Acquire the principles of pharmaceutical unit operations performed in pharmaceutical industry like, mixing, drying, size reduction and evaporation
3. Describe the equipment's of heat transfer, evaporation, drying, mixing, size reduction, size enlargement and size analysis, used in industrial pharmacy with their operation and applications.
4. Select the most appropriate equipment used for certain unit operations.
5. Classify all equipment used in heat transfer, evaporation, mixing ,drying, size reduction, size enlargement and size analysis and pharmaceutical preparation
6. Perform the most important tests in heat transfer, evaporation, mixing, drying, size reduction, enlargement and size analysis.
7. Collect data about different equipment used in pharmaceutical industry and their operation.
8. Conduct research studies and analyze results.
9. Assess the proper storage conditions for raw materials and finished pharmaceutical products.
10. Manage a suitable methodology to operate the different equipment.
11. Solve the problems encountered in the manufacture of dosage forms.
12. Work effectively as a part of team in order to fulfill certain project.
13. Demonstrate critical thinking and problem solving in different theoretical and practical situations. 14. Present industrial data in a graphical form

V. Course Content:

1 – Course Topics/Items:

B – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Parts of Pharmaceutical Industry and location	**a1-3,b1, d1-5**	Organization Chart of Industries Important department Plant location Factors affecting on plant location Plant layout Factors influencing on layout Objectives of plant layout Principles of plant layout	1	2

			Steps involved in plant layout Classification of plant layout		
2	Plant Design from the Standpoint of Safety	**a1, d1-5**	-Location -Arrangement of building -Overhead clearance -Building & Equipment's -Processes -Special safety protection equipment -Fire protection	1	2
3	Intro. to Ind. Processing	**a2,b2, d1**	-Pharmaceutical Plant Design - Reasons for increasing large scale manufacture. -Breakdown of Processes:	1	2
4	Heat transfer.	**a3**, **b2**, b4, **d2**	Conduction Convection Radiation Fourier's law Units & Conversion Thermal conductivity A-Through a plane wall B-Through a composite wall: C-Through Thin-walled pipes and tubes: D-Through thick-walled pipes and tubes: Thermal insulation: Source of heat energy: Types of steam: Equipment's I- Design of heating equipment Heat exchanger.	1	2
5	Evaporation.	**a3**, **b2**, b4, **d2**	Definition. Factors affecting evaporation. A-Natural circulating evaporators. B-Forced circulation evaporators. C-Film evaporators.	1	2

6	Mixing & mixing Equip.	**a3**, **b2**, b4, **c1**, **d2**	Definition: Objective:	1	2
			Types of Mixing. Classification of mixing. Factors influencing mixing. Mixing Operation: Classification of equipment for mixin Solid-solid, solid-liquid and liquid – liquid mixers.		
7	**Mid Term Exam.**	a1-3,b1-4		1	2
8	Process validation of Semi-solid dosage forms	**a3**, **b1, d3**	General Processes. Process Validation Program. Why, when and who performs it? Validation Protocol. Process Validation Option: Semisolids manuf. consideration I -Flow diagram. II - Unit Operation for semisolid System. III - Filling & Packaging Operation Sampling Plan: Monitoring Output:	1	2

9	Drying and drying Equip.	**a3**, **b2**, b4, **d2**	Definition. Non thermal drying. Importance of drying. Theory of Drying: Relative Humidity. Equilibrium moisture content (EMC): Types of dryers: Dryers for dilute solutions, suspensions and slurries Dryers for damp solid materials	1	2
			Continuous and Batch dryers.		
10	Size Reduction.	**a3**, **b2**, b4, **d2**	Definitions Objective Factors affecting size reduction: Pharmaceutical Application of Size Reduction: METHODS OF SIZE REDUCTION	1	2
11	Size Enlargement.	**a3**, **b2**, b4**, d2**	Objectives. Granulation Techniques of Making Tablets by Pre Compression:	1	2
12	Particle Size Analysis.	**a3**, **b2**, b4**, d2**	Importance: Methods Microscopy. Sieving. Sedimentation techniques Optical and electrical sensing zone method Laser light scattering techniques Cyclone separators Elutriation	1	2

13	Materials used in construction of pharmaceutical industries	**a1, b2, d1-5**	Objective. Metal and metal alloy Glass Fluoropolymers GMP Guidelines WHO / GMP guidelines GMP / FDA guidelines	3	6
14	**Final Exam**	a1-3,b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Mixing with V-shaped & double cone blenders (study the effect of the type of mixer, mixing time and mixing RPM)	c1-3,d1-5	**1**	**2**
2	1. Size reduction (Hammer mill + Ball mill + Cutter mill). 2. Size enlargement (Reciprocating horizontal granulator + Perforated basket granulator). 3. Size enlargement (Chilsonator).	c1-4,d1-5	**2**	**4**
3	1. Wet granulation with planetary mixer. 2. Dry granulation.	c1-4,d1-5	**1**	**2**
4	1. Evaporation (Problems)	c1-4,d1-5	**1**	**2**
5	1. Tableting of granules using a single / a rotary tablet press. 2. Measurement of tablet weight variation, hardness and friability for the prepared tablets and 2 market products.	c1-4,d1-5	**2**	**4**
6	**Mid. Exam**	c1-4	**1**	**2**
7	Heat transfer (Problems,).	c1-4,d1-5	**1**	**2**

8	1. Preparation of a calibration curve of a model drug E.g (Paracetamol). 2. Measurement of tablet disintegration and dissolution.	c1-4,d1-5	**1**	**2**
9	Drying (Fluidized bed dryer + Tray dryer + Lyophilizer + Standard spray dryer) and problems	c1-4,d1-5	**1**	**2**
10	1. Assay of drug content using UV spectrophotometer. 2. Demonstration of HPLC apparatus.	c1-4,d1-5	**1**	**2**
11	1. Particle size analyses, sieving. 2. Capsule feeding process, size, identification,	c1-4,d1-5	**2**	**4**
12	Revision in factory and labs	c1-4,d1-5	**1**	**2**
13	**Final Practical Exam**	c1-4	**1**	**2**
Number of Weeks /and Units P r Semester			**16**	**32**

VI. a. Teaching strategies of the course:

1. Lectures using white board and data show.
2. Practical session using laboratory equipment
3. Project tasks for groups of students (10 each) to prepare a report related to the topics lectured and make presentation for that report.

b- Assessment Methods:

1- Written exams including the mid- and final-term exams To assess understanding, intellectual, professional 2- Practical exam To assess professional and practical skills
3- Oral To assess Knowledge, understanding, intellectual skills, general skills and confidence
4- Collaborative projects assignment to assess the ability to work in group, solve problems, present data and discussion
5. Quizzes To assess Knowledge, understanding, intellectual skills

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-3, b1-4, d1-5**	Sporadic through the semester	**10**
2	Reports	**c1-4, d1-5**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
2	**Participation and quizzes**	**1-12**	**10**	7%	a1-3,b1-4**, d1-5**
3	**Collaborative projects assignment**	9th week	**10**	7%	a1-3,b1-4**, d1-5**
	Mid practical- exam, reports and attendance	**All weeks**	**30**	20%	c1-4
4	**Mid-semester exam**	**8**	**30**	20%	a1-3,b1-4
	Final practical- exam	**16**	**20**	13%	c1-4
5	**Final theoretical Exam**	**16**	**50**	33%	a1-3,b1-4
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د.ماجد علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	1. The Theory and Practice of Industrial Pharmacy 2nd Ed, lea & Febiger , Philadelphia (2002). 2. Sarfaraz K.Niazi ,(2009),Handbooks of Pharmaceutical Manufacturing Formulations 2nd Ed.,
7- Recommended Readings and Reference Materials	
	Rockville, MD,2008,- United States Pharmacopoeia, The United States Pharmacopeial Convention, Inc.,. , 31st ed., U.S.A. Reynold, J.E.F., 2000, Martindale, The Extra Pharmacopoeia, The Pharmaceutical Press, 32nd ed., London.
8- Essential References	
	- Remington:, 2000, The Science and Practice of Pharmacy, Alfonso, R.G. (Ed.), 20th ed. The University
	of the Sciences in Philadelphia, U.S.A., - Allen, L. V., Popovich, N. G., and Ansel, H. C., 2005, Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems, , 8th Edition, Lippincott Williams & Wilkins Publishers,.
9- Electronic Materials and Web Sites *etc*.	
	Periodicals as Drug Development and Industrial Pharmacy, International Journal of Pharmaceutics. http:/www.polymerfactory.com, http:/www.capsugel.com Companies home pages http://www.pharmaceutical technology.com http://www.sciencedirect.com http://www.pubmed.com http://www.google.com
10- Other Learning Material:	
	Study tour : A visit to pharmaceutical industries will be an integrated part of the syllabi

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Pharmaceutical Quality Control

I. Course Identification and General Information:

1	**Course Title**	**Pharmaceutical Quality Control**				
2	**Course Number & Code:**	Ph5913				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		1	**2**			**2**
4	**Study level/ semester at which this course is offered:**	5^{th} level / 1^{st} semester				
5	**Pre –requisite (if any):**	Pharmaceutical Analytical Chemistry I &II Instrumental Analysis I &II.				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
10	**Location of teaching the course:**	Faculty of Pharmacy				
11	**Prepared by:**	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen				
12	**Date of approval:**					

II. Course description:

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The course provides the students with the fundamental knowledge about the principles of pharmaceutical quality control of pharmaceutical products according to GMP and pharmacopeial requirements. It also concerns with study statistical and validation methods used for quality control of pharmaceutical products as well as their approval and stability.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the basic principles of quality control and steps of pharmaceutical analysis.
2. Explain statistical and validation methods used for quality control of pharmaceutical products.
3. Illustrate the GMP guidlines and steps of approval of pharmaceutical products
4. Understand the Stability indicating assays and all tests carried out on pharmaceutical products.
5. Outline the GMP requirements for all steps of quality control pharmaceutical products.
6. Distinguish between parameters of validation according to ICH and USP methods.
7. Predict the factors that affect the drug stability.
8. Operate and validate different pharmaceutical instruments and methods in the lab according to rules of GMP to minimize the errors in pharmaceutical analysis..
9. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
10. Apply the pharmacopeial methods for evaluation of drug stability as well as Q.C for different dosage forms.
11. Standardize analytical methods according to ICH and USP guidelines for pharmaceutical quality Control.
12. Work effectively in a team during applications of instrumental analysis of different pharmaceutical preparations.
13. Manage the time in an work effectively.
14. Utilize computers to get and use on-line data base and improve professional competencies

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding

After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize the basic principles of quality control and steps of pharmaceutical analysis.
		a2-	Explain statistical and validation methods used for
A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		quality control of pharmaceutical products.
		a3-	Illustrate the GMP guidlines and steps of approval of pharmaceutical products.
		a4-	Understand the Stability indicating assays and all tests carried out on pharmaceutical products.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the basic principles of quality control and steps of pharmaceutical analysis.	Lectures method, group discussion and brainstorming.	Oral Exam, homework, report, Quizzes, Short answers and Written exam
a2-	Explain statistical and validation methods used for quality control of pharmaceutical products.		
a3-	Illustrate the GMP guidelines and steps of approval of pharmaceutical products.		
a4-	Understand the Stability indicating assays and all tests carried out on pharmaceutical products.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**			
Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Outline the GMP requirements for all steps of quality control pharmaceutical products.
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Distinguish between parameters of validation according to ICH and USP methods.
		b3-	Predict the factors that affect the drug stability.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

***Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills.** **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	***Methods of assessment***
b1-	Outline the GMP requirements for all steps of quality control pharmaceutical products.	Lectures method, group discussion and brainstorming.	Oral Exam, homework, report, Quizzes, Short answers and Written exam
b2-	Distinguish between parameters of validation according to ICH and USP methods.		
b3-	Predict the factors that affect the drug stability.		

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(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Operate and validate different pharmaceutical instruments and methods in the lab according to rules of GMP to minimize the errors in pharmaceutical analysis..
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c2-**	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.		
		c3-	Apply the pharmacopeial methods for evaluation of drug stability as well as Q.C for different dosage forms.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c4-**	Standardize analytical methods according to ICH and USP guidelines for pharmaceutical quality Control.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:	Teaching strategies/methods to be used	Methods of assessment

c1-	Operate and validate different pharmaceutical instruments and methods in the lab according to rules of GMP to minimize the errors in pharmaceutical analysis..	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short answers and Written exam
c2-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.		
c3-	Apply the pharmacopeial methods for evaluation of drug stability as well as Q.C for different dosage forms.		
c4-	Standardize analytical methods according to ICH and USP guidelines for pharmaceutical quality Control.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Work effectively in a team during applications of Q.C of different pharmaceutical preparations.
D5-	Apply information and communication technology and working effectively in a team.	d2-	Manage the time in work effectively.
		d3-	Utilize computers to get and use on-line d base and improve professional competencie

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Work effectively in a team during applications of instrumental analysis of different pharmaceutical preparations.	Lectures method, group discussion and practical sessions	Oral Exam, homework, report, Quizzes, Short answers and Written exam
d2-	Manage the time in work effectively.		
d3-	Utilize computers to get and use on-line data base and improve professional competencies.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

a
s

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	**Introduction to Quality control**	a1, b1, d1-3	Definitions and some terms used in quality control of drugs, basic principle of quality control. Component of Quality Control, General Quality System Requirements, The main part of the ISO standard is made up of three separate standards, Pharmaceutical Quality Control System, Control Charts	2	2
2	Steps of pharmaceutical analysis	a1, b1, d1-3	-Define the problem, objectives, method, calculation and report.	1	1
3	Statistics used in quality control of drugs	a2, b1, d1-3	Accuracy, precision, calibration curve calculations	1	1
4	Good manufacturing practice	a3, b1, d1-3	Some terms in GMP, GLP, GAP, requirements of GMP	2	2
5	Method validation	a2, b1-2, d1-3	Definition, USP and ICH parameters of validation methods	2	2
6	Midterm Exam	a1-3, b1-2		1	1
7	Pharmaceutical products approving	a3, b1, d1-3	Registration and drug approving requirements and tests	1	1
8	Stability of pharmaceutical products	a4, b1, d1-3	-Definitions, half life, shelf life - Chemical reactions and storage conditions affecting drug stability	1	1
9	Stability indicating assays	a4, b1, d1-3	Real time and accelerated stability indicating assays	2	2
10	Physical &Physicochemical and biological tests carried out on pharmaceutical products	a1, a4, b1-3, d1-3	All the chemical, physicochemical and biological tests on drug products	2	2

11	**Final Exam**	a1-4, b1-3		1	1
Number of Weeks /and Units Per Semester				**16**	**32**

b - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	**Study the errors of pharmaceutical analysis.**	c1, c2, d1-3	1	2
2	WHO good practices for pharmaceutical quality control laboratories**.**	c1, c2, d1-3	2	4
3	Study the parameters of validation for method used for analysis of certain dosage form according to USP.	c1, c2, c4, d1-3	3	6
4	Mid-Exam	c1,c2 , c4	1	2
5	Study the parameters of validation for method used for analysis of certain dosage form according to ICH**.**	c1, c2, d1-3	3	6
6	Study of stability indicating assays **of certain drugs.**	c1, c2, c3 , d1-3	3	6
7	Quality control tests for different Pharmaceutical dosage forms	c1-4 , d1-3	2	4
8	Final Exam	**c1-4**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lectures using data show video animation, Practice session, Discussions, Small group discussions, Tutorials and Practical classes

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VII. Assignments:

- Homework
- Reports

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3 ,b1,b3, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, b1-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	30%	c1,c2,c3, c4
3	**Theoretical mid-semester exam**	9th	20	20%	a1-3, b1, b2
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-4, b1-3
6	**Final Exam (practical)**	**16th**	20	20%	c1-4
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)

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Two contact hours per week	None

X. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication, Canada.

2- Satinder Ahuja, Stephen Scypinski, 2001. Handbook Of Modern Pharmaceutical Analysis, Academic Press, San Diego, USA.

3- James Swarbrick, James C. Boylan, Marcel Dekker, Encyclopedia of pharmaceutical technology: Vol 7, vol16., Inc. New York- Basel- Hongkong.

2- Recommended Books and Reference Materials.

1- J. Ermer and J. H. McB. Miller, 2005. Method Validation in Pharmaceutical Analysis, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

2- Robert A. Nash, Alfred H. Wachter, Pharmaceutical Process Validation, Volume 129, Marcel Dekker Inc.

3- Andrew J Fletcher, Lionel D Edward, Anthony W Fox Peter Stonie, 2002. Principle and practice of medicine, John Wiley and Sons Ltd. London , UK.

4- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

1- the Analyst;

2- J. Pharm. & Biomed. Anal.

3- J. Assoc. off Anal. Chem.

4- The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)

5- The Analytical Forum on ChemWeb (http://analytical.

6- chemweb.com/search/search.exe) **XI.** Facilities Required:

1 - **Accommodation:**	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - **Computing resources:**	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
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1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused
	absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.

4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** - Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. - Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the subsection (5) of the course policies.

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د. يحيى الدخين **ا.د. محمود البريهي** **ا.م.د.توفيق العبيدي** **د.خالد الشوبة** **ا.م.د. هدى العماد** **ا.د. القاسم محمد عباس** **د. محمد عباس**

7	**Other policies:** - - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Plan of Pharmaceutical Quality Control

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Yahya AL-Dokhain, Dr. Mohammed Hamid-Addeen	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU

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د. يحيى الدخين	ا.د. محمود البريهي	ا.م.د.توفيق العبيدي	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس د. محمد عباس

E-mail			h				

II- Course Identification and General Information:

1-	**Course Title:**	Pharmaceutical Quality Control				
2-	**Course Number & Code:**	Ph5913				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	1		2
4-	**Study level/year at which this course is offered:**	5th level /1st semester				
5-	**Pre –requisite (if any):**	Pharmaceutical Analytical Chemistry I &II Instrumental Analysis I &II.				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course provides the students with the fundamental knowledge about the principles of pharmaceutical quality control of pharmaceutical products according to GMP and pharmacopeial requirements. It also concerns with study statistical and validation methods used for quality control of pharmaceutical products as well as their approval and stability.

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IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

15. Recognize the basic principles of quality control and steps of pharmaceutical analysis.
16. Explain statistical and validation methods used for quality control of pharmaceutical products.
17. Illustrate the GMP guidlines and steps of approval of pharmaceutical products
18. Understand the Stability indicating assays and all tests carried out on pharmaceutical products.
19. Outline the GMP requirements for all steps of quality control pharmaceutical products.
20. Distinguish between parameters of validation according to ICH and USP methods.
21. Predict the factors that affect the drug stability.
22. Operate and validate different pharmaceutical instruments and methods in the lab according to rules of GMP to minimize the errors in pharmaceutical analysis..
23. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
24. Apply the pharmacopeial methods for evaluation of drug stability as well as Q.C for different dosage forms.
25. Standardize analytical methods according to ICH and USP guidelines for pharmaceutical quality Control.
26. Work effectively in a team during applications of instrumental analysis of different pharmaceutical preparations.
27. Manage the time in an work effectively.
28. Utilize computers to get and use on-line data base and improve professional competencies

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	**Introduction to**	a1, b1, d1-3	Definitions and some terms used in quality control of drugs, basic principle of quality control.	1,2	2

	Quality control		Component of Quality Control, General Quality System Requirements, The main part of the ISO standard is made up of three separate standards, Pharmaceutical Quality Control System, Control Charts		
2	Steps of pharmaceutical analysis	a1, b1, d1-3	-Define the problem, objectives, method, calculation and report.	3	1
3	Statistics used in quality control of drugs	a2, b1, d1-3	Accuracy, precision, calibration curve calculations	4	1
4	Good manufacturing practice	a3, b1, d1-3	Some terms in GMP, GLP, GAP, requirements of GMP	5,6	2
5	Method validation	a2, b1-2, d1-3	Definition, USP and ICH parameters of validation methods	7,8	2
6	Midterm Exam	a1-3, b1-2		9	1
7	Pharmaceutical products approving	a3, b1, d1-3	Registration and drug approving requirements and tests	10	1
8	Stability of pharmaceutical products	a4, b1, d1-3	-Definitions, half life, shelf life - Chemical reactions and storage conditions affecting drug stability	11	1
9	Stability indicating assays	a4, b1, d1-3	Real time and accelerated stability indicating assays	12,13	2
10	Physical &Physicochemical and biological tests carried out on pharmaceutical products	a1, a4, b1-3, d1-3	All the chemical, physicochemical and biological tests on drug products	14,15	2
11	**Final Exam**	a1-4, b1-3		16	1
Number of Weeks /and Units Per Semester				**16**	**32**

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b - Practical Aspect				
Order	**Tasks/ Experiments**	**CILOs (symbols)**	**Week Due**	**Contact Hours**
1	**Study the errors of pharmaceutical analysis.**	c1, c2, d1-3	1	2
2	WHO good practices for pharmaceutical quality control laboratories**.**	c1, c2, d1-3	2,3	4
3	Study the parameters of validation for method used for analysis of certain dosage form according to USP.	c1, c2, c4, d1-3	4-6	6
4	Mid-Exam	c1,c2 , c4	7	2
5	Study the parameters of validation for method used for analysis of certain dosage form according to ICH**.**	c1, c2, d1-3	8-10	6
6	Study of stability indicating assays **of certain drugs.**	c1, c2, c3 , d1-3	11-13	6
7	Quality control tests for different Pharmaceutical dosage forms	c1-4 , d1-3	14,15	4
8	Final Exam	**c1-4**	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI- Teaching strategies of the course:

Lectures using data show video animation, Practice session, Discussions, Small group discussions, Tutorials and Practical classes

-

VII- Assignments:

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- Homework
- Reports

VIII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1,a3 ,b1,b3, d1-3
	Oral Tests and Homeworkassignments	Sporadic through the semester	5	5%	a2, a4, b1-3, d1-3
2	**Attendance, Practical Reports and Practical mid-semester exam**	8th	30	30%	c1,c2,c3, c4
3	**Theoretical mid-semester exam**	9th	20	20%	a1-3, b1, b2
5	**Final Exam (theoretical)**	**16th**	30	30%	a1-4, b1-3
6	**Final Exam (practical)**	**16th**	20	20%	c1-4
	Total		**100**	**100%**	

IX- Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X- Learning Resources:

1- Required Textbook(s) (maximum two).

4- Somenath Mitra, 2003. Sample Preparation Techniques in Analytical Chemistry, A John Wiley & Sons, Inc., Publication, Canada.

5- Satinder Ahuja, Stephen Scypinski, 2001. Handbook Of Modern Pharmaceutical Analysis, Academic Press, San Diego, USA.

6- James Swarbrick, James C. Boylan, Marcel Dekker, Encyclopedia of pharmaceutical technology: Vol 7, vol16., Inc. New York- Basel- Hongkong.

2- Recommended Books and Reference Materials.

5- J. Ermer and J. H. McB. Miller, 2005. Method Validation in Pharmaceutical Analysis, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

6- Robert A. Nash, Alfred H. Wachter, Pharmaceutical Process Validation, Volume 129, Marcel Dekker Inc.

7- Andrew J Fletcher, Lionel D Edward, Anthony W Fox Peter Stonie, 2002. Principle and practice of medicine, John Wiley and Sons Ltd. London , UK.

8- Lectures Notes and Practical Manual.

3- Electronic Materials and Web Sites *etc*.

7. the Analyst;

8. J. Pharm. & Biomed. Anal.

9. J. Assoc. off Anal. Chem.

10. The Analytical Abstracts database (http://www.rsc.org/ CFAA/AASearchPage.cfm)

11. The Analytical Forum on ChemWeb (http://analytical.

12. chemweb.com/search/search.exe)

XI- Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII- **Course Improvement Processes:**

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills.
	▪ Regular revision of course specification and syllabus items.

XIII- Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination). -A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused

	absentness (hospitals medical reports along with discharge summaries or death certificate) must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absentness.

4	**Assignments & Projects:** - Micro-assignments and practical reports must be submitted for the assessment on or before the due date. If a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.
5	**Cheating:** -If a student is found cheating in the final and med-term examinations and quizzes(copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** - Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source. - Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment. All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the subsection (5) of the course policies.

7	**Other policies:** - - Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent. Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.

Course Specification of Cosmetics

I. Course Identification and General Information:							
1	Course Title:	Cosmetics					
2	Course Number & Code:	Ph2922					
3	Credit hours: 2hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1	2			2	
4	Study level / semester at which course is offered:	Level: - Fifth Year /First Semester					
5	Pre –requisite (if any):	Pharmaceutics I,II,III and IV					
6	Co –requisite (if any):						
7	Programs in which course is offered:	Bachelor of pharmacy					
8	Language of teaching the course:	English					
9	Department in which course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy- Sana`a university					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

Topics will cover structure, functions, disorders of skin and hair. Also formulation, manufacture, evaluation, testing and selection of best natural or synthetic materials to prepare safe and legal cosmetic preparations.

III. Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Define the different cosmetic products using different bases and different additives
2. Report the specifications of healthy skin and hair, and how to maintain healthy state
3. State different methods of preparation of cosmetic products and methods of evaluation
4. Identify the principles of controlling the body smell, hair disorders and different cosmetic colorants.
5. Illustrate safety and compatibility of different cosmetic constituents used in different preparation.
6. Describe the basic concepts involved in the formulation and manufacture of cosmetic products
7. Evaluate factors affecting preparation and evaluation of different cosmetic preparations.
8. Select the best equipment and/or operational line to perform pharmaceutical operation.
9. Diagrammatically design the studied equipments for each operation.
10. Classify the different cosmetic products and compare the characteristic. difference between them
11. Compound, prepare and design different cosmetic formulations
12. Perform the quality control tests and evaluate some cosmetic products
13. Classify different additives used in cosmetic preparations
14. Demonstrate different methods of preparation, evaluation of cosmetic preparations, critical thinking, problem solving, decision-making abilities, leadership and team working abilities

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Define the different cosmetic products using different bases and different additives.

A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Report the specifications of healthy skin and hair, and how to maintain healthy state
A5-	Demonstrate the basic knowledge of pharmacoecnomics, policy, legislation,	**a3**	State different methods of preparation of cosmetic products and methods of evaluation.
	marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.		
		a4	Identify the principles of controlling the body smell, hair disorders and different cosmetic colorants.
		a5	Illustrate safety and compatibility of different cosmetic constituents used in different preparation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures methods , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a1-	Define the different cosmetic products using different bases and different additives.		
a2-	Define the different cosmetic products using different bases and different additives.		
a3	State different methods of preparation of cosmetic products and methods of evaluation.		
a4	Identify the principles of controlling the body smell, hair disorders and different cosmetic colorants.		

a5	Illustrate safety and compatibility of different cosmetic constituents used in different preparation.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses,	**b1-**	Describe the basic concepts involved in the formulation and manufacture of cosmetic products.
	contraindication and toxicity.		
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Evaluate factors affecting preparation and evaluation of different cosmetic preparations
		b3-	Select the best equipment and/or operational line to perform pharmaceutical operation.
		b4	Diagrammatically design the studied equipments for each operation.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b1-	Describe the basic concepts involved in the formulation and manufacture of cosmetic products.		

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b2-	Evaluate factors affecting preparation and evaluation of different cosmetic preparations	Computer based teaching and learning	
b3-	Select the best equipment and/or operational line to perform pharmaceutical operation.		
b4	Diagrammatically design the studied equipments for each operation.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C3-	Extract, isolate, purify, identify, standardize, formulate natural products and assure their rational use.	**c1-**	Classify the different cosmetic products and compare the characteristic. difference between them
		c2	Compound, prepare and design different cosmetic formulations.
		c3-	Perform the quality control tests and evaluate some cosmetic products

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports
c1-	Classify the different cosmetic products and compare the characteristic. difference between them		

c2	Compound, prepare and design different cosmetic formulations.		
c3-	Perform the quality control tests and evaluate some cosmetic products		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional Development.	**d1-**	Classify different additives used in cosmetic preparations.
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	**d2**	Demonstrate different methods of preparation, evaluation of cosmetic preparations, critical thinking, problem solving, decision-making abilities, leadership and team working abilities.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Classify different additives used in cosmetic preparations.		
d2	Demonstrate different methods of preparation, evaluation of cosmetic preparations, critical thinking, problem solving, decision-making abilities, leadership and team working abilities.		

V. Course Content:

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1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to cosmetic science	a1,b1,d1-2	Introduction to cosmetic science and health care products. History.	**1**	**1**
2	Skin diseases & disorders. Skin care, sunscreen & skin bleaches products.	a2, a4, a5, ,d1-2	Human skin structure & function Cosmetic specifications Cosmetic Product Forms. Skin physiology Skin Functions Dry Skin Mixed Skin Sensitive Skin	**1**	**1**
3	Hair structure, function & disorders.	a2, a4, a5,,d1-2	Hair regions Morphologically Chemical Composition Hair Loss & treatment Treatment of alopecia	**1**	**1**
4	Anti-perspirants & deodorants	a2, a4, a5 ,d1-2	-Odor, Sebum, Perspiration, Sweat glands, Sweat, Physiological action, -Odor and Methods to reduce or control auxiliary odor. Antiperspirants mechanisms Deodorants/ingredients. Risks.	**1**	**1**
5	Foundation, lipstick & nail cosmetic preparations	a4, a5, b3, b4 ,d1-2	Characters Preparation	**1**	**1**

6	Creams, s and shaving preparations	a1, a3, b3, b4, d1	Types Characters Preparation	**1**	**1**
7	**Mid – Exam**	a1-5,b1-4		**1**	**1**
8	Shampoos & conditioners.	a1, a3, b3, b4, d1	Types A well formulated shampoo Additives Shampoo benefits Effect of shampoo on hair	**1**	**1**
9	Dandruff and its control	a2, b3 ,d1-2	Causes Treatment Formulation	**1**	**1**
10	Hair tonics, colorants, waving & Straighteners preparation	a1, a3, b3, d1	Advantages & disadvantage Preparation	**1**	**1**
11	Depilatories Perfumes	a3, a4, b3,d1-2	Historical perspective Odor classification Quality assurance Solvents	**1**	**1**
12	The tooth and oral health – Dentifrices, abrasives and anticaries	a1, a3, b3, d1	Tooth Anatomy Dental Caries Maintaining oral hygiene Oral care products 1.Toothpaste 2.Mouthwash 3.TeethWhitening	**1**	**1**
13	Quality control of cosmetic products	a3, b2, d2	Thermal Stability Photosensitivity	**3**	**3**
			Physical/Chemical Stability Tests:		
14	**Final Exam**	a1-5,b1-4		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة ا.د.ماجد
علوان ا.د. محمود البريهي ا.د.ماجد علوان د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس

1	Introduction and cosmetic principle	c1-2,d1	**1**	**2**
2	Cream	c1-3,d1-2	**1**	**2**
3	Cream	c1-3,d1-2	1	**2**
4	Shampoo	c1-3,d1-2	**1**	**2**
5	Shampoo	c1-3,d1-2	**1**	**2**
6	Skin care, sunscreen & skin bleaches products.	c1-3,d1-2	**1**	**2**
7	**Mid exam**	c1-3	**1**	**2**
8	Anti-perspirants & deodorants	c1-3,d1-2	**1**	**2**
9	Lipstik	c1-3,d1-2	**1**	**2**
10	Paste	c1-3,d1-2	**1**	**2**
11	Soaps	c1-3,d1-2	**1**	**2**
12	Lotion	c1-3,d1-2	**2**	**2**
13	Mascara, eye shadow, nail paints,	c1-3,d1-2	**1**	**2**
14	Depilatories Perfumes	c1-3,d1-2	**1**	**2**
16	**Final exam.**	c1-3	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.ماجد
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Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	7.5	7%	a1-5, b1-4**, d1-2**
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	7.5	7%	a1-5, b1-4**, d1-2**
3.	**Attendance, Practical Reports**	**All Weeks**	10	10%	c1-3
4.	**Practical mid-semester exam**	11th	10	10%	c1-3
5.	**Theoretical mid-semester exam**	6th	20	20%	a1-5, b1-4
6.	**Final Exam (theoretical)**	16th	35	33%	a1-5, b1-4
7.	**Final Exam (practical)**	16th	10	13%	c1-3
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Notes on Cosmetics prepared by the department staff.
2. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
3. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

1. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
2. Florence, A.T. and Attwood, D., 2006, "Physicochemical principles of pharmacy", 4th edition Pharmaceutical Press, London.

3- Electronic Materials and Web Sites *etc*.

http://www.pharmaceutical technology.com
www.pubmed.com www.sciencedirect.com

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative

	assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Cosmetics

I. - Information about Faculty Member Responsible for the Course:		
Name of Faculty Member	Prof. Dr. Maged Alwan	Office Hours

Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:

1-	Course Title:	Cosmetics				
2-	Course Number & Code:	Ph2922				
3-	Credit hours: 2hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	2		2
4-	Study level/year at which this course is offered:	5th year/1st semester				
5-	Pre –requisite (if any):	Pharmaceutics I-IV				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

III. Course description:

Topics will cover structure, functions, disorders of skin and hair. Also formulation, manufacture, evaluation, testing and selection of best natural or synthetic materials to prepare safe and legal cosmetic preparations.

IV. Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Define the different cosmetic products using different bases and different additives
2. Report the specifications of healthy skin and hair, and how to maintain healthy state
3. State different methods of preparation of cosmetic products and methods of evaluation
4. Identify the principles of controlling the body smell, hair disorders and different cosmetic colorants.
5. Illustrate safety and compatibility of different cosmetic constituents used in different preparation.
6. Describe the basic concepts involved in the formulation and manufacture of cosmetic products
7. Evaluate factors affecting preparation and evaluation of different cosmetic preparations.
8. Select the best equipment and/or operational line to perform pharmaceutical operation.
9. Diagrammatically design the studied equipments for each operation.
10. Classify the different cosmetic products and compare the characteristic. difference between them
11. Compound, prepare and design different cosmetic formulations
12. Perform the quality control tests and evaluate some cosmetic products
13. Classify different additives used in cosmetic preparations
14. Demonstrate different methods of preparation, evaluation of cosmetic preparations, critical thinking, problem solving, decision-making abilities, leadership and team working abilities

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to cosmetic science	a1,b1,d1-2	Introduction to cosmetic science and health care products. History.	**1**	**1**
2	Skin diseases & disorders. Skin care, sunscreen & skin bleaches products.	a2, a4, a5, ,d1-2	Human skin structure & function Cosmetic specifications Cosmetic Product Forms. Skin physiology Skin Functions	**1**	**1**

			Dry Skin Mixed Skin Sensitive Skin		
3	Hair structure, function & disorders.	a2, a4, a5,,d1-2	Hair regions Morphologically Chemical Composition Hair Loss & treatment Treatment of alopecia	**1**	**1**
4	Anti-perspirants & deodorants	a2, a4, a5 ,d1-2	-Odor, Sebum, Perspiration, Sweat glands, Sweat, Physiological action, -Odor and Methods to reduce or control auxiliary odor. Antiperspirants mechanisms Deodorants/ingredients. Risks.	**1**	**1**
5	Foundation, lipstick & nail cosmetic preparations	a4, a5, b3, b4 ,d1-2	Characters Preparation	**1**	**1**
6	Creams, s and shaving preparations	a1, a3, b3, b4, d1	Types Characters Preparation	**1**	**1**
7	**Mid – Exam**	a1-5,b1-4		**1**	**1**
8	Shampoos & conditioners.	a1, a3, b3, b4, d1	Types A well formulated shampoo Additives Shampoo benefits Effect of shampoo on hair	**1**	**1**
9	Dandruff and its control	a2, b3 ,d1-2	Causes Treatment Formulation	**1**	**1**
10	Hair tonics, colorants, waving & Straighteners preparation	a1, a3, b3, d1	Advantages & disadvantage Preparation	**1**	**1**

11	Depilatories Perfumes	a3, a4, b3,d1-2	Historical perspective Odor classification Quality assurance Solvents	**1**	**1**
12	The tooth and oral health – Dentifrices, abrasives and anticaries	a1, a3, b3, d1	Tooth Anatomy Dental Caries Maintaining oral hygiene Oral care products 1.Toothpaste 2.Mouthwash 3.TeethWhitening	**1**	**1**
13	Quality control of cosmetic products	a3, b2, d2	Thermal Stability Photosensitivity Physical/Chemical Stability Tests:	**3**	**3**
14	**Final Exam**	a1-5,b1-4		**1**	**1**
Number of Weeks /and Units Per Semester				**16**	**16**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Introduction and cosmetic principle	c1-2,d1	**1**	**2**
2	Cream	c1-3,d1-2	**1**	**2**
3	Cream	c1-3,d1-2	**1**	**2**
4	Shampoo	c1-3,d1-2	**1**	**2**
5	Shampoo	c1-3,d1-2	**1**	**2**
6	Skin care, sunscreen & skin bleaches products.	c1-3,d1-2	**1**	**2**
7	**Mid exam**	c1-3	**1**	**2**
8	Anti-perspirants & deodorants	c1-3,d1-2	**1**	**2**
9	Lipstik	c1-3,d1-2	**1**	**2**

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10	Paste	c1-3,d1-2	**1**	**2**
11	Soaps	c1-3,d1-2	**1**	**2**
12	Lotion	c1-3,d1-2	**2**	**2**
13	Mascara, eye shadow, nail paints,	c1-3,d1-2	**1**	**2**
14	Depilatories Perfumes	c1-3,d1-2	**1**	**2**
16	**Final exam.**	c1-3	**1**	**2**
Number of Weeks /and Units Pr Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-4, d1-2**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-2**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	7.5	7%	a1-5, b1-4**, d1-2**
9.	**Oral Tests and Homeworkassignments**	Sporadic through the	7.5	7%	a1-5, b1-4**, d1-2**
		semester			
10.	**Attendance, Practical Reports**	**All Weeks**	10	10%	c1-3
11.	**Practical mid-semester exam**	11th	10	10%	c1-3
12.	**Theoretical mid-semester exam**	6th	20	20%	a1-5, b1-4
13.	**Final Exam (theoretical)**	16th	35	33%	a1-5, b1-4
14.	**Final Exam (practical)**	16th	10	13%	c1-3
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

4. Notes on Cosmetics prepared by the department staff.
5. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
6. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.

6- Recommended Readings and Reference Materials

3. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
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7- Electronic Materials and Web Sites *etc*.

http://www.pharmaceutical technology.com

www.pubmed.com www.sciencedirect.com

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmacoeconomics

I. Course Identification and General Information:							
1	Course Title:	Pharmacoeconomics					
2	Course Number & Code:	Ph2923					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		1	-	-	-	1	
4	Study level/ semester at which this course is offered:	Fifth year, First Semester					
5	Pre –requisite (if any):	Pharmaceutical Biostatistics					
6	Co –requisite (if any):	Fifth level					
7	Program (s) in which the course is offered:	Bachelor of pharmacy					
8	Department (s) in which the course is offered:	Pharmaceutics					
9	Language of teaching the course:	English					
10	Location of teaching the course:	Faculty of pharmacy – Sana'a University					
11	Prepared by:	Prof. Dr. Ahmed Mohamed Sabati					
12	Date of approval:						

II. Course Description:

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ا.د.احمد سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

This course introduces students to the principles of Pharmacoeconomics for use in analyzing the economic impact of pharmaceuticals on health care systems and Pharmacoeconomics analysis and costing of drugs and services. **Overall Aims of Course:**

A. Explain how Pharmacoeconomics distinguishes itself as a unique "toolbox" for use in analyzing the economic impact of pharmaceuticals on health care systems.

B. Explain the different perspectives influence Pharmacoeconomics analysis and costing of drugs and services.

I- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Demonstrate a basic background of pharmacoeconomics.
2. Recognize Pharmacoeconomics issues and able to address the effects of medication use in populations
3. Describe the economic, institutional and policy aspects of the markets for health care and health care technologies
4. Apply skills to the solution of real life problems by developing research questions, conducting research and sharing research findings with the scientific community.
5. Recognize drug safety issues and develop appropriate strategies to optimize the benefit/risk ratio of the product involved.
6. Write a study protocol in a clear, simple, and parsimonious manner, responsive to the question at hand, and proposing a methodological sound design.
7. Derive the relevant cost and revenue streams needed to conduct a pharmacoeconomics analysis.
8. Review skill to work in pharmaceutical companies and pharmacy benefits management, and government public health, medicine, and other related sectors.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research	a1-	Demonstrate a basic background of pharmacoeconomics.
A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic	a2-	Recognize Pharmacoeconomics issues and able to address the effects of medication use in populations
	products as well as ethics of health care..	a3	Describe the economic, institutional and policy aspects of the markets for health care and health care technologies

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a1-	Demonstrate a basic background of pharmacoeconomics.		
a2-	Recognize Pharmacoeconomics issues and able to address the effects of medication use in populations		
a3-	Describe the economic, institutional and policy aspects of the markets for health care and health care technologies		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

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ا.د.احمد سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Program Intended Learning Outcomes (Sub- PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Apply skills to the solution of real life problems by developing research questions, conducting research and sharing research findings with the scientific community.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Recognize drug safety issues and develop appropriate strategies to optimize the benefit/risk ratio of the product involved.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b1-	Apply skills to the solution of real life problems by developing research questions, conducting research and sharing research findings with the scientific community.		
b2-	Recognize drug safety issues and develop appropriate strategies to optimize the benefit/risk ratio of the product involved.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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After completing this program, students will be able to:		After completing this course, students will be able to:	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care Professionals to optimize therapeutic outcomes.	c1-	Write a study protocol in a clear, simple, and parsimonious manner, responsive to the question at hand, and proposing a methodological sound design.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	c2-	Derive the relevant cost and revenue streams needed to conduct a pharmacoeconomics analysis.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports. -
c1-	Write a study protocol in a clear, simple, and parsimonious manner, responsive to the question at hand, and proposing a methodological sound design.		
c2-	Derive the relevant cost and revenue streams needed to conduct a pharmacoeconomics analysis.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D1-	Practice independent learning needed for continuous professional development	d1-	

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D2-	Employ proper documentation and filing systems in different pharmaceutical fields		Review the skills to work in pharmaceutical companies and pharmacy benefits management, and government public health, medicine, and other related sectors.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Review skills to work in pharmaceutical companies and pharmacy benefits management, and government public health, medicine, and other related sectors.		

I. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	No. of week	Contact Hours
1	Introduction of terminology; review of major methodologies- Definition of pharmacoeconomics.	a1, a2	1	1
2	Basic principle of clinical epidemiology relevant to pharmacoeconomics studies.	a1, a3, b1-2 c2	1	1
3	Role of pharmacoeconomics in the health care system and academic	a1, a2, b1-2, c1,	1	1
4	Case-control, nested case-control studies; cross-over designs studies and matching in pharmacoeconomics	a1, a3, b1-2, c1-2	1	1
5	Large Data Base Research Student discussion of data source selection	a1, a3, b1, c1	1	1
6	Drug Utilization studies	a1, a2, b1,c1	1	1

7	Evaluating and improving physician prescription	a1, a3, b1-2, c2, d1	1	1
8	Role and importance of pharmacoeconomic analyses in drug management	a1, a3, b1-2, c2	1	1
9	Basic types of pharmacoeconomic analyses	a1, a3, b1-2, c2	1	1
10	Cost Effectiveness and Cost Minimization	a1, a3, b1-2, c2	1	1
11	Cost Benefit and Cost Utility	a1, a3, b1-2, c2	1	1
12	Pharmacoeconomics in Drug Development	a1, a2, c1	1	1
13	Quality of Life Assessment	a1, a3, b1-2, c1-2, d1	1	1
14	Quality of Life Assessment	a1, a3, b1-2, c1-2, d1	1	1
Number of Weeks /and Units Per Semester			**14**	**28**

I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam and reports.

I. Schedule of Assessment Tasks for Students During the Semester:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**5**	5%	a1-3, b1-2, c1-2
2	**Assignments**	4-12	**5**	5%	a1-3, b1-2, c1-2
3	**Mid-semester exam**	**8**	**20**	20%	a1-3, b1-2, c1-2
5	**Final Exam**	**16**	**70**	70%	a1-3, b1-2, c1-2
	Total		**100**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
-	-

III. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Tilson HH, Chan KA. Editors. Pharmacoepidemiology and Therapeutic Risk Management. Harvey Whitney press, Cincinnati, 2008.
2. Drummond MF, McGuire A. Economic evaluation in health care; merging theory with practice. Oxford University Press, 2001

2- Recommended Readings and Reference Materials

1. Drummond MF, O'Brien B. *Methods for the Economic Evaluation of Health Care Programmes.* 2nd Edition. Oxford University Press. New York, New York. 1997.
2. Strom BL, Kimmel SE. *Textbook of Pharmacoepidemiology*. West Sussex, England: John Wiley & Sons Ltd, 2006.

3- Essential References

Course notes (lecture notes and practical notes) prepared by teacher of the subject.

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4- Electronic Materials and Web Sites *etc*.	
	International Society for Pharmacoepidemiology website. http://www.pharmacoepi.org
5- Other Learning Material:	

I. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.
II. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	
▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).	
2- Other strategies for evaluation of teaching by the instructor or by the department.	
Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).	
3- Processes for improvement of teaching.	

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and
	their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

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1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmacoeconomics

II- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member		Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

III- Course Identification and General Information:		
1-	Course Title:	Pharmacoeconomics
2-	Course Number & Code:	Ph2923

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3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		1	-			1
4-	**Study level/year at which this course is offered:**	Fifth year, First Semester				
5-	**Pre –requisite (if any):**	Pharmaceutical Biostatistics				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

IV. Course Description:

This course introduces students to the principles of Pharmacoeconomics for use in analyzing the economic impact of pharmaceuticals on health care systems and Pharmacoeconomics analysis and costing of drugs and services. **Overall Aims of Course:**

C. Explain how Pharmacoeconomics distinguishes itself as a unique "toolbox" for use in analyzing the economic impact of pharmaceuticals on health care systems.
D. Explain the different perspectives influence Pharmacoeconomics analysis and costing of drugs and services.

IV- Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Demonstrate a basic background of pharmacoeconomics.
2. Recognize Pharmacoeconomics issues and able to address the effects of medication use in populations
3. Describe the economic, institutional and policy aspects of the markets for health care and health care technologies
4. Apply skills to the solution of real life problems by developing research questions, conducting research and sharing research findings with the scientific community.
5. Recognize drug safety issues and develop appropriate strategies to optimize the benefit/risk ratio of the product involved.
6. Write a study protocol in a clear, simple, and parsimonious manner, responsive to the question at hand, and proposing a methodological sound design.
7. Derive the relevant cost and revenue streams needed to conduct a pharmacoeconomics analysis.
8. Review skill to work in pharmaceutical companies and pharmacy benefits management, and government public health, medicine, and other related sectors.

V. Intended learning outcomes (ILOs) of the course:

Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	Contact Hours
1	Introduction of terminology; review of major methodologies- Definition of pharmacoeconomics.	a1, a2	1	1
2	Basic principle of clinical epidemiology relevant to pharmacoeconomics studies.	a1, a3, b12 c2	2	1

3	Role of pharmacoeconomics in the health care system and academic	a1, a2, b12, c1,	3	1
4	Case-control, nested case-control studies; cross-over designs studies and matching in pharmacoeconomics	a1, a3, b12, c1-2	4	1
5	Large Data Base Research Student discussion of data source selection	a1, a3, b1, c1	5	1
6	Drug Utilization studies	a1, a2, b1,c1	6	1
7	Evaluating and improving physician prescription	a1, a3, b12, c2, d1	7	1
8	Midterm exam	a1-3, b1-2, c1-2, d1	8	1
9	Role and importance of pharmacoeconomic analyses in drug management	a1, a3, b12, c2	9	1
10	Basic types of pharmacoeconomic analyses	a1, a3, b12, c2	10	1
11	Cost Effectiveness and Cost Minimization	a1, a3, b12, c2	11	1
11	Cost Benefit and Cost Utility	a1, a3, b12, c2	12	1
13	Pharmacoeconomics in Drug Development	a1, a2, c1	13	1
14	Quality of Life Assessment	a1, a3, b1-2, c1-2, d1	14	1
15	Quality of Life Assessment	a1, a3, b1-2, c1-2, d1	15	1
16	Final Term Exan	a1-3, b1-2, c1-2, d1	16	1
Number of Weeks /and Units Per Semester			**16**	**16**

II. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.
b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam and reports.

II. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**5**	5%	a1-3, b1-2, c1-2
2	**Assignments**	4-12	**5**	5%	a1-3, b1-2, c1-2
3	**Mid-semester exam**	**8**	**20**	20%	a1-3, b1-2, c1-2
5	**Final Exam**	**16**	**70**	70%	a1-3, b1-2, c1-2
	Total		**100**	**100%**	

IV. Students' Support:

Office Hours/week	Other Procedures (if any)
-	-

V. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

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	3. Tilson HH, Chan KA. Editors. Pharmacoepidemiology and Therapeutic Risk Management. Harvey Whitney press, Cincinnati, 2008. 4. Drummond MF, McGuire A. Economic evaluation in health care; merging theory with practice. Oxford University Press, 2001
7- Recommended Readings and Reference Materials	
	3. Drummond MF, O'Brien B. *Methods for the Economic Evaluation of Health Care Programmes.* 2nd Edition. Oxford University Press. New York, New York. 1997. 4. Strom BL, Kimmel SE. *Textbook of Pharmacoepidemiology*. West Sussex, England: John Wiley & Sons Ltd, 2006.
8- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
9- Electronic Materials and Web Sites *etc*.	
	International Society for Pharmacoepidemiology website. http://www.pharmacoepi.org
10- Other Learning Material:	

III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.
IV. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).

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7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	

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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification

I. Course Identification and General Information:							
1	**Course Title:**	Applied and Evaluation of Pharmaceutical Research					
2	**Course Number & Code:**	**Ph991**					
3	**Credit hours:**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		2				**2**	
4	**Study level / semester at which course is offered:**	**Level:** - Fifth / Second Semester					
5	**Pre –requisite (if any):**	All specialized courses					
6	**Co –requisite (if any):**	-					
7	**Programs in which course is offered:**	Bachelor of pharmacy					
8	**Language of teaching the course:**	**English**					
9	**Department in which course is offered:**	-					
10	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university					
11	**Prepared by:**	Prof. Dr. Maged Alwan					
12	**Date of approval:**						

I. Course description:

This study-unit elucidates the application of research methodology to the aspects of pharmaceutical research that focuses on process and service outcomes. Aspects relevant to a robust design of the research project in the areas of pharmaceutical services and in pharmaceutical technology processes are highlighted. Application of research methodology principles in the development of controlled trials, clinical trials and process analysis is presented.

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II. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe types of study design and approaches
2. Demonstrate the basic knowledge of research methodology and the principles.
3. Describe research project planning steps.
4. Describe application of biostatistics for data handling.
5. Explain techniques of data handling, analysis and interpretation.
6. Explain and reflect upon limitations of qualitative and quantitative research studies.
7. Appreciate approvals required for research in the field of pharmacy including ethics and date protection boards approvals
8. Analyze literature and study designs
9. Conduct literature review and adopt appropriate referencing techniques
10. Develop research skills as applicable to research in pharmaceutical industry and patient-centred pharmaceutical services
11. Develop scholarly reports and dissemination of research results by adopting academic writing skills.
12. Critically analyze literature and study designs
13. Use a protocol for assessment of research evaluation activities
14. Conduct literature review and adopt appropriate referencing techniques; 15. Conduct research studies and utilize the results in different fields
16. Handle and analyze data.
17. Retrieve information from a variety of sources, including libraries, databases and internet
18. Implement presentation, writing reports and interviewing skills in various research field
19. Apply information and communication technology and work independently or as a part of team in different research fields.

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**
After completing this program, students will be able to:	**After completing this course, students will be able to:**

A1.	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Describe types of study design and approaches;
A2.	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a2-**	Demonstrate the basic knowledge of research methodology and the principles.
A3.	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a3-**	Describe research project planning steps.
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a4-**	Describe application of biostatistics for data handling.
A5	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care	**a5-**	Explain techniques of data handling, analysis and interpretation.

		a6-	Explain and reflect upon limitations of qualitative and quantitative research studies.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures using white board or data show. Case study Discussion session Brain storm	Written mid-term exam Oral exam Quizzes Case study and reports Written final exam
a1-	Describe types of study design and approaches;		
a2-	Demonstrate the basic knowledge of research methodology and the principles.		
a3-	Describe research project planning steps.		
a4-	Describe application of biostatistics for data handling.		
a5-	Explain techniques of data handling, analysis and interpretation.		
a6-	Explain and reflect upon limitations of qualitative and quantitative research studies.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1.	Consolidate the chemical, biochemical and physiological principles to construct the n pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Appreciate approvals required for research in the field of pharmacy including ethics and date protection boards approvals;

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B2.	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b2-**	Analyze literature and study designs;
B3.	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b3-**	Conduct literature review and adopt appropriate referencing techniques;
B4.	Plan a modern system for administration of medical foundations and merge the ethics to	**b4-**	Develop research skills as applicable to research in pharmaceutical industry and patient-centred
	business during the drug marketing		pharmaceutical services.
B5.	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b5-**	Develop scholarly reports and dissemination of research results by adopting academic writing skills.
		b6-	Critically analyze literature and study designs

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures using white board or data show. Research assignments Case study and Solve problems Discussion session Brain storm	Written mid-term exam Quizzes Case study and reports Written final exam
b1-	Appreciate approvals required for research in the field of pharmacy including ethics and date protection boards approvals;		
b2-	Analyze literature and study designs;		
b3-	Conduct literature review and adopt appropriate referencing techniques;		
b4-	Develop research skills as applicable to research in pharmaceutical industry and patient-centred pharmaceutical services.		
b5-	Develop scholarly reports and dissemination of research results by adopting academic writing skills.		

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b6-	Critically analyze literature and study designs		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation,	**c1-**	Use a protocol for assessment of research evaluation activities
	packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.		
C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	**c2-**	Conduct literature review and adopt appropriate referencing techniques;
C3.	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c3-**	Conduct research studies and utilize the results in different fields
C4.	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c4-**	Handle and analyse data
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:	Research assignments Case study	Written mid-term exam

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c1-	Use a protocol for assessment of research evaluation activities	Discussion session Brain storm	Case study and reports Written final exam
c2-	Conduct literature review and adopt appropriate referencing techniques;		
c3-	Conduct research studies and utilize the results in different fields		
c4-	Handle and analyse data		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1.	Practice independent learning needed for continuous professional development	**d1-**	Retrieve information from a variety of sources, including libraries, databases and internet
D2.	Employ proper documentation and filing systems in different pharmaceutical fields	**d2**	Implement presentation, writing reports and interviewing skills in various research field .
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities	**d3**	Apply information and communication technology and work independently or as a part of team in different research fields
D4.	Take responsibility for adaptation to change needs in pharmacy practice.		
D5-	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills	Teaching strategies/methods to be used	Methods of assessment

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After completing this course, students will be able to:		Research assignments Discussion session	Written exam Quizzes Assignments
d1-	Retrieve information from a variety of sources, including libraries, databases and internet		
d2	Implement presentation, writing reports and interviewing skills in various research field .		
d3	Apply information and communication technology and work independently or as a part of team in different research fields		

IV. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	**Introduction Research Concepts**	- Introduction. - Definitions: - Research Concepts - Attributes of researcher -Motivation of researcher - Research Problem -Source to identify problems -Good problem specification. -Originality of the problems. - Problem f formulation , examples -Determination of problem importance - Criteria of Good Research.	a2, a3, a4, b2,b4, b5, b6, c1, c2, c3, c4, d1	**1**	**2**
2	**Research Objectives and Scope**	-Definition of research method -Physical and moral means. -Theoretical and applied methods example -Research methods components. - Reliability & Validity. - Common characteristics between different approaches.	a2, a3, b2,b3, c1,c2,d1,d3	1	2

		- Research title. -Examples of unacceptable addresses. - Research terms. - Research limitations - Division of limitations. - A good research - Research Process			
3	**Hypothesis and Research Questions**	- Hypothesis - Types of hypothesis - Foundation of making hypothesis - Research Questions - Research Assumptions - Literature review. - Research literature. - Previous Research. - Criteria for choosing intellectual production - Indications of intellectual production	a2,a3, b3, c2,c3, d1, d3	1	2

4	**Research Tools.**	- Questionnaire design, cover letter writing - Design a personal interview form and a scientific note. - Identify the types of the sample - Identify the cases that take place in study - Questionnaire, Covering Letter, most prominent conditions of cover letter, Survey form, -Division of the questionnaire, Closed, Open, Open – Closed, Importance questions,	a2,a3,a6, b3, c2,c3, d1, d3	2	**4**

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		multiple choice. Questions. - Condition of the questionnaire - Conditions that should be fulfilled in the questionnaire - Advantages and disadvantages of the questionnaire. - Steps to design the questionnaire. - Pre-testing questionnaire. - Follow- up. - Accuracy and Reliability. - Interview. - Structured Interview. - Unstructured Interview. - Interview terms. - Adv. and disadvantages of the interview.			

5	**Observation.**	- Participative and none Observation. - Conditions of observation. Population & Research Sample - Definition of research population - Cases in which the entire society is studied. - Types of society, (Homogeneous and (Homogeneous Population).	a1-3, b2-3c2-3, d1, d3	1	2

6	**Research Sample**	- Conditions that must be met in the sample - Sample volume - How to choose a sample? - Sample selection (simple, systematic and stratified Sample). Non -Random Sample (Quota sample, Purposive sample, accidental Sample)	a1-3, b2-3c2-3, d1, d3	1	2
7	**Med Term Exam.**		a1-6, b2-6, c1-4	1	2

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8	**Research Organization and Documentation.**	- Basics of numbering and arranging tables and figures. - Conditions that must be observed in the printing. - Arrange margins and references. - Correct way to write footnotes and a list of references. - Punctuation - Formatting tables and figures to coordination of research chapters, etc.. -Documentation methods and elements. - Footnotes.	a2,a5,a6, b3,b6, c1,c4, d1-3	1	2
9	**Research Reports**	- Research Proposal - Diagram description. - Advantages of search scheme - Search plan elements	a1-3, b1-4, c1-3, d3	1	2

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10	**and of** **Examples characteristics scientific research.**	2. Scientific steps .. 3. Scientific procedures .. 4. Steps of scientific research. A. Identify the problem: B. Formulate the problem . C. Discovering the problems. 1. Experience 2-Previous Studies 3-Study and Reading: 4- Observations: 5- Scientific Produres: -Organized process: -Logical process: -Experimental process: -Brief and concise process: -Applicable:	a1-3, b1-4, c1-3, d1,d3	2	4

11	Outline of pharmaceu research project:	Sources of Information: Gathering information Published Sources Unpublished Sources Extraction Quote Types of citation 1. Direct quotation: 2. Indirect quotation: Source of quoted information Bibliography: List of sources Record of quotations: A research project. Research Proposal. Outline of the research project: 1. Cover page or title.	a1-6, b5, c2-3, d1-3	3	6
		2. Abstract: 3. Introduction 4. Aim. 5. Research problems. 6.Research Methods 7. Results 8.Descusion (Possible outcomes of research and time Table). 9. Conclusion 10. Recommendation 11.Bibliography			
16	Final Exam.		a1-6, b1-6, c1-4	1	2
Number of Weeks /and Units Per Semester				**16**	**32**

V. Teaching strategies of the course:

1. Lectures using white board or data show.
2. Research assignments
3. Case study and brain storm
4. Discussion session

3-Assessment Methods:

1- Written mid-term exam To assess The ability of students to follow-up The course subjects.
2- Oral exam To assess The ability of students in expressing and presenting their knowledge clearly and in systematic approach.
3-Quizzes To assess Knowledge, understanding, intellectual skills
4-Case study and reports To assess the skills of problem-solving and date presentation 5-
Written final exam To assess The overall outcomes.

VI. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-6, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4**		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**10**	10%	a5-6, b4, c3, d1-3
2	**Assignments**	4-12	**10**	10%	a1-4, b1-6, c1-4, d1-3
3	**Mid-semester exam**	**8**	**20**	20%	a1-6, b2-6, c1-4
5	**Final Exam**	**16**	**70**	70%	a1-6, b1-6, c1-4
	Total		**100**	**100%**	

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VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Aparasu R, (2010), Research Methods for Pharmaceutical Practice and Policy, 1st edition, Pharmaceutical Press, London.
- Babar Z, (2015), Pharmacy Practice Research Methods, 1st edition , ADIS, Switzerland. - Stuart MC, (2007), The complete guide to medical writing, 1st edition, Pharmaceutical Press, London.

2- Recommended Readings and Reference Materials

Notes prepared by department staff members.

3- Essential References

4- Electronic Materials and Web Sites *etc*.

www.pubmed.com

5- Other Learning Material:

Study tour :

I. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

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II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

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6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Applied and Evaluation of Pharmaceutical Research

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Maged Alwan	**Office Hours**					
Location & Telephone No.		**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail							

II- Course Identification and General Information:

1-	**Course Title:**	Applied and Evaluation of Pharmaceutical Research				
2-	**Course Number & Code:**	**Ph991**				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	-		2
4-	**Study level/year at which this course is offered:**	5th level / 1st semester				
5-	**Pre –requisite (if any):**	All specialized courses				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				

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8-	**Language of teaching the course:**	English
9-	**System of Study:**	Semesters
10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III. Course description:

This study-unit elucidates the application of research methodology to the aspects of pharmaceutical research that focuses on process and service outcomes. Aspects relevant to a robust design of the research project in the areas of pharmaceutical services and in pharmaceutical technology processes are highlighted. Application of research methodology principles in the development of controlled trials, clinical trials and process analysis is presented.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1- Describe types of study design and approaches
2- Demonstrate the basic knowledge of research methodology and the principles.
3- Describe research project planning steps.
4- Describe application of biostatistics for data handling.
5- Explain techniques of data handling, analysis and interpretation.
6- Explain and reflect upon limitations of qualitative and quantitative research studies.
7- Appreciate approvals required for research in the field of pharmacy including ethics and date protection boards approvals
8- Analyze literature and study designs
9- Conduct literature review and adopt appropriate referencing techniques
10- Develop research skills as applicable to research in pharmaceutical industry and patient-centred pharmaceutical services
11- Develop scholarly reports and dissemination of research results by adopting academic writing skills.
12- Critically analyze literature and study designs
13- Use a protocol for assessment of research evaluation activities
14- Conduct literature review and adopt appropriate referencing techniques; 15- Conduct research studies and utilize the results in different fields 16- Handle and analyze data.
17- Retrieve information from a variety of sources, including libraries, databases and internet
18- Implement presentation, writing reports and interviewing skills in various research field
19- Apply information and communication technology and work independently or as a part of team in different research fields.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	**Introduction Research Concepts**	- Introduction. - Definitions: - Research Concepts - Attributes of researcher -Motivation of researcher - Research Problem -Source to identify problems -Good problem specification. -Originality of the problems. - Problem f formulation , examples -Determination of problem importance - Criteria of Good Research.	a2, a3, a4, b2,b4, b5, b6, c1, c2, c3, c4, d1	**1**	**2**

2	**Research Objectives and Scope**	-Definition of research method -Physical and moral means. -Theoretical and applied methods example -Research methods components. - Reliability & Validity. - Common characteristics between different approaches.	a2, a3, b2,b3, c1,c2,d1,d3	2	2

		- Research title. -Examples of unacceptable addresses. - Research terms. - Research limitations - Division of limitations. - A good research - Research Process			

3	**Hypothesis and Research Questions**	- Hypothesis - Types of hypothesis - Foundation of making hypothesis - Research Questions - Research Assumptions - Literature review. - Research literature. - Previous Research. - Criteria for choosing intellectual production - Indications of intellectual production	a2,a3, b3, c2,c3, d1, d3	3	2
4	**Research Tools.**	- Questionnaire design, cover letter writing - Design a personal interview form and a scientific note. - Identify the types of the sample - Identify the cases that take place in study - Questionnaire, Covering Letter, most prominent conditions of cover letter, Survey form, -Division of the questionnaire, Closed, Open, Open – Closed, Importance questions,	a2,a3,a6, b3, c2,c3, d1, d3	4-5	**4**

		multiple choice. Questions. - Condition of the questionnaire - Conditions that should be fulfilled in the questionnaire - Advantages and disadvantages of the questionnaire. - Steps to design the questionnaire. - Pre-testing questionnaire. - Follow- up. - Accuracy and Reliability. - Interview. - Structured Interview. - Unstructured Interview. - Interview terms. - Adv. and disadvantages of the interview.			

5	**Observation.**	- Participative and none Observation. - Conditions of observation. Population & Research Sample - Definition of research population - Cases in which the entire society is studied. - Types of society, (Homogeneous and (Homogeneous Population).	a1-3, b2-3c2-3, d1, d3	6	2

6	**Research Sample**	- Conditions that must be met in the sample - Sample volume - How to choose a sample? - Sample selection (simple, systematic and stratified Sample). Non -Random Sample (Quota sample, Purposive sample, accidental Sample)	a1-3, b2-3c2-3, d1, d3	7	2
7	**Med Term Exam.**		a1-6, b2-6, c1-4	8	2

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8	**Research Organization and Documentation.**	- Basics of numbering and arranging tables and figures. - Conditions that must be observed in the printing. - Arrange margins and references. - Correct way to write footnotes and a list of references. - Punctuation - Formatting tables and figures to coordination of research chapters, etc.. -Documentation methods and elements. - Footnotes.	a2,a5,a6, b3,b6, c1,c4, d1-3	9	2
9	**Research Reports**	- Research Proposal - Diagram description. - Advantages of search scheme - Search plan elements	a1-3, b1-4, c1-3, d3	10	2

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10	**and of** **Examples characteristics scientific research.**	2. Scientific steps .. 3. Scientific procedures .. 4. Steps of scientific research. A. Identify the problem: B. Formulate the problem . C. Discovering the problems. 1. Experience 2-Previous Studies 3-Study and Reading: 4- Observations: 5- Scientific Produres: -Organized process: -Logical process: -Experimental process: -Brief and concise process: -Applicable:	a1-3, b1-4, c1-3, d1,d3	11-12	4

11	Outline of pharmaceu research project:	Sources of Information: Gathering information Published Sources Unpublished Sources Extraction Quote Types of citation 1. Direct quotation: 2. Indirect quotation: Source of quoted information Bibliography: List of sources Record of quotations: A research project. Research Proposal. Outline of the research project: 1. Cover page or title.	a1-6, b5, c2-3, d1-3	13-15	6
		2. Abstract: 3. Introduction 4. Aim. 5. Research problems. 6.Research Methods 7. Results 8.Descusion (Possible outcomes of research and time Table). 9. Conclusion 10. Recommendation 11.Bibliography			
16	Final Exam.		a1-6, b1-6, c1-4	16	2
Number of Weeks /and Units Per Semester				**16**	**32**

VI. Teaching strategies of the course:

1. Lectures using white board or data show.
2. Research assignments
3. Case study and brain storm
4. Discussion session

3-Assessment Methods:

1- Written mid-term exam To assess The ability of students to follow-up The course subjects.
2- Oral exam To assess The ability of students in expressing and presenting their knowledge clearly and in systematic approach.
3-Quizzes To assess Knowledge, understanding, intellectual skills
4-Case study and reports To assess the skills of problem-solving and date presentation 5-
Written final exam To assess The overall outcomes.

VI. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-6, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-4**		

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-12**	**10**	10%	a5-6, b4, c3, d1-3
2	**Assignments**	4-12	**10**	10%	a1-4, b1-6, c1-4, d1-3
3	**Mid-semester exam**	**8**	**20**	20%	a1-6, b2-6, c1-4
5	**Final Exam**	**16**	**70**	70%	a1-6, b1-6, c1-4

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	Total	**100**	**100%**	

VIII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

IX. Learning Resource (MLA style or APA style)s:

6- Required Textbook(s) (maximum two)

- Aparasu R, (2010), Research Methods for Pharmaceutical Practice and Policy, 1st edition, Pharmaceutical Press, London.
- Babar Z, (2015), Pharmacy Practice Research Methods, 1st edition , ADIS, Switzerland. - Stuart MC, (2007), The complete guide to medical writing, 1st edition, Pharmaceutical Press, London.

7- Recommended Readings and Reference Materials

Notes prepared by department staff members.

8- Essential References

9- Electronic Materials and Web Sites *etc*.

www.pubmed.com

10- Other Learning Material:

Study tour :

X. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XI. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

10- Procedures for periodically reviewing of course effectiveness and planning for improvement

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Clinical Pharmacy & therapeutics II

I. Course Identification and General Information:						
1	**Course Title:**	Clinical Pharmacy & therapeutics (II)				
2	**Course Number & Code:**	Ph21024				
3	**Credit hours:**	**C.H**				**Total**
		Theoretical	**Practical**	**Training**	**Seminar**	
		2	2	-	-	3
4	**Study level/ semester at which this course is offered:**	Fifth year, First Semester				
5	**Pre –requisite (if any):**	Pharmaceutical Care (II) and Clinical Pharmacy & therapeutics (I)				
6	**Co –requisite (if any):**					
7	**Program (s) in which the course is offered:**	Bachelor degree of pharmacy				
8	**Department (s) in which the course is offered:**	Pharmaceutics				
9	**Language of teaching the course:**	English				
10	**Location of teaching the course:**	Faculty of pharmacy – Sana'a University				
11	**Prepared by:**	Prof. Dr. Ahmed Mohamed Sabati				
12	**Date of approval:**					

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II. Course Description:

The course deals with the study of the different diseases and selection of study cases. The course also includes the role of the clinical pharmacist in providing pharmaceutical health care to the patient. **Overall Aims of Course:**

A- Giving knowledge about the patho-physiology of disease.

B- Explain the symptoms and complications of the diseases.

C- Analysis treatment aims and algorithms, drug interactions, dose calculations, side effects of drugs.

D- Describe the appropriate lifestyle modifications, patient awareness and counseling.

E- Solve the given case according to the correct therapeutic way.

III. Intended learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.
2. Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.
3. Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.
4. Recognize the special considerations of populations required for designing a treatment plan.
5. Construct an appropriate monitoring plan to assess disease treatment.
6. Recognize recent researches, articles and advanced studies about treatment of diseases.
7. Correlate disease pathophysiology with their manifestations, investigations and physical examinations.
8. Solve the case studies according to the therapeutic way.
9. Interpret patient`s clinical data and features, including patient records held within practice settings.
10. Design & implement ptient-specific plan, including monitoring parameters to solve & prevent drug related problems.
11. Evaluate critically observations and measurements, in terms of their significance and theory underlying them.
12. Give advises for the patients and others on the safe and effective use of medicines.
13. Apply acquired skills to diagnose the case studies precisely.
14. Interact effectively with patients, the public and health care professionals; includes communication both written and oral.
15. Solve the problem based on a given information like patient history.
16. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.

I. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
After completing this program, students will be able to:	After completing this course, students will be able to:

A1-	Recognize the principles of, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.
A3-	A3. Describethe general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.
		a3	Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.
		a4-	Recognize the special considerations of populations required for designing a treatment plan.
		a5-	Construct an appropriate monitoring plan to assess disease treatment.
		a6-	Recognize recent researches, articles and advanced studies about treatment of diseases.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures methods , Computer based teaching and learning, group discussion, case study and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a1-	Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.		
a2-	Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.		
a3	Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.		

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a4-	Recognize the special considerations of populations required for designing a treatment plan.		
a5-	Construct an appropriate monitoring plan to assess disease treatment.		
a6-	Recognize recent researches, articles and advanced studies about treatment of diseases.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B2-	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b1-**	Correlate disease pathophysiology with their manifestations, investigations and physical examinations.
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing.	**b2-**	Solve the case studies according to the therapeutic way.
		b3-	Interpret patient`s clinical data and features, including
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.		patient records held within practice settings.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.	Teaching strategies/methods to be used	Methods of assessment

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After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b1-	Correlate disease pathophysiology with their manifestations, investigations and physical examinations.		
b2-	Solve the case studies according to the therapeutic way.		
b3-	Interpret patient`s clinical data and features, including patient records held within practice settings.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Design & implement patient-specific plan, including monitoring parameters to solve & prevent drug related problems.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Evaluate ritically observations and measurements, in terms of their significance and theory underlying them.
		c3-	Give advises for the patients and others on the safe and effective use of medicines.
		c4-	Apply acquired skills to diagnose the case studies precisely.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

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Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods Practical session, brainstorming, Tutorials, Seminars and Case study	Practical works, homework, practical exam and practical reports.
c1-	Design & implement atient-specific plan, including monitoring parameters to solve & prevent drug related problems.		
c2-	Evaluate critically observations and easurements, in terms of their significance and theory underlying them.		
c3-	Give advises for the patients and others on the safe and effective use of medicines.		
c4-	Apply acquired skills to diagnose the case studies precisely.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Interact effectively with patients, the public and health care professionals; includes communication both written and oral.
D4	Take responsibility for adaptation to change needs in pharmacy practice.	**d2**	Solve the problem based on a given information like patient history.
D5	Apply information and communication technology and working effectively in a team.	**d3**	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.
		d4	Behave with an ethical attitude and approach.

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Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Small group discussions, Tutorials and Practical session	Homework and reports.
d1-	Interact effectively with patients, the public and health care professionals; includes communication both written and oral.		
d2	Solve the problem based on a given information like patient history.		
d3	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.		
d4	Behave with an ethical attitude and approach.		

I. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	No. of week	Contact Hours
1	Sexually Transmitted Diseases	a1, a2, d1-3	1	2
2	Neurological diseases (Epilepsy)	a1, b4, d1-3	1	2
3	Neurological diseases (Parkinsonism)	a1-6, b1-3, c1, c4, d1-3	1	2
4	Diseases of CVS (Hypertension)	a1-6, b1-3, c1, c4, d1-3	1	2

5	Diseases of CVS (Angina pectoris)	a1-6, b1-3, c1, c4, d1-3	1	2
6	Diseases of CVS (Myocardial Infarction)	a1-6, b1-3, c1, c4, d1-3	1	2
7	Diseases of CVS (C.H.F.)	a1-6, b1-3, c1, c4, d1-3	1	2
8	Diseases of CVS (Thromboembolic diseases)	a1-6, b1-3, c1, c4, d1-3	1	2
9	Chronic bronchitis and Emphysema	a1-6, b1-3, c1, c4, d1-3	1	2
10	Bronchial Asthma	a1-6, b1-3, c1, c4, d1-3	1	2
11	Chronic obstructive pulmonary disease	a1-6, b1-3, c1, c4, d1-3	1	2
12	Tuberculosis	a1-6, b1-3, c1, c4, d1-3	1	2
13	Diabetes Mellitus	a1-6, b1-3, c1, c4, d1-3	1	2
14	Diabetes Mellitus	a1-6, b1-3, c1, c4, d1-3	1	2
Number of Weeks /and Units Per Semester			**14**	**28**

b- Practical Aspect:

Week	Case Study on	CILOs (symbols)	Number of weeks	Contact hours
1	Sexually Transmitted Diseases	c1, c2, c3, c4	**1**	**2**
2	Neurological diseases (Epilepsy)	c1, c2, c3, c4	**1**	**2**
3	Neurological diseases (Parkinsonism)	c1, c2, c3, c4	**1**	**2**
4	Diseases of CVS (Hypertension)	c1, c2, c3, c4	**1**	**2**

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ا.د.احمد سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

5	Diseases of CVS (Angina pectoris)	c1, c2, c3, c4	**1**	**2**
6	Diseases of CVS (Myocardial Infarction)	c1, c2, c3, c4	**1**	**2**
7	Diseases of CVS (C.H.F.)	c1, c2, c3, c4	**1**	**2**
8	Diseases of CVS (Thromboembolic diseases)	c1, c2, c3, c4	**1**	**2**
9	Chronic bronchitis and Emphysema	c1, c2, c3, c4	**1**	**2**
10	Bronchial Asthma	c1, c2, c3, c4	**1**	**2**
11	Chronic obstructive pulmonary disease	c1, c2, c3, c4	**1**	**2**
12	Tuberculosis	c1, c2, c3, c4	**1**	**2**
13	Diabetes Mellitus	c1, c2, c3, c4	**1**	**2**
14	Diabetes Mellitus	c1, c2, c3, c4	**1**	**2**
Number of Weeks /and Units Per Semester			**14**	**28**

I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

I. Schedule of Assessment Tasks for Students During the Semester:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-3,b1-2, c1, c4
2.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-6, b3, c1, c4
3.	**Attendance, Practical Reports**	**All**	15	10%	c1-4
		Weeks			
4.	**Practical mid-semester exam**	7th	15	10%	c1-4
5.	**Theoretical mid-semester exam**	9th	30	20%	a1-6, b1-3, c1, c4
6.	**Final Exam (theoretical)**	**16th**	50	33%	a1-6, b1-3, c1, c4
7.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)

III. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1-Walker and Edwards (eds). **Clinical Pharmacy and Therapeutics**. 3rd edition (2003).

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2- Recommended Readings and Reference Materials	
	Terry L. Schwinghammer & Julia M. Koehler. **Pharmacotherapy Casebook:** A Patient-Focused Approach 7th edition 2009
3- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
4- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
5- Other Learning Material:	
	-

II. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.
III. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Clinical Pharmacy & therapeutics (II)

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member		Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:		
1-	Course Title:	Clinical Pharmacy & therapeutics (II)
2-	Course Number & Code:	Ph21024

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3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	2		3
4-	**Study level/year at which this course is offered:**	5^{th} level /1^{st} semester				
5-	**Pre –requisite (if any):**	Pharmaceutical care (II)				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor degree of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course Description:

The course deals with selected major disease states and their therapy, especially in the individualization of drug usages. The role of the pharmacist in the provision of optimal patient care through monitoring of patients drug therapy is emphasized. **Overall Aims of Course:**

A- Giving knowledge about the patho-physiology of disease.
B- Explain the symptoms and complications of the diseases.
C- Analysis treatment aims and algorithms, drug interactions, dose calculations, side effects of drugs.
D- Describe the appropriate lifestyle modifications, patient awareness and counseling.
E- Solve the given case according to the correct therapeutic way.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Describe the principals of patho-physiology, symptoms and complications that relevant to diseases.
2. Recall knowledge about drugs and their uses therapeutically concerning their identities, safety, optimum use in medication and contraindications.
3. Recognize the lifestyle modifications, underlying causes and contributing factors in the development of disease.
4. Recognize the special considerations of populations required for designing a treatment plan.
5. Construct an appropriate monitoring plan to assess disease treatment.
6. Recognize recent researches, articles and advanced studies about treatment of diseases.
7. Correlate disease pathophysiology with their manifestations, investigations and physical examinations.
8. Solve the case studies according to the therapeutic way.
9. Interpret patient`s clinical data and features, including patient records held within practice settings.
10. Design & implement patient-specific plan, including monitoring parameters to solve & prevent drug related problems.
11. Evaluate critically observations and measurements, in terms of their significance and theory underlying them.
12. Give advises for the patients and others on the safe and effective use of medicines.
13. Apply acquired skills to diagnose the case studies precisely.
14. Interact effectively with patients, the public and health care professionals; includes communication both written and oral.
15. Solve the problem based on a given information like patient history.
16. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports for criticizing of suitable drugs for each case.

II. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Week Due	Contact Hours
1	Sexually Transmitted Diseases	a1, a2, d1-3	1	2
2	Neurological diseases (Epilepsy)	a1, b4, d1-3	2	2

3	Neurological diseases (Parkinsonism)	a1-6, b1-3, c1, c4, d1-3	3	2
4	Diseases of CVS (Hypertension)	a1-6, b1-3, c1, c4, d1-3	4	2
5	Diseases of CVS (Angina pectoris)	a1-6, b1-3, c1, c4, d1-3	5	2
6	Diseases of CVS (Myocardial Infarction)	a1-6, b1-3, c1, c4, d1-3	6	2
7	Diseases of CVS (C.H.F.)	a1-6, b1-3, c1, c4, d1-3	7	2
8	Diseases of CVS (Thromboembolic diseases)	a1-6, b1-3, c1, c4, d1-3	8	2
9	Med Term Exam	a1-6, b1-3, c1, c4	9	2
10	Chronic bronchitis and Emphysema	a1-6, b1-3, c1, c4, d1-3	10	2
11	Bronchial Asthma	a1-6, b1-3, c1, c4, d1-3	11	2
12	Chronic obstructive pulmonary disease	a1-6, b1-3, c1, c4, d1-3	12	2
13	Tuberculosis	a1-6, b1-3, c1, c4, d1-3	13	2
14	Diabetes Mellitus	a1-6, b1-3, c1, c4, d1-3	14	2
15	Diabetes Mellitus	a1-6, b1-3,	15	2
		c1, c4, d1-3		
16	Final Term Exam	a1-6, b1-3, c1, c4	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

b- Practical Aspect:

Week	Case Study on	CILOs (symbols)	Week Due	Contact hours
1	Sexually Transmitted Diseases	c1, c2, c3, c4	1	2
2	Neurological diseases (Epilepsy)	c1, c2, c3, c4	2	2
3	Neurological diseases (Parkinsonism)	c1, c2, c3, c4	3	2
4	Diseases of CVS (Hypertension)	c1, c2, c3, c4	4	2
5	Diseases of CVS (Angina pectoris)	c1, c2, c3, c4	5	2
6	Diseases of CVS (Myocardial Infarction)	c1, c2, c3, c4	6	2
7	Diseases of CVS (C.H.F.)	c1, c2, c3, c4	7	2
8	Diseases of CVS (Thromboembolic diseases)	c1, c2, c3, c4	8	2
9	Med Term Exam	c1, c2, c3, c4	9	2
10	Chronic bronchitis and Emphysema	c1, c2, c3, c4	10	2
11	Bronchial Asthma	c1, c2, c3, c4	11	2
12	Chronic obstructive pulmonary disease	c1, c2, c3, c4	12	2
13	Tuberculosis	c1, c2, c3, c4	13	2
14	Diabetes Mellitus	c1, c2, c3, c4	14	2
15	Diabetes Mellitus	c1, c2, c3, c4	15	2
16	Final Term Exam	c1, c2, c3, c4	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

IV. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

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b- Assessment Methods:
Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam Practical works, practical exam and practical reports.

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-3,b1-2, c1, c4
9.	**Quizzes and Homework-assignments**	Sporadic through the semester	10	7%	a2-6, b3, c1, c4
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-4
11.	**Practical mid-semester exam**	7th	15	10%	c1-4
12.	**Theoretical mid-semester exam**	9th	30	20%	a1-6, b1-3, c1, c4
13.	**Final Exam (theoretical)**	**16th**	50	33%	a1-6, b1-3, c1, c4
14.	**Final Exam (practical)**	**16th**	20	13%	c1-4
	Total		**150**	**100%**	

V. Students' Support:

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Office Hours/week	Other Procedures (if any)

VI. Learning Resource (MLA style or APA style)S:	
6- Required Textbook(s) (maximum two)	
	1-Walker and Edwards (eds). **Clinical Pharmacy and Therapeutics**. 3rd edition (2003).
7- Recommended Readings and Reference Materials	
	Terry L. Schwinghammer & Julia M. Koehler. **Pharmacotherapy Casebook:** A Patient-Focused Approach 7th edition 2009
8- Essential References	
	Course notes (lecture notes and practical notes) prepared by teacher of the subject.
9- Electronic Materials and Web Sites *etc*.	
	Websites in international network (internet
10- Other Learning Material:	
	-

VI. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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3 - Computing resources:	- Computer laboratory with internet facilities.

VII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching
▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.
▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.
▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement
▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification

I. Course Identification and General Information:							
1	Course Title:	Complementary and Alternative Medicine					
2	Course Number & Code:	Ph3107					
3	Credit hours:	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	-	-	-	2	
4	Study level/ semester at which this course is offered:	5th level /2nd semester					
5	Pre –requisite (if any):	Pharmacognosy, phytotherapy					
6	Co –requisite (if any):	None					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Department of Pharmacognosy					
10	Location of teaching the course:	Faculty of Pharmacy					
11	Prepared by:	Dr. Bushra Moharam					
12	Date of approval:						

II. Course description:

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- This course presents updated information about Complementary and Alternative Medicine (CAM) including sections on statistical usage, alternative medical systems, mind body medicine, biologically based practices, energy therapies, manipulative and body based practices, consumer issues, and research. Application of complementary and alternative medicine (CAM) provides public health professionals autonomy by allowing them to address aspects of a patient's well-being often disregarded by Western medicine.

Upon completion of this course, the students should be able to understand;

- The fundamental knowledge about herbal medicine including preparation, identity, efficacy, standardization and its relation to conventional medicine, in addition to the use of herbal medications in some common health problems, its toxicological aspects, regulatory laws of production and forensic pharmacognosy.

I. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Identify and understand the principles of complementary and alternative therapies and its relation to conventional medicine.
2. Understand the function and structure of each system of the body
3. Understand potential effects of particular therapies, factors that may affect or restrict treatment, and the rationale behind the therapies.
4. Mention the principles of herbal medicine preparation, identification, efficacy and standardization.
5. develop of skills, practices and professional practices required for a successful career
6. Apply the independence of thought required to describe, interpret and summaries key theoretical aspects
7. contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of
8. medicinal plants and their uses in improving health
9. Work independently taking responsibility for autonomous learning and identify needs for personal, professional and academic development.
10. communicate with others in a clear manner, using words and numbers, through written work using appropriate academic conventions.
11. work independently and identify personal needs for skill development on an ongoing basis.
12. Plan, design and execute activities with peers, using appropriate techniques and procedures taking responsibility for an agreed area.
13. Demonstrate an understanding of professional, ethical and legal issues in practice.
14. Utilize appropriate information technology appropriately.
15. Demonstrate a comprehensive knowledge of anatomy and the location of internal organs, vessels and structures.

II. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in:	Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding
Knowledge and Understanding	
After completing this program, students will be able to:	**After completing this course, students will be able to:**

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A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Identify and understand the principles of complementary and alternative therapies and its relation to conventional medicine.
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a2-**	Understand the function and structure of each system of the body
		a3	Understand potential effects of particular therapies, factors that may affect or restrict treatment, and the rationale behind the therapies.
		a4	Mention the principles of herbal medicine preparation, identification, efficacy and standardization.
		a5	develop of skills, practices and professional practices required for a successful career

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures, discussion, seminar activities, working on assignments	▪ reports, presentations, and traditional examinations
a1-	Identify and understand the principles of complementary and alternative therapies and its relation to conventional medicine.		
a2-	Understand the function and structure of each system of the body		
a3	Understand potential effects of particular therapies, factors that may affect or restrict treatment, and the rationale behind the therapies.		
a4	Mention the principles of herbal medicine preparation, identification, efficacy and standardization.		
a5	develop of skills, practices and professional practices required for a successful career		

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(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b1-**	Apply the independence of thought required to describe, interpret and summaries key theoretical aspects
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b2-**	contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of medicinal plants and their uses in improving health
		b3-	Work independently taking responsibility for autonomous learning and identify needs for personal, professional and academic development.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, discussion, Tutorial	Written and oral examination, Practical examination
b1-	Apply the independence of thought required to describe, interpret and summaries key theoretical aspects		

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b2-	contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of medicinal plants and their uses in improving health		
b3-	Work independently taking responsibility for autonomous learning and identify needs for personal, professional and academic development.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C2-	Handle and dispose chemicals and pharmaceutical preparations safely and effectively.	**c1-**	communicate with others in a clear manner, using words and numbers, through written work using appropriate academic conventions.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.	**c2-**	work independently and identify personal needs for skill development on an ongoing basis.
		c3	Recognise and respond to appropriate moral and ethical issues within the context of Complementary therapies.
		c4	Plan, design and execute activities with peers, using appropriate techniques and procedures taking responsibility for an agreed area.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		**- Lectures, discussion**	**- Written, and oral examination**
c1-	communicate with others in a clear manner, using words and numbers, through written work using appropriate academic conventions.		
c2-	work independently and identify personal needs for skill development on an ongoing basis.		
c3	Recognise and respond to appropriate moral and ethical issues within the context of Complementary therapies.		
c4	Plan, design and execute activities with peers, using appropriate techniques and procedures taking responsibility for an agreed area.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Demonstrate an understanding of professional, ethical and legal issues in practice.
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2**	Utilize appropriate information technology appropriately.
		d3	Demonstrate a comprehensive knowledge of anatomy and the location of internal organs, vessels and structures.

Teaching And Assessment Methods For Achieving Learning Outcomes:

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Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures, Tutorials, Student-led Seminars and Oral Presentations	essays, reports, presentations, and traditional examinations
d1-	Demonstrate an understanding of professional, ethical and legal issues in practice.		
d2	Utilise appropriate information technology appropriately.		
d3	Demonstrate a comprehensive knowledge of anatomy and the location of internal organs, vessels and structures.		

III. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	**Introduction To Complementary& Alternative Medicine**	a1-4,	-Definition of CAM - difference between complementary alternative medicine **and conventional medicine.** - Types of CAM	**1**	**2**
2	**Alternative Medical Systems**	a1-3, b1-3, c1-4,d1-3	traditional Chinese medicine, Ayurveda , naturopathy, acupuncture homeopathy	**2**	**2**
3	***Energy-Based Therapies***	a1-3, b1-3, c1-4,d1-3	Introduction, Magnet Therapy, reiki, therapeutic touch	**3**	**2**

4	**Mind-Body Therapies**	a1-3, b1-3, c1-4,d1-3	Mind-Body Medicine: An Overview , Art Therapy, Deep Breathing, Exercises, Feng Shui Guided Imagery and Hypnosis, Meditation, Music Therapy , Prayer and Spirituality, Relaxation Training, Tai Chi , Yoga	**4-6**	**6**
5	**Midterm exam**	a1-3, b1,3		**7**	**2**
6	***Biologically Based Therapies***	a1-4, b1-3, c1-4,d1-3	Biologically Based Therapies: An Overview, Apitherapy, Aromatherapy and Essential Oils, Diet-Based Therapies	**8,9**	**4**
7	***Manipulative and BodyBased Therapies***	a1-3, b1-3, c1-4,d1-3	Introduction, Alexander Technique,	**10,11**	**4**
			Aquatic Therapy (Hydrotherapy), Massage Therapy, Reflexology		
8	***Alternative Treatments for Specific Diseases and Condition***	a1-4, b1-3, c1-4,d1-3	- Arthritis and CAM - Asthma, Allergies, and CAM, - Cancer and CAM -Cognitive Decline and CAM -Diabetes and CAM	**12-14**	**6**
9	**Revision**	a1-4, b1-3		**15**	**2**
10	**Final exam**	a1-4, b1-3		**16**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

IV. Teaching strategies of the course:

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▪ Lectures, solving problem, Small group discussions, Tutorials
-Assessment Methods:
Written and Oral exams, Quizzes, homework, participation, Reports , and presentations

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Present/Absent	1-16	10	10%	a1-5, b1-3
2	Class activities	1-16	10	10%	a1-5, b1-3
3	Midterm written Exam	7th	20	20%	c1-4
5	Final Exam (theoretical)	16th	60	60%	c1-4
	Total		**100**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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VII. Learning Resource (MLA style or APA style)S:	
1- Required Textbook(s) (maximum two)	
	- Karen Lee Fontaine & Bill Kaszubski. 2004. Absolute Beginner's Guide to Alternative Medicine". Sams Publishing - Ian O. Monica R. 2012- perspectives on complementary and alternative medicines. Imperial College Press; UK
2- Recommended Readings and Reference Materials	
	C.S.Yuan, E. J. Bieber,2002. Textbook of Complementary and Alternative Medicine" . 2nd edition, Parthenon Publishing Group. Amy L. Sutton. 2010**.** Complementary and Alternative Medicine Sourcebook. 4th ed. Omnigraphic US
3- Essential References	
4- Electronic Materials and Web Sites *etc*.	
	www.biomedcentral.com www.medscape.com http://www.sciencedirect.com/ http://www.ncbi.nlm.nih.gov/
5- Other Learning Material:	
	-

VIII. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc.
	- Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

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IX. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

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6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.

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7	**Other policies**: ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Complementary and Alternative Medicine

I. - Information about Faculty Member Responsible for the Course:

		Office Hours					
Name of Faculty Member	Bushra Moharam						
Location & Telephone No.	730010755	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	bushramoharam@yahoo.com.	1		1			

II. Course Identification and General Information:

1-	**Course Title:**	**Complementary and Alternative Medicine**				
2-	**Course Number & Code:**	**Ph3108**				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		3	-	-		3
4-	**Study level/year at which this course is offered:**	5th level /2nd semester				
5-	**Pre –requisite (if any):**	Pharmacognosy, phytotherapy				
6-	**Co –requisite (if any):**	None				
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				

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10-	**Mode of delivery:**	Regular
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university

III. Course Description:

This course presents updated information about Complementary and Alternative Medicine (CAM) including sections on statistical usage, alternative medical systems, mind body medicine, biologically based practices, energy therapies, manipulative and body based practices, consumer issues, and research. Application of complementary and alternative medicine (CAM) provides public health professionals autonomy by allowing them to address aspects of a patient's well-being often disregarded by Western medicine.
Upon completion of this course, the students should be able to understand;
- The fundamental knowledge about herbal medicine including preparation, identity, efficacy, standardization and its relation to conventional medicine, in addition to the use of herbal medications in some common health problems, its toxicological aspects, regulatory laws of production and forensic pharmacognosy.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Identify and understand the principles of complementary and alternative therapies and its relation to conventional medicine.
2. Understand the function and structure of each system of the body
3. Understand potential effects of particular therapies, factors that may affect or restrict treatment, and the rationale behind the therapies.
4. Mention the principles of herbal medicine preparation, identification, efficacy and standardization.
5. develop of skills, practices and professional practices required for a successful career
6. Apply the independence of thought required to describe, interpret and summaries key theoretical aspects
7. contribute to the development of the profession through applied study, analysis of the published literature, drug information and evaluation of
8. medicinal plants and their uses in improving health
9. Work independently taking responsibility for autonomous learning and identify needs for personal, professional and academic development.
10. communicate with others in a clear manner, using words and numbers, through written work using appropriate academic conventions.
11. work independently and identify personal needs for skill development on an ongoing basis.
12. Plan, design and execute activities with peers, using appropriate techniques and procedures taking responsibility for an agreed area.
13. Demonstrate an understanding of professional, ethical and legal issues in practice.
14. Utilize appropriate information technology appropriately.
15. Demonstrate a comprehensive knowledge of anatomy and the location of internal organs, vessels and structures.

16. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	**Introduction To Complementary& Alternative Medicine**	a1-4,	-Definition of CAM - difference between complementary alternative medicine **and conventional medicine.** - Types of CAM	**1**	**2**
2	**Alternative Medical Systems**	a1-3, b1-3, c1-4,d1-3	traditional Chinese medicine, Ayurveda , naturopathy, acupuncture homeopathy	**1**	**2**
3	***Energy-Based Therapies***	a1-3, b1-3, c1-4,d1-3	Introduction, Magnet Therapy, reiki, therapeutic touch	**1**	**2**
4	**Mind-Body Therapies**	a1-3, b1-3, c1-4,d1-3	Mind-Body Medicine: An Overview , Art Therapy, Deep Breathing, Exercises, Feng Shui Guided Imagery and Hypnosis, Meditation, Music Therapy , Prayer and Spirituality, Relaxation Training, Tai Chi , Yoga	**3**	**6**
5	**Midterm exam**	a1-3, b1,3		**1**	**2**
6	***Biologically Based Therapies***	a1-4, b1-3, c1-4,d1-3	Biologically Based Therapies: An Overview, Apitherapy, Aromatherapy and Essential	**2**	**4**
			Oils, Diet-Based Therapies		
7	***Manipulative and BodyBased Therapies***	a1-3, b1-3, c1-4,d1-3	Introduction, Alexander Technique, Aquatic Therapy (Hydrotherapy), Massage Therapy, Reflexology	**2**	**4**

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8	***Alternative Treatments for Specific Diseases and Condition***	a1-4, b1-3, c1-4,d1-3	- Arthritis and CAM - Asthma, Allergies, and CAM, - Cancer and CAM -Cognitive Decline and CAM -Diabetes and CAM	**3**	**6**
9	**Revision**	a1-4, b1-3		**1**	**2**
10	**Final exam**	a1-4, b1-3		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

17. Teaching strategies of the course:

Lectures, solving problem, Small group discussions, Tutorials

18. Assessment Methods:

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Present/Absent	All	10	10%
2	Class activities	All	10	10%
3	Midterm written Exam	7th	20	20%
4	Final Exam (theoretical)	16th	60	60%
5	**Total**		**100**	**100%**

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19. Learning Resources:

I

1- Required Textbook(s) (maximum two).

- Karen Lee Fontaine & Bill Kaszubski. 2004. Absolute Beginner's Guide to Alternative Medicine". Sams Publishing
- Ian O. Monica R. 2012- perspectives on complementary and alternative medicines. Imperial College Press; UK

2- Essential References.

C.S.Yuan, E. J. Bieber,2002. Textbook of Complementary and Alternative Medicine" . 2nd edition, Parthenon Publishing Group.

Amy L. Sutton. 2010**.** Complementary and Alternative Medicine Sourcebook. 4th ed. Omnigraphics US

3- Electronic Materials and Web Sites *etc.*

www.biomedcentral.com www.medscape.com
http://www.sciencedirect.com/
http://www.ncbi.nlm.nih.gov/

20. Course Policies:

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.
	▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Drug discovery and Development

I. Course Identification and General Information:

1.	**Course Title**	Drug discovery and Development					
2.	**Course Number & Code:**	**Ph51014**					
3.	**Credit hours:**	**C.H**				**Total**	
		Th.	**Pr.**	**Tr.**	**Seminar.**		
		2				**2**	
4.	**Study level/ semester at which this course is offered:**	5th level /2nd semester					
5.	**Pre –requisite (if any):**	Medicinal Chemistry I,II, III & IV					
6.	**Co –requisite (if any):**	-					
7.	**Program (s) in which the course is offered:**	**Bachelor of pharmacy**					
8.	**Language of teaching the course:**	English					
9.	**The department in which the course is offered:**	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry					
10.	**Location of teaching the course:**	Faculty of Pharmacy					
11.	**Prepared by:**	Associate Prof. Tawfeek Ahmed Alobaidy Associate Prof. Jalal Abdulallah Hamoud					
12.	**Date of approval:**						

II. Course description:

This course introduces students to the basic principle of drug discovery and development. It demonstrate properties of drug likeness and drugs. It also covers the fundamental knowledge about the drug design.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic principles of drug discovery, design and development.
2. Illustrate the concepts of fragments, drug likeness and drugs properties and importance of combinatory and parallel synthesis in finding a drug likeness.
3. Discuss the basic concepts of drug targets.
4. Demonstrate the essential knowledge and understanding about the properties of drug likeness in designing new chemical entities of potential biological activities.
5. Explain the preclinical and clinical studies that proceed the getting drug to the market.
6. Determine the methods used to calculate the properties of drug molecules
7. Identify the 3D pharmacophore of drug and the binding sites
8. Diagram the schemes that describe the types drug designs
9. Apply the docking procedures for design of some enzyme inhibitors.
10. Practice the drug design using some computer program.
11. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some examples for drug design.
12. Use computer and technology efficiently to collect, analyze and interpret information to gain knowledge in field of drug discovery and design.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		**After participating in the course, students would be able to**	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Recognize the basic principles of drug discovery, design and development.

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A2-	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a2-**	Illustrate the concepts of fragments, drug likeness and drugs properties and importance of combinatory and parallel synthesis in finding a drug likeness.
		a3-	Discuss the basic concepts of drug targets.
A3-	Understand the general cellular, biochemical and physiological aspects of human body and recognize thepharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use andoverall health needs.	**a4-**	Demonstrate the essential knowledge and understanding about the properties of drug likeness in designing new chemical entities of potential biological activities.
		a5-	Explain the preclinical and clinical studies that proceed the getting drug to the market.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding **After participating in the course, students would be able to:**		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the basic principles of drug discovery, design and development.	Lectures methods, group discussion, Computer based teaching and learning.	Quizzes, Attendance, Participation, reports, homework, and written exam.
a2-	Illustrate the concepts of fragments, drug likeness and drugs properties and importance of combinatory and parallel synthesis in finding a drug likeness.		
a3-	Discuss the basic concepts of drug targets.		
a4-	Demonstrate the essential knowledge and understanding about the properties of drug likeness in designing new chemical entities of potential biological activities.		
a5-	Explain the preclinical and clinical studies that proceed the getting drug to the market.		

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(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub- PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Determine the methods used to calculate the properties of drug molecules.
		b2-	Identify the 3D pharmacophores of drugs and the binding sites.
		b3-	Diagram the schemes that describe the types drug designs.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Determine the methods used to calculate the properties of drug molecules	Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, homework, and Written exam.
b2-	Identify the 3D pharmacophore of drug and the binding sites		
b3-	Diagram the schemes that describe the types drug designs.		

(C) Professional and Practical Skills.

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Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Professional and Practical Skills**			
Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Apply the docking procedures for design of some enzyme inhibitors.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Practice the drug design using some computer program.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used**	**Methods of assessment**
c1-	Apply the docking procedures for design of some enzyme inhibitors.	Lectures methods, group discussion and Computer based teaching and learning	Practical work on computer and homework.
c2-	Practice the drug design using some computer program.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

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Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some examples for drug design.
D5-	Apply information and communication technology and working effectively in a team	**d2-**	Use computer and technology efficiently to collect, analyze and interpret information to gain knowledge in field of drug discovery and design.

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		Teaching strategies/methods to be used.	Methods of assessment
d1-	Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some examples for drug design.	Small group discussions and brainstorming	Homework and reports.
d2-	Use computer and technology efficiently to collect, analyze and interpret information to gain knowledge in field of drug discovery and design.		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	**Introduction to Drug discovery, design and development**	a1, d1,d2	-Terminology related to Drug discovery, design and development - Stages of drug discovery, primary goals and major activities.	1	2

2	**Integral Part of Drug Discovery: from fragments, lead, drug-like molecule to drug molecule**	a2, b1, d1, d2	**-Lead compound and drug-like molecule** Finding a fragment and lead compound, What is a drug-like molecule Lipinski's Rule Veber Rules **-Basic concepts about drug targets What is drug molecule** **Structural Integrity of a Drug Molecule:** Pharmaceutical, Pharmacokinetic and Pharmacodynamic Phases **-Structural fragments of a drug molecule:** pharmacophore, toxicophore, metabophore **-The properties of drug molecules:** 1. solubility and partition coefficient 2. Shape (steric, conforma onal, topological) proper es 3. Stereochemical proper es 4. Electronic properties **- Combinatorial and parallel synthesis in medicinal chemistry projects**	3	6

3	**Basic concepts of drug targets**	a3,d1, d2	- Protein as drug targets - Enzymes as drug targets - Receptors as drug targets - Nucleic acids as drug targets - Miscellaneous drug targets	2	4
4	**Mid Exam**	a1, a2, a3,b1		1	2

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5	**Drug discovery, design, and development**	a4, b1, b2, b3, c1,c2, d1, d2	**-Molecular and quantum mechanics** Molecular mechanics Quantum mechanics Energy minimization **-Molecular properties:** Partial charges, Molecular electrostatic potentials, Molecular orbitals , Spectroscopic transitions , The use of grids in measuring molecular properties **-Conformational analysis -Structure comparisons and overlays** **-Identifying the active conformation** X-ray crystallography Comparison of rigid and non-rigid ligands **-3D pharmacophore identification:** X-ray crystallography Structural comparison of active compounds Automatic identification of Pharmacophores **-Docking procedures** **-Types of Computer aided drug design** **1-**Structure-based drug design (direct design) strategy (SBDD) 2- Ligand –based drug design (indirect design) strategy (LBDD) **-Docking procedures** **-Examples for drug modelling** **A- Optimizing target interactions** - Drug optimization: strategies in drug design **B- Optimizing access to the target**	6	12
6	**Getting the drug to market**	a5, d1,d2	**Preclinical and clinical trials** Toxicity testing Drug metabolism studies Pharmacology, formulation, and stability tests Clinical trials	1	2

7	**Review**	a1,a2,a3,a4,a 5, b1, b2, b3, c1, c2		1	2
7	**Final Exam**	a1,a2,a3,a4,a5, b1, b2, b3, c1, c2		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

VII- a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, Tutorials and brainstorming.
b- Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a1-a4,b2,c1-2, d1-2	Sporadic through the semester	**5**
2	Reports	a1,a2, a5, b1, c1-2, d1-2		

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)

1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1-a4,b2,c1-2, d1-2
2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	5	5%	a1,a2, a5, b1, c1-2, d1-2
3	**Theoretical mid-semester exam**	7th	20	20%	a1, a2, a3, b1
4	**Final Exam (theoretical)**	**16th**	70	70%	a1,a2,a3,a4,a5, b1, b2, b3, c1, c2
	Total		**100**	**100%**	

II. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

III. Learning Resources:

1- Required Textbook(s) (maximum two).

1- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia

2- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

2- Recommended Books and Reference Materials.

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1- Andrew Davis A, E Ward S, 2015, "The Handbook of Medicinal Chemistry Principles and Practice". 3rd edition, The Royal Society of Chemistry. Cambridge

2- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and Discovery" Third edition, Taylor & Francis, London.

3- Jhoti H and Andrew R. L, 2007, "structure-based drug discovery" Springer, Dordrecht.

4- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approac edition, Oxford University Press, Inc., New York.

5- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

6- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

7- K-H. Hellwich C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

8- Lectures Notes.

3- Electronic Materials and Web Sites *etc*.

1- http://www.chemaxon/marvin
2 - http://www.webmolecules.com
3-http://www.acdlabs.com
4- http://www.pdb.com
5-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

IV. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - **Accommodation:** net connection, etc.
- Well-equipped laboratories with all required equipment and reagents.

2 - **Computing resources:** - Computer laboratory with internet facilities.

V. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	

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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.

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5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Drug discovery and Development

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Tawfeek A. Al-Obaidy Jalal Abdulallah Hamoud	Office Hours					
Location & Telephone No.	770507931	SAT	SUN	MON	TUE	WED	THU
E-mail	Tawfik_93@yahoo.com		2h				

II- Course Identification and General Information:		
1-	**Course Title:**	Drug discovery and Development
2-	**Course Number & Code:**	**Ph51014**

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3-	**Credit hours:**	**C.H**				**C.H Th.**
		Th.	**Th.**	**Th.**	**Th.**	
		2	**2**	**2**	**2**	**2**
4-	**Study level/year at which this course is offered:**	5th level /2nd semester				
5-	**Pre –requisite (if any):**	Medicinal Chemistry I,II, III & IV				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

This course introduces students to the basic principle of drug discovery and development. It demonstrate properties of drug likeness and drugs. It also covers the fundamental knowledge about the drug design.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Recognize the basic principles of drug discovery, design and development.
2. Illustrate the concepts of fragments, drug likeness and drugs properties and importance of combinatory and parallel synthesis in finding a drug likeness.
3. Discuss the basic concepts of drug targets.
4. Demonstrate the essential knowledge and understanding about the properties of drug likeness in designing new chemical entities of potential biological activities.
5. Explain the preclinical and clinical studies that proceed the getting drug to the market.
6. Determine the methods used to calculate the properties of drug molecules
7. Identify the 3D pharmacophore of drug and the binding sites
8. Diagram the schemes that describe the types drug designs
9. Apply the docking procedures for design of some enzyme inhibitors.
10. Practice the drug design using some computer program.
11. Work independently or collaboratively as a teamwork member to prepare seminars/ presentations or write reports to present some examples for drug design.
12. Use computer and technology efficiently to collect, analyze and interpret information to gain knowledge in field of drug discovery and design.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours

1	**Introduction to Drug discovery, design and development**	a1, d1,d2	-Terminology related to Drug discovery, design and development - Stages of drug discovery, primary goals and major activities.	1	2
2	**Integral Part of Drug Discovery: from fragments, lead, drug-like molecule to drug molecule**	a2, b1, d1, d2	**-Lead compound and drug-like molecule** Finding a fragment and lead compound, What is a drug-like molecule Lipinski's Rule Veber Rules **-Basic concepts about drug targets What is drug molecule** **Structural Integrity of a Drug Molecule:** Pharmaceutical, Pharmacokinetic and Pharmacodynamic Phases **-Structural fragments of a drug molecule:** pharmacophore, toxicophore, metabophore **-The properties of drug molecules:** 1. solubility and partition coefficient 2. Shape (steric, conforma onal, topological) proper es 3. Stereochemical proper es 4. Electronic properties **- Combinatorial and parallel synthesis in medicinal chemistry projects**	2-4	6
3	**Basic concepts of drug targets**	a3,d1, d2	- Protein as drug targets - Enzymes as drug targets - Receptors as drug targets - Nucleic acids as drug targets - Miscellaneous drug targets	5,6	4
4	**Mid Exam**	a1, a2, a3,b1		7	2

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5	**Drug discovery, design, and development**	a4, b1, b2, b3, c1,c2, d1, d2	**-Molecular and quantum mechanics** Molecular mechanics Quantum mechanics Energy minimization **-Molecular properties:** Partial charges, Molecular electrostatic potentials, Molecular orbitals , Spectroscopic transitions , The use of grids in measuring molecular properties **-Conformational analysis -Structure comparisons and overlays** **-Identifying the active conformation** X-ray crystallography Comparison of rigid and non-rigid ligands **-3D pharmacophore identification:** X-ray crystallography Structural comparison of active compounds Automatic identification of Pharmacophores **-Docking procedures** **-Types of Computer aided drug design** **1-**Structure-based drug design (direct design) strategy (SBDD) 2- Ligand –based drug design (indirect design) strategy (LBDD) **-Docking procedures** **-Examples for drug modelling** **C- Optimizing target interactions** - Drug optimization: strategies in drug design **D- Optimizing access to the target**	8-13	12
6	**Getting the drug to market**	a5, d1,d2	**Preclinical and clinical trials** Toxicity testing Drug metabolism studies Pharmacology, formulation, and stability tests Clinical trials	14	2

7	**Review**	a1,a2,a3,a4,a 5, b1, b2, b3, c1, c2		15	2
8	**Final Exam**	a1,a2,a3,a4,a5, b1, b2, b3, c1, c2		16	2
Number of Weeks /and Units Per Semester				**16**	**32**

VIII- a-Teaching strategies of the course:
Lecture method, Group Discussion, Problem solving sessions and Computer based teaching and learning, Tutorials and brainstorming.
b- Assessment Methods:
Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a1,a2, a5, b1, c1-2, d1-2	Sporadic through the semester	**5**
2	Reports	a1-a4, b2, c1-2, d1-2		

VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Attendance, Participation, reports and quizzes**	**All Weeks**	5	5%	a1-a4,b2,c1-2,d1-2

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2	**Oral Tests and Homeworkassignments**	Sporadic through the semester	5	5%	a1,a2, a5, b1, c1-2, d1-2
3	**Theoretical mid-semester exam**	7th	20	20%	a1, a2, a3, b1
4	**Final Exam (theoretical)**	**16th**	70	70%	a1,a2,a3,a4,a5, b1, b2, b3, c1, c2
	Total		**100**	**100%**	

VII. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

VIII. Learning Resources:

1- Required Textbook(s) (maximum two).

3- Donald J. Abraham," BURGER'S Medicinal Chemistry and Drug Discovery" 6 th edition, A John Wiley and Sons, Inc, Virginia

4- John M. Beale, Jr. and John H. Block, 2011, "Text book of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, Wilson and Gisvold, Lippincott Williams and Wilkins, A Wolters Kluwer Company, Philadelphia.

2- Recommended Books and Reference Materials.

9- Andrew Davis A, E Ward S, 2015, "The Handbook of Medicinal Chemistry Principles and Practice". 3rd edition, The Royal Society of Chemistry. Cambridge

10- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Design and

Discovery" Third edition, Taylor & Francis, London.

11- Jhoti H and Andrew R. L, 2007, "structure-based drug discovery" Springer, Dordrecht.

12- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemical Approac edition, Oxford University Press, Inc., New York.

13- Graham L. Patrick, 2013, "An Introduction to Medicinal Chemistry" 5th Edition, Oxford University Press Inc, New York.

14- Thomas L. Lemke, Victoria F. Roche, David A. Willaiams and S. William Zito, 2008, "Foye's Principles of Medicinal Chemistry" 6 th, Edition,., Lippincott Williams & Wilkins, a Wolters Kluwer business, Philadelphia.

15- K-H. Hellwich C. D. Siebert, 2006, "Stereochemistry Workbook" Springer-Verlag Berlin Heidelberg, Berlin.

16- Lectures Notes.

3- Electronic Materials and Web Sites *etc*.

2- http://www.chemaxon/marvin

2 - http://www.webmolecules.com

3-http://www.acdlabs.com

4- http://www.pdb.com

5-PASSPrediction of Activity Spectra for Substance) (http://www.ibmh.msk.su/PASS).

IX. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities

X. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.

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- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Industrial Pharmacy II

I. Course Identification and General Information:							
1	Course Title:	Industrial Pharmacy II					
2	Course Number & Code:	Ph21025					
3	Credit hours:3hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2	1			3	
4	Study level / semester at which course is offered:	Level: - Fifth Year /Second Semester					
5	Pre –requisite (if any):	Industrial Pharmacy I					
6	Co –requisite (if any):						
7	Programs in which course is offered:	Bachelor of pharmacy					
8	Language of teaching the course:	English					
9	Department in which course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy- Sana`a university					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

Course provide students with the necessary knowledge in the area of pharmaceutical technology, and to help them to understand the fundamentals and importance of the unit operations in the manufacture of dosage forms such as mixing, drying, milling and particle size analysis

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Distinguish appropriate good manufacturing practice (GMP) and Quality Control (QC) criteria to aseptic and sterile production facilities and other pharmaceutical industry
2. Identify the principles of quality assurance (QA) in education and of quality assurance of pharmaceutical processes and products.
3. **Recall the principles** of various instruments and techniques including manufacturing, packaging, labeling and storing processes in pharmaceutical industry
4. Describe the equipment's of filtration, crystilization, distillation and air purification used in industrial pharmacy with their operation and applications.
5. Recommend good manufacturing practice (GMP), good laboratory practice (GLP), good clinical practice (GCP) and good safety practice (GSP) guidelines in pharmaceutical technology, pharmaceutical research and pharmacy practice..
6. Assess the relationship between equipment design and product characteristics
7. Select the best equipment and/or operational line to perform pharmaceutical operation.
8. Diagrammatically design the studied equipments for each operation.
9. Manage pharmaceutical instruments and equipment safely and efficiently and solve commonly encountered problems in pharmaceutical manufacturing processes
10. Collect data about different equipment used in pharmaceutical industry and their operation.
11. Conduct research studies and analyze results.
12. Plan strategies to fulfill workplace pharmaceutical needs
13. Retrive and evaluate information from different sources.
14. Work in groups and independently.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**	
Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding	**Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding**
After completing this program, students will be able to:	**After completing this course, students will be able to:**

A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Distinguish appropriate good manufacturing practice (GMP) and Quality Control (QC) criteria to aseptic and sterile production facilities and other pharmaceutical industry
A2-	Recognize the physicochemical properties,	**a2-**	Identify the principles of quality assurance (QA) in
	preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development		education and of quality assurance of pharmaceutical processes and products.
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeia requirements to support the pharmaceutical industries and research.	**a3**	Recall the principles of various instruments and techniques including manufacturing, packaging, labeling and storing processes in pharmaceutical industry.
		a4	Describe the equipment's of filtration, crystilization, distillation and air purification used in industrial pharmacy with their operation and applications.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		1. Lectures using white board and data show. 2. Practical session using laboratory equipment 3. Research assignments 4. Case study 5. Discussion session	**1-Written exam** To assess understanding, intellectual, professional **2-Practical exam** To assess professional and practical skills **3-Oral** To assess Knowledge, understanding, intellectual skills, general skills and confidence **4-Quizzes** To assess Knowledge, understanding, intellectual skills
a1-	Distinguish appropriate good manufacturing practice (GMP) and Quality Control (QC) criteria to aseptic and sterile production facilities and other pharmaceutical industry		
a2-	Identify the principles of quality assurance (QA) in education and of quality assurance of pharmaceutical processes and products		
a3-	Recall the principles of various instruments and techniques including manufacturing, packaging, labeling and storing processes in pharmaceutical industry.		

a4-	Describe the equipment's of filtration, crystilization, distillation and air purification used in industrial pharmacy with their operation and applications.		**5-Case study** To assess the skills of problem-solving and date presentation 6-Reports

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Recommend good manufacturing practice (GMP), good laboratory practice (GLP), good clinical practice (GCP) and good safety practice (GSP) guidelines in pharmaceutical technology, pharmaceutical research and pharmacy practice..
B3-	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	**b2-**	Assess the relationship between equipment design and product characteristics.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b3-**	Select the best equipment and/or operational line to perform pharmaceutical operation
		b4	Diagrammatically design the studied equipments for each operation

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.	Teaching strategies/methods to be used	Methods of assessment

After completing this course, students will be able to:		1.Lecture 2.Practical using laboratory equipment 3.Research assignments	1.Written exam 2.Oral 3.Quizzes
b1-	Recommend good manufacturing practice (GMP), good laboratory practice (GLP), good clinical practice (GCP) and good safety practice (GSP) guidelines in pharmaceutical technology, pharmaceutical research and pharmacy practice..		
b2-	Assess the relationship between equipment design and product characteristics.		
b3-	Select the best equipment and/or operational line to perform pharmaceutical operation		
b4-	Diagrammatically design the studied equipments for each operation.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Manage pharmaceutical instruments and equipment safely and efficiently and solve commonly encountered problems in pharmaceutical manufacturing processes
C3-	Perform extraction, isolation, purification, identification, standardization, formulation of natural products and assure their rational use.	**c2**	Collect data about different equipment used in pharmaceutical industry and their operation.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3**	Conduct research studies and analyze results.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

		Methods of assessment

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	
After completing this course, students will be able to:		1.Practical session using laboratory equipment 2.Discussion session 3.Research	1.Oral 2.Quizzes 3.Case study
c1-	Manage pharmaceutical instruments and equipment safely and efficiently and solve commonly encountered problems in pharmaceutical manufacturing processes		
c2	Collect data about different equipment used in pharmaceutical industry and their operation.		
c3	Conduct research studies and analyze results.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
D2	Employ proper documentation and filing systems in different pharmaceutical fields	d1-	Plan strategies to fulfill workplace pharmaceutical needs
D3.	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d2	Retrieve and evaluate information from different sources.
D5.	Apply information and communication technology and working effectively in a team.	d3	Work in groups and independently

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

		Methods of assessment

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Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	
After completing this course, students will be able to:		1. Lectures using white board and data show. 2. Practical session 3. Research assignments 4. Discussion session	Oral Case study Quizzes Reports
d1-	Plan strategies to fulfill workplace pharmaceutical needs		
d2-	Retrieve and evaluate information from different sources.		
d3	Work in groups and independently		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	cGMP current good manufacture practice	a1, a2, b1,d1-3	Introduction to current good manufacture practice Starting materials Personnel Building and facilities Complaints and product recalls	1	2

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2	cGMP current good manufacture practice	a1, b1, d2,d1-3	Documentations Self-inspection and quality audits Quality assurance and quality control	1	2
3	cGMP current good manufacture practice	b2, d1, d2, ,d1-3	Introduction to validation of manufacturing process Types of process validation Validation of sterile products	1	2
4	Filtration	a4, b3, b4,d1-3	Introduction Mechanism Factors affecting Filter media Filter aids Filtration equipment's Leaf filters Rotator continuous Meta filters Filter press Centrifugal filtration	1	2
5	Air Purification	a4, b3, b4,d1-3	Ways in air purification used in pharmaceutical industry. Effectiveness processes	1	2
			used to purify air. Mechanism of air purification. 1-Filtration. 2-Sedimentation 3-Electricalprecipitation 4-Scrubbing.		

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6	Crystallization	a4, b2, b4 ,d1-3	Definition Crystal forms and habit Solubility curves Factors affecting rate of crystal growth Caking of crystals Crystallization equipment	1	2
7	**Mid Term Exam.**	a1-4,b1-4		1	2
8	Distillation	a4, b2, b4 ,d1-3	Concepts Application Types Equipment's.	1	2
9	Industrial Plants Hazards & Safety	a1-2,b1, ,d1-3	Industrial hazards Types of hazards Noise, equipment noise sources ,level & potential control solutions Industrial effluent testing and treatment Waste Water Treatment	1	2
10	Pharmaceutical packaging	a3,b4,d1-3	Ideal properties, function, , and types of packaging Influence of packaging materials. Glass, metal, plastics, paper & board Films, foils & laminates Rubber Closures Labeling Packaging lines, packaging	2	4
			area, packaging equipment. Package testing & stability.		

11	Standard Operating Procedures (SOPs)	a3,a4,b3, d1, d3	SOP for dissolution apparatus Objective Scope Responsibilities Procedure:	1	2
12	Pharmaceutical Herbal Formulations	a2,a3,b3, d1, d2	Categorization of herbal medicines Quality Safety W.H.O. Guidelines for Quality Standardized Herbal Formulations Advantages of Herbal Medicine Ash values, Extractive values determination Potential Toxic contaminants in herbal formulation Contamination of herbal formulation WHO Guidelines for Potential contaminants in Herbal Formulations Heavy Metal Arsenic Cadmium Lead Microbial Contamination Instrumentation	2	4
13		a3, b3 ,d1-3	The important products that manufactured by microorganism in pharmaceutical industry Vaccine Antibody Antibiotics Probiotics	2	4

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	Role microorganism in Pharmaceutical Industry		Source of Probiotics and Effect on Bod Enzyme & Vit. production Bacteriocins Chelation Antimicrobial copper alloy surfaces Phage therapy Antimicrobial activity & disinfection Medical devices Cosmetic microbiology		
14	**Final Exam**	a1-4,b1-4		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	1. Drying and drying control. 2. Drying equibments (selection)	c1-2,d1-4	**1**	**2**
2	1. Extraction (Batch percolator + Packed column tower).	c1-3,d1-4	**1**	**2**
3	Crystallization , formation , growth Saturation and Super saturation.	c1-3,d1-4	**1**	**2**
4	Liquid preparation, volume variation, density and viscosity	c1-3,d1-4	**1**	**2**
5	1. Sedimentation rate 2. Calculation.	c1-3,d1-4	**1**	**2**
6	Pre-formulation studies on acetaminophen / acetyl salicylic acid Or any drug.	c1-3,d1-4	**1**	**2**
7	**Mid. Exam**	c1-3	**1**	**2**
8	Preparation and evaluation of acetaminophen tablets	c1-3,d1-4	**2**	**4**
9	Coating of tablets- film coating of tables/granules	c1-3,d1-4	**1**	**2**

10	Preparation and evaluation of Tetracycline capsules Or Other drugs.	c1-3,d1-4	**1**	**2**
11	Preparation of Ascorbic Acid injection Or other drugs.	c1-3,d1-4	**1**	**2**
12	Preparation of Eye drops/ and Eye ointments.	c1-3,d1-4	**1**	**2**
13	Quality control test of marketed Pharmaceutical preparation / selection	c1-3,d1-4	**1**	**2**
14	Revision in factory and labs	c1-3,d1-4	**1**	**2**
16	**Final Practical Exam.**	c1-3	**1**	**2**
Number of Weeks /and Units Pr Semester			**16**	**32**

VI. a-Teaching strategies of the course:

1. Lectures using white board and data show.
2. Practical session using laboratory equipment
3. Research assignments
4. Case study
5. Discussion session

b-Assessment Methods:

1-Written exam To assess understanding, intellectual, professional
2-Practical exam To assess professional and practical skills
3-Oral To assess Knowledge, understanding, intellectual skills, general skills and confidence
4-Quizzes To assess Knowledge, understanding, intellectual skills
5-Case study To assess the skills of problem-solving and date presentation 6-Reports

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-4,d1-4**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-4**		

III. Schedule of Assessment Tasks for Students During the Semester:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة ا.د.ماجد
علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-4,b1-4, **d1-4**
2.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-4, b1-4, **d1-4**
3.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-3
4.	**Practical mid-semester exam**	11th	15	10%	c1-3
5.	**Theoretical mid-semester exam**	6th	30	20%	a1-4, b1-4
6.	**Final Exam (theoretical)**	16th	50	33%	a1-4, b1-4
7.	**Final Exam (practical)**	16th	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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	1. , lea & Febiger, (2002),The Theory and Practice of Industrial Pharmacy 2nd Ed, Philadelphia. 2. Sarfaraz K.Niazi ,(2009),Handbooks of Pharmaceutical Manufacturing Formulations 2nd Ed.,
2- Recommended Readings and Reference Materials	
	Rockville, MD,2008,- United States Pharmacopoeia, The United States Pharmacopeial Convention, Inc.,. , 31st ed., U.S.A. Reynold, J.E.F., 2000, Martindale, The Extra Pharmacopoeia, The Pharmaceutical Press, 32nd ed., London.
3- Essential References	
	- Remington:, 2000, The Science and Practice of Pharmacy, Alfonso, R.G. (Ed.), 20th ed. The University of the Sciences in Philadelphia, U.S.A., - Allen, L. V., Popovich, N. G., and Ansel, H. C., 2005, Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems, 8th Edition ,Lippincott Williams & Wilkins Publishers.
4- Electronic Materials and Web Sites *etc*.	
	http://www.pharmaceutical technology.com http://www.sciencedirect.com http://www.pubmed.com http://www.google.com
5- Other Learning Material:	
	Study tour: A visit to pharmaceutical industries will be an integrated part of the syllabi

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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علوان	ا.د. محمود البريهي	ا.د.ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

Course Plan of Industrial Pharmacy II

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Maged Alwan	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:						
1-	Course Title:	Industrial Pharmacy II				
2-	Course Number & Code:	Ph2921				
3-	Credit hours:3hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	2		3
4-	Study level/year at which this course is offered:	5th year/2nd semester				
5-	Pre –requisite (if any):	Industrial Pharmacy I				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

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III. Course description:

Course provide students with the necessary knowledge in the area of pharmaceutical technology, and to help them to understand the fundamentals and importance of the unit operations in the manufacture of dosage forms such as mixing, drying, milling and particle size analysis

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

15. Distinguish appropriate good manufacturing practice (GMP) and Quality Control (QC) criteria to aseptic and sterile production facilities and other pharmaceutical industry
16. Identify the principles of quality assurance (QA) in education and of quality assurance of pharmaceutical processes and products.
17. **Recall the principles** of various instruments and techniques including manufacturing, packaging, labeling and storing processes in pharmaceutical industry
18. Describe the equipment's of filtration, crystilization, distillation and air purification used in industrial pharmacy with their operation and applications.
19. Recommend good manufacturing practice (GMP), good laboratory practice (GLP), good clinical practice (GCP) and good safety practice (GSP) guidelines in pharmaceutical technology, pharmaceutical research and pharmacy practice..
20. Assess the relationship between equipment design and product characteristics
21. Select the best equipment and/or operational line to perform pharmaceutical operation.
22. Diagrammatically design the studied equipments for each operation.
23. Manage pharmaceutical instruments and equipment safely and efficiently and solve commonly encountered problems in pharmaceutical manufacturing processes
24. Collect data about different equipment used in pharmaceutical industry and their operation.
25. Conduct research studies and analyze results.
26. Plan strategies to fulfill workplace pharmaceutical needs
27. Retrive and evaluate information from different sources.
28. Work in groups and independently.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	cGMP current good manufacture practice	a1, a2, b1,d1-3	Introduction to current good manufacture practice Starting materials Personnel Building and facilities	1	2
			Complaints and product recalls		
2	cGMP current good manufacture practice	a1, b1, d2,d1-3	Documentations Self-inspection and quality audits Quality assurance and quality control	1	2
3	cGMP current good manufacture practice	b2, d1, d2, ,d1-3	Introduction to validation of manufacturing process Types of process validation Validation of sterile products	1	2
4	Filtration	a4, b3, b4,d1-3	Introduction Mechanism Factors affecting Filter media Filter aids Filtration equipment's Leaf filters Rotator continuous Meta filters Filter press Centrifugal filtration	1	2

5	Air Purification	a4, b3, b4,d1-3	Ways in air purification used in pharmaceutical industry. Effectiveness processes used to purify air. Mechanism of air purification. 1-Filtration. 2-Sedimentation 3-Electricalprecipitation 4-Scrubbing.	1	2
6	Crystallization	a4, b2, b4 ,d1-3	Definition Crystal forms and habit Solubility curves Factors affecting rate of crystal growth	1	2
			Caking of crystals Crystallization equipment		
7	**Mid Term Exam.**	a1-4,b1-4		1	2
8	Distillation	a4, b2, b4 ,d1-3	Concepts Application Types Equipment's.	1	2
9	Industrial Plants Hazards & Safety	a1-2,b1, ,d1-3	Industrial hazards Types of hazards Noise, equipment noise sources ,level & potential control solutions Industrial effluent testing and treatment Waste Water Treatment	1	2

10	Pharmaceutical packaging	a3,b4,d1-3	Ideal properties, function, , and types of packaging Influence of packaging materials. Glass, metal, plastics, paper & board Films, foils & laminates Rubber Closures Labeling Packaging lines, packaging area, packaging equipment. Package testing & stability.	2	4
11	Standard Operating Procedures (SOPs)	a3,a4,b3, d1, d3	SOP for dissolution apparatus Objective Scope Responsibilities Procedure:	1	2
12	Pharmaceutical Herbal Formulations	a2,a3,b3, d1, d2	Categorization of herbal medicines Quality Safety	2	4

			W.H.O. Guidelines for Quality Standardized Herbal Formulations Advantages of Herbal Medicine Ash values, Extractive values determination Potential Toxic contaminants in herbal formulation Contamination of herbal formulation WHO Guidelines for Potential contaminants in Herbal Formulations Heavy Metal Arsenic Cadmium Lead Microbial Contamination Instrumentation		
13	Role microorganism in Pharmaceutical Industry	a3, b3 ,d1-3	The important products that manufactured by microorganism in pharmaceutical industry Vaccine Antibody Antibiotics Probiotics Source of Probiotics and Effect on Bod Enzyme & Vit. production Bacteriocins Chelation Antimicrobial copper alloy surfaces Phage therapy Antimicrobial activity & disinfection Medical devices Cosmetic microbiology	2	4

14	**Final Exam**	a1-4,b1-4		1	2
Number of Weeks /and Units Per Seme ster				**16**	**32**

b- Practical Aspect:

Order	Practical Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	1. Drying and drying control. 2. Drying equibments (selection)	c1-2,d1-4	**1**	**2**
2	1. Extraction (Batch percolator + Packed column tower).	c1-3,d1-4	**1**	**2**
3	Crystallization , formation , growth Saturation and Super saturation.	c1-3,d1-4	**1**	**2**
4	Liquid preparation, volume variation, density and viscosity	c1-3,d1-4	**1**	**2**
5	1. Sedimentation rate 2. Calculation.	c1-3,d1-4	**1**	**2**
6	Pre-formulation studies on acetaminophen / acetyl salicylic acid Or any drug.	c1-3,d1-4	**1**	**2**
7	**Mid. Exam**	c1-3	**1**	**2**
8	Preparation and evaluation of acetaminophen tablets	c1-3,d1-4	**2**	**4**
9	Coating of tablets- film coating of tables/granules	c1-3,d1-4	**1**	**2**
10	Preparation and evaluation of Tetracycline capsules Or Other drugs.	c1-3,d1-4	**1**	**2**
11	Preparation of Ascorbic Acid injection Or other drugs.	c1-3,d1-4	**1**	**2**
12	Preparation of Eye drops/ and Eye ointments.	c1-3,d1-4	**1**	**2**
13	Quality control test of marketed Pharmaceutical preparation / selection	c1-3,d1-4	**1**	**2**
14	Revision in factory and labs	c1-3,d1-4	**1**	**2**

16	**Final Practical Exam.**	c1-3	**1**	**2**
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

1. Lectures using white board and data show.
2. Practical session using laboratory equipment
3. Research assignments
4. Case study
5. Discussion session

b-Assessment Methods:

1-Written exam To assess understanding, intellectual, professional
2-Practical exam To assess professional and practical skills
3-Oral To assess Knowledge, understanding, intellectual skills, general skills and confidence
4-Quizzes To assess Knowledge, understanding, intellectual skills
5-Case study To assess the skills of problem-solving and date presentation 6-Reports

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-4,d1-4**	Sporadic through the semester	**10**
2	Reports	**c1-3, d1-4**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
8.	**Attendance, Participation and quizzes**	**All Weeks**	10	7%	a1-4,b1-4, **d1-4**

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9.	**Oral Tests and Homeworkassignments**	Sporadic through the semester	10	7%	a1-4, b1-4, **d1-4**
10.	**Attendance, Practical Reports**	**All Weeks**	15	10%	c1-3
11.	**Practical mid-semester exam**	11th	15	10%	c1-3
12.	**Theoretical mid-semester exam**	6th	30	20%	a1-4, b1-4
13.	**Final Exam (theoretical)**	16th	50	33%	a1-4, b1-4
14.	**Final Exam (practical)**	16th	20	13%	c1-3
	Total		**150**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

X. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

1. , lea & Febiger, (2002),The Theory and Practice of Industrial Pharmacy 2nd Ed, Philadelphia.
2. Sarfaraz K.Niazi ,(2009),Handbooks of Pharmaceutical Manufacturing Formulations 2nd Ed.,

7- Recommended Readings and Reference Materials

Rockville, MD,2008,- United States Pharmacopoeia, The United States Pharmacopeial Convention, Inc.,. , 31st ed., U.S.A.
Reynold, J.E.F., 2000, Martindale, The Extra Pharmacopoeia, The Pharmaceutical Press, 32nd ed., London.

8- Essential References

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
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	- Remington:, 2000, The Science and Practice of Pharmacy, Alfonso, R.G. (Ed.), 20th ed. The University of the Sciences in Philadelphia, U.S.A., - Allen, L. V., Popovich, N. G., and Ansel, H. C., 2005, Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems, 8th Edition ,Lippincott Williams & Wilkins Publishers.
9- Electronic Materials and Web Sites *etc*.	
	http://www.pharmaceutical technology.com http://www.sciencedirect.com http://www.pubmed.com http://www.google.com
10- Other Learning Material:	
	Study tour: A visit to pharmaceutical industries will be an integrated part of the syllabi

XI. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.
XII. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	

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	□ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. □ Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Hospital Pharmacy

I. Course Identification and General Information:						
1	Course Title:	Hospital Pharmacy				
2	Course Number & Code:	Ph21026				
3	Credit hours:	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2	-	-	-	2
4	Study level/ semester at which this course is offered:	Fifth year, Second Semester				
5	Pre –requisite (if any):	Pharmaceutical Care (II) and Clinical Pharmacy I				
6	Co –requisite (if any):	Clinical Pharmacy II				
7	Program (s) in which the course is offered:	Bachelor of pharmacy				
8	Department (s) in which the course is offered:	Pharmaceutics				
9	Language of teaching the course:	English				
10	Location of teaching the course:	Faculty of pharmacy – Sana'a University				
11	Prepared by:	Prof. Dr. Ahmed Mohamed Sabati				
12	Date of approval:					

II. Course Description:

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د.احمد سباتي	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

This course covers the development, functions, organization and administration of pharmaceutical services within the hospital. This course also deals with the pharmaceutical services offered to in-patients and out-patients. It includes drug distribution, I.V. admixtures, total parenteral nutrition, and dosage calculations. Emphasis is also given to design and manufacture of formulations for hospital use including their quality assurance and packaging. **Overall Aims of Course:**
The student shall develop an understanding of the complete process of the drug distribution system, from the purchasing and receipt of drugs by the hospital including their administration to the patient. The resident shall also develop an understanding of an intravenous admixture service, including total parenteral nutrition and chemotherapy.

III. Intended Learning outcomes (ILOs) of the course:

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At the end of this course, the students will be able to:

1. Explain hospital organization/ PTC committee functions and the professional practice management skills
2. Demonstrate proper aspect technique and calculations in IV admixture compounding and prepare intravenous admixtures, total parenteral nutrition, and chemotherapy.
3. Recognize steps involved in drug therapy monitoring and requirements for stores management and inventory control.
4. Describe all legal requirements and professional standards that pertain to the drug distribution in hospitals and their contribution to patient- focused pharmacy practice
5. Recognize the polices of MMU (Medication Management and Use) Committee
6. Calculate the medicine doses and dosage regimen.
7. Interpret patient and clinical data, including patients records held within practice settings.
8. Interpret of prescription and other orders of medicines.
9. Identify potential drug- related problems that could occur as result of the hospital's distribution system and identify ways to prevent their occurrence.
10. Apply in practice setting the knowledge and understanding required to meet the needs of patient and other health professionals.
11. Interpret the appropriateness of medication order before preparing or permitting dispensing the patient dose.
12. Adujst unit dose and interpret/ check medication orders for completeness, appropriateness, and accuracy
13. Follow departmental procedures and pharmacy standards of practice to insure the integrity of drugs dispensed within the hospital.
14. Identify, document, evaluate and follow-up on medication errors, in accordance with hospital policy.
15. Effectively review, process and dispenses medication orders, according to hospital policies and procedures, including formulary drugs, non-formulary drugs, restricted drugs, drugs within therapeutic interchange policy, investigational and special access drugs, narcotic and controlled drugs. Accurately assess admixture solutions for appropriate concentrations, rate, compatibilities, stability, and storage 16. Communicate efficiently and effectively with patients and other healthcare professionals.
17. Reflect on the use of communication skills in counter prescribing.
18. Critically analyze published literature.

I. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in:
Knowledge and Understanding.

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Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
A1	Recognize the principles of physical, chemical, clinical, social, behavioral, health and Pharmaceutical sciences	**a1-**	Explain hospital organization/ PTC committee functions and the professional practice management skills
		a2	Demonstrate proper aspect techniques and calculations for IV admixture compounding and prepare intravenous admixtures, total parenteral nutrition, and chemotherapy.
A5 -	demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care .	**a3**	Recognize steps involved in drug therapy monitoring and requirements for stores management and inventory control.
		a4	Describe all legal requirements and professional standards that pertain to the drug distribution in hospitals and their contribution to patient- focused pharmacy practice
		a5	Recognize the polices of MMU (Medication Management and Use) Committee.

Teaching And Assessment Methods For Achieving Learning Outcomes

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/ methods to be used	Methods of assessment
completing this course, students will be able to:		Lectures methods , Computer based teaching and learning, group discussion and tutorial	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
a1-	Explain hospital organization/ PTC committee functions and the professional practice management skills		
a2	Demonstrate proper aspect technique and calculations in IV admixture compounding and prepare intravenous admixtures, total parenteral nutrition, and chemotherapy.		
a3	Recognize steps involved in drug therapy monitoring and requirements for stores management and inventory control.		

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a4	Describe all legal requirements and professional standards that pertain to the drug distribution in hospitals and their contribution to patient- focused pharmacy practice		
a5	Recognize the polices of MMU (Medication Management and Use) Committee.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B4-	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing.	**b1-**	Calculate the medicine doses and dosage regimen.
		b2-	Interpret patient and clinical data, including patients records held within practice settings.
B5-	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b3-**	Interpret of prescription and other orders of medicines.
		b4-	Identify potential drug- related problems that could occur as result of the hospital's distribution system and identify ways to prevent their occurrence.
		b5-	Apply in practice setting the knowledge and understanding required to meet the needs of patient and other health professionals.
		b6-	Interpret the appropriateness of medication order before preparing or permitting dispensing the patient dose.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.	Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		

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b1-	Calculate the medicine doses and dosage regimen.	Lectures methods, Group Discussion, Problem solving	Oral Exam, Quizzes, Attendance, Participation,
b2-	Interpret patient and clinical data, including patients records held within practice settings.		
b3-	Interpret of prescription and other orders of medicines.	sessions, brainstorming and Computer based teaching and learning	Short answers, reports, homework, and Written exam.
b4-	Identify potential drug- related problems that could occur as result of the hospital's distribution system and identify ways to prevent their occurrence.		
b5-	Apply in practice setting the knowledge and understanding required to meet the needs of patient and other health professionals.		
b6-	Interpret the appropriateness of medication order before preparing or permitting dispensing the patient dose.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Adust unit dose and Interpret/ check medication orders for completeness, appropriateness, and accuracy
		c2-	Follow departmental procedures and pharmacy standards of practice to insure the integrity of drugs dispensed within the hospital.
C5-			

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	Conduct research studies and utilize the results in different pharmaceutical fields.	**c3**	Identify document, evaluate and follow-up on medication errors, in accordance with hospital policy.
		c4-	Effectively review, process and dispenses medication orders, according to hospital policies and procedures, including formulary drugs, non-formulary drugs, restricted drugs, drugs within therapeutic interchange policy, investigational and special access drugs, narcotic and controlled drugs.
		c5-	Accurately assess admixture solutions for appropriate concentrations, rate, compatibilities, stability, and storage

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
c1-	Adust unit dose and Interpret/ check medication orders for completeness, appropriateness, and accuracy		
c2-	Follow departmental procedures and pharmacy standards of practice to insure the integrity of drugs dispensed within the hospital.		
c3-	Identify document, evaluate and follow-up on medication errors, in accordance with hospital policy.		

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c4-	Effectively review, process and dispenses medication orders, according to hospital policies and procedures, including formulary drugs, non-formulary drugs, restricted drugs, drugs within therapeutic interchange policy, investigational and special access drugs, narcotic and controlled drugs.		
c5-	Accurately assess admixture solutions for appropriate concentrations, rate, compatibilities, stability, and storage		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional development	**d1-**	Communicate efficiently and effectively with patients and other healthcare professionals.
D2	Employ proper documentation and filing systems in different pharmaceutical fields	**d2**	Reflect on the use of communication skills in counter prescribing.
		d3	Critically analyze published literature.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills	Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Oral Exam, Quizzes,

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d1-	Communicate efficiently and effectively with patients and other healthcare professionals.	Lectures methods, Group Discussion, Problem solving sessions, brainstorming and Computer based teaching and learning	Attendance, Participation, Short answers, reports, homework, and Written exam.
d2-	Reflect on the use of communication skills in counter prescribing.		
d3-	Critically analyze published literature.		

II. Course Content:

1 – Course Topics/Items:

Order	Topic List / Units	CILOs (symbols)	No. of week	Contact Hours
1	**Introduction :** Organization and Structure Organization of a hospital and hospital pharmacy - Responsibilities of a hospital	a1, d1-3	1	2

	pharmacist			
2	Pharmacy and therapeutic committee- Hospital formulary	formulary Contents, preparation and revision of a1, d1-3	1 2	
3	**Drug Store Management and Inventory Control:**	a1, a2, a3, a4	1	2
4	Organization of a drug store Storage conditions. Purchase and Inventory Control - Principles - Procurement and stocking	purchase procedures - Purchase order - a3, a4, d1-3	1 2	
5	**Inpatient pharmacy services:** Dose adjustment.	**Inpatient pharmacy services:** Dose a2, b1,c1,d1- 1 2 adjustment.	3	
6		a2, a3,b1- - Intravenous admixture (TPN) - Therapy drug	1 2	
7	(TDM)	3,c1, c5,d1-3 monitoring		
8		a4, b2,b3, b6, Outpatient dispensing - methods adopted. c2,c4, d1-3	1 2	
9	Types of drug distribution systems. - Charging policy – labeling - Dispensing of drugs to	a4, b3, b4, Drug Distribution Systems in Hospitals: b6, c2,c4, d1-	1 2 d1-3	2

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	ambulatory patients. Dispensing of controlled drugs.	3		
10	**Polices of MMU (Medication Management and Use) Committee**	a5, d1-3	1	2
11	Reporting system Medication Errors and Near Miss Events	c3, d1-3	1	2
12	Dispensing - High Alert Medications-Medication	b6, c2,c4, d13	1	2
13	CPR Crush Cart - PARENTERAL THERAPY	a2, a3,b1-3,c1, c5,d1-3	1	2
14	Overseeing Medication Use - Distribution and Control of Narcotics	a4, b3, b4, d1-3	1	2
Number of Weeks /and Units Per Semester			**14**	**28**

I. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam and reports.

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation, Assignments and quizzes**	**All weeks**	**10**	10%	a1-5, b1-6, c1-6, d1-3
2	**Mid-semester exam**	**8**	**20**	20%	a1-4, b1-3, b6, c1,c2,c4, c5

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3	**Final Exam**	**16**	**70**	70%	a1-5, b1-6, c1-6
	Total		**50**	**100%**	

I. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs	

II. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

M. C. Allwood and J. T. Fell. 1980."Textbook of Hospital Pharmacy" Blackwell Scientific Publications, Oxford.

2- Recommended Readings and Reference Materials

 W.E. Hassan "Hospital Pharmacy" 3rd ed. Lea and Febiger, Philadelphia,1974.\
Clinical Pharmacy - Jankins, Superandio and Laticlasis.

3- Essential References

Course notes (lecture notes and practical notes) prepared by teacher of the subject.

4- Electronic Materials and Web Sites *etc*.

Websites in international network (internet

5- Other Learning Material:

-

I. Facilities Required:

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1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

II. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Hospital Pharmacy

I- Information about Faculty Member Responsible for the Course:								
Name of Faculty Member		Office Hours						
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II- Course Identification and General Information:

1-	Course Title:	Hospital Pharmacy

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2-	**Course Number & Code:**	Ph21026				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	-		2
4-	**Study level/year at which this course is offered:**	5th level /2nd semester				
5-	**Pre –requisite (if any):**	Pharmaceutical Care (II) and Clinical Pharmacy I				
6-	**Co –requisite (if any):**	-				
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

IV. Course Description:

This course covers the development, functions, organization and administration of pharmaceutical services within the hospital. This course also deals with the pharmaceutical services offered to in-patients and out-patients. It includes drug distribution, I.V. admixtures, total parenteral nutrition, and dosage calculations. Emphasis is also given to design and manufacture of formulations for hospital use including their quality assurance and packaging. **Overall Aims of Course:**
The student shall develop an understanding of the complete process of the drug distribution system, from the purchasing and receipt of drugs by the hospital including their administration to the patient. The resident shall also develop an understanding of an intravenous admixture service, including total parenteral nutrition and chemotherapy.

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V. Intended Learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Explain hospital organization/ PTC committee functions and the professional practice management skills
2. Demonstrate proper aspect technique and calculations in IV admixture compounding and prepare intravenous admixtures, total parenteral nutrition, and chemotherapy.
3. Recognize steps involved in drug therapy monitoring and requirements for stores management and inventory control.
4. Describe all legal requirements and professional standards that pertain to the drug distribution in hospitals and their contribution to patient- focused pharmacy practice
5. Recognize the polices of MMU (Medication Management and Use) Committee
6. Calculate the medicine doses and dosage regimen.
7. Interpret patient and clinical data, including patients records held within practice settings.
8. Interpret of prescription and other orders of medicines.
9. Identify potential drug- related problems that could occur as result of the hospital's distribution system and identify ways to prevent their occurrence.
10. Apply in practice setting the knowledge and understanding required to meet the needs of patient and other health professionals.
11. Interpret the appropriateness of medication order before preparing or permitting dispensing the patient dose.
12. Adust unit dose and Interpret/ check medication orders for completeness, appropriateness, and accuracy
13. Follow departmental procedures and pharmacy standards of practice to insure the integrity of drugs dispensed within the hospital.
14. Identify, document, evaluate and follow-up on medication errors, in accordance with hospital policy.
15. Effectively review, process and dispenses medication orders, according to hospital policies and procedures, including formulary drugs, non-formulary drugs, restricted drugs, drugs within therapeutic interchange policy, investigational and special access drugs, narcotic and controlled drugs.Accurately assess admixture solutions for appropriate concentrations, rate, compatibilities, stability, and storage
16. Communicate efficiently and effectively with patients and other healthcare professionals.
17. Reflect on the use of communication skills in counter prescribing.
18. Critically analyze published literature.

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V-Course Content:

1 – Course Topics/Items:

Order	Topic List / Units	CILOs (symbols)	Week Due	Contact Hours
1	**Introduction :** Organization and Structure Organization of a hospital and hospital pharmacy - Responsibilities of a hospital pharmacist	a1, d1-3	1	2
2	Pharmacy and therapeutic committee- Hospital formulary Contents, preparation and revision of hospital formulary	a1, d1-3	2	2
3	**Drug Store Management and Inventory Control:** • Organization of a drug store • Storage conditions.	a1, a2, a3, a4	3	2
4	Purchase and Inventory Control - Principles - purchase procedures - Purchase order - Procurement and stocking	a3, a4, d1-3	4	2
5	**Inpatient pharmacy services:** Dose adjustment.	a2, b1,c1,d1-3	5	2
6	**Inpatient pharmacy services:** Dose adjustment. - Intravenous admixture (TPN) - Therapy drug monitoring (TDM)	a2, a3,b1-3,c1, c5,d1-3	6	2
7	Outpatient dispensing - methods adopted.	a4, b2,b3, b6, c2,c4, d1-3	7	2
8	Med Term Exam	a1-4, b1-3, b6, c1,c2,c4, c5	8	2
9	Drug Distribution Systems in Hospitals:	a4, b3, b4, d1-3	9	2
10	Types of drug distribution systems. - Charging policy – labeling - Dispensing of drugs to ambulatory patients. Dispensing of controlled drugs.	a4, b3, b4, b6, c2,c4, d13	10	2

11	**Polices of MMU (Medication Management And Used) Committee**	a5, d1-3	11	2
11	Reporting system Medication Errors and Near Miss Events	c3, d1-3	12	2
13	Dispensing - High Alert Medications- Medication	b6, c2,c4, d13	13	2
14	CPR Crush Cart - PARENTERAL THERAPY	a2, a3,b1-3,c1, c5,d1-3	14	2
15	Overseeing Medication Use - Distribution and Control of Narcotics	a4, b3, b4, d1-3	15	2
16	Final Term Exam	a1-5, b1-6, c1-5	16	2
Number of Weeks /and Units Per Semester			**16**	**32**

II. a-Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, case study, Computer based teaching and learning, tutorials, brainstorming and Practical sessions.

b- Assessment Methods:

Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam and reports.

II. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation, Assignments and quizzes**	**All weeks**	**10**	10%	a1-5, b1-6, c1-6, d1-3
2	**Mid-semester exam**	**8**	**20**	20%	a1-4, b1-3, b6, c1,c2,c4, c5

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3	**Final Exam**	**16**	**70**	70%	a1-5, b1-6, c1-6
	Total		**50**	**100%**	

III. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs	

IV. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

M. C. Allwood and J. T. Fell. 1980."Textbook of Hospital Pharmacy" Blackwell Scientific Publications, Oxford.

7- Recommended Readings and Reference Materials

 W.E. Hassan "Hospital Pharmacy" 3rd ed. Lea and Febiger, Philadelphia,1974.\ Clinical Pharmacy - Jankins, Superandio and Laticlasis.

8- Essential References

Course notes (lecture notes and practical notes) prepared by teacher of the subject.

9- Electronic Materials and Web Sites *etc*.

Websites in international network (internet

10- Other Learning Material:

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III. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

IV. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------

1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.

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3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Specification of Pharmaceutical Marketing

I. Course Identification and General Information:							
1	Course Title:	Pharmaceutical Marketing					
2	Course Number & Code:	Ph21027					
3	Credit hours: 2hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2				2	
4	Study level/ semester at which this course is offered:	Fifth year/ Second semester					
5	Pre –requisite (if any):	Pharmaceutics I-IV- Drug Delivery Systems					
6	Co –requisite (if any):						
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University					
11	Prepared by:	Prof Dr/ Mahmoud Mahyoob Alburyhi					
12	Date of approval:						

II. Course description:

Understand the fundamental aspects of marketing and promotional activities in the healthcare sector. -Point out the relationship between marketing and finance. -Understand the fundamental aspects of pharmacy management. Develop good selling and negotiation skills.

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III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Learn the importance of pharmaceutical marketing in business
2. Know the importance of promotional activities in healthcare.
3. Identify different types of pharmaceutical marketing analysis
4. Describe the balance sheet and operating income management.
5. Report different types of marketing analysis.
6. Illustrate market needs.
7. Recognize and control pharmacy business.
8. Manage the relationship with customers
9. Handle of balance sheet and operating income management
10. Analyze product life cycle
11. Assess Marketing plan and planning.
12. Assess Stock management skills.
13. Employ good selling and negotiation skills.
14. Retrieve curriculum vitae.
15. Develop good relationships with the customers.
16. Arrange Presentation and interviewing skills.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	**a1-**	Learn the importance of pharmaceutical marketing in business

A5-	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic	**a2-**	Know the importance of promotional activities in healthcare.
		a3-	Identify different types of pharmaceutical marketing analysis
	products as well as ethics of health care..	**a4-**	Describe the balance sheet and operating income management.
		a5-	Report different types of marketing analysis.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures brainstorming and discussion	▪ Attendance ▪ Written and oral exams ▪ Quiz and Small Projects
a1-	Learn the importance of pharmaceutical marketing in business		
a2-	Know the importance of promotional activities in healthcare.		
a3-	Identify different types of pharmaceutical marketing analysis		
a4-	Describe the balance sheet and operating income management.		
a5-	Report different types of marketing analysis.		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Illustrate market needs.

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B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research	**b2-**	Recognize and control pharmacy business.
B5	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b3-**	Manage the relationship with customers.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, discussion and brain storm	Written , report and oral exams
b1-	Illustrate market needs.		
b2-	Recognize and control pharmacy business.		
b3-	Manage the relationship with customers.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in preformulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Handle of balance sheet and operating income management
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Analyze product life cycle
		c3-	Assess Marketing plan and planning.
		c4-	Assess Stock management skills.

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		c5-	Employ good selling and negotiation skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		- Lectures, discussion and brain storm	- Written and oral exams
c1	Handle of balance sheet and operating income management		
c2	Analyze product life cycle		
c3	Assess Marketing plan and planning.		
c4	Assess Stock management skills.		
c5	Employ good selling and negotiation skills.		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D2-	Employ proper documentation and filing systems in different pharmaceutical fields	**d1-**	Retrieve curriculum vitae.
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2**	Develop good relationships with the customers.
D4-	Take responsibility for adaptation to change needs in pharmacy practice.	**d3**	Arrange Presentation and interviewing skills.
D5-	Apply information and communication technology and working effectively in a team		

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Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures and discussion	Reports, project, Written and oral exams
d1-	Retrieve curriculum vitae.		
d2	Develop good relationships with the customers.		
d3	Arrange Presentation and interviewing skills.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmaceutical marketing	**a1, b1**	Methods of Economic Evaluation	**1**	**2**
2	Marketing definition and importance	**a3, b1,a2**	The professional sales person	**1**	**2**
3	pharmaceutical Marketing promotional mix and promotional activities in the	**a2**	Communication	**1**	**2**
4	Element of pharmaceutical marketing plan and planning	**b1, c3**	Marketing Plain and Marketing Mix	**1**	**2**
5	pharmaceutical Marketing analysis	**a3, a5**	Selling	**1**	**2**
6	Management of product life cycle	**c2**	Definitions, classifications	**1**	**2**

7	Mid-term exam	**a1-5, b1, c2-3**		**1**	**2**
8	Finance and accounting – relationship between marketing and finance	**b1, b2**	Electronic Information Management	**1**	**2**
9	Managing profitability of business/brand	**b2**	Definitions, classifications	**1**	**2**
10	Balance sheet and operating income management	**a4, c1**	Definitions, classifications	**1**	**2**
11	Pharmacy management- category management	**c2, c5**	Definitions, classifications	**1**	**2**
12	Merchandizing and stock management	**b2, c4**	Definitions, classifications	**1**	**2**
13	Skills development- selling and negotiation skills	**b3, c5,d2,d3**	Definitions, classifications	**1**	**2**
14	Interviewing skills	**b3, b2, b3**	Applications	**1**	**2**
15	Writing Curriculum Vitae	**d1**	Professional Writing	**1**	**2**
16	Final-term exam	**a1-5, b1-3, c1-5**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-5, b1-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-5, d1-3**		

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VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation, reports	All weeks	**10**	10%	**a1-5, b2-3, c1, c4-5,d1-3**
2	Written Mid exam, Oral exam, reports, projects	2-14	**30**	30%	**a1-5, b1, c2-3**
3	Written Final exam	16th	**60**	60%	**a1-5, b1-3, c1-5**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

A book prepared by the staff members

Mickey C. Smith., 1991, Pharmaceutical Marketing: Strategy and cases. Haworth Press Inc .

2- Recommended Readings and Reference Materials

.: Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.

Kotler, Philip, and Gary Armstrong., 2010, Principles of marketing. Pearson Education,.

3- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com http://www.wikipedia.com https://scholar.google.com.eg/
4- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching	
	▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
	▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	

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	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.

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2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Marketing

I. - Information about Faculty Member Responsible for the Course:		
Name of Faculty Member	Prof Dr/ Mahmoud Mahyoob Alburyhi	Office Hours

Location & Telephone No.	777970600	SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com			2hrs	2hrs		

II. Course Identification and General Information:

1-	Course Title:	Pharmaceutical Marketing				
2-	Course Number & Code:	Ph21027				
3-	Credit hours: 2hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	-	-		2
4-	Study level/year at which this course is offered:	Fifth year/Second semester				
5-	Pre –requisite (if any):	Pharmaceutics I-IV- Drug Delivery Systems				
6-	Co –requisite (if any):					
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

III. Course description:

Understand the fundamental aspects of marketing and promotional activities in the healthcare sector. -Point out the relationship between marketing and finance. -Understand the fundamental aspects of pharmacy management. Develop good selling and negotiation skills.

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Learn the importance of pharmaceutical marketing in business
2. Know the importance of promotional activities in healthcare.
3. Identify different types of pharmaceutical marketing analysis
4. Describe the balance sheet and operating income management.
5. Report different types of marketing analysis.
6. Illustrate market needs.
7. Recognize and control pharmacy business.
8. Manage the relationship with customers
9. Handle of balance sheet and operating income management
10. Analyze product life cycle
11. Assess Marketing plan and planning.
12. Assess Stock management skills.
13. Employ good selling and negotiation skills.
14. Retrieve curriculum vitae.
15. Develop good relationships with the customers.
16. Arrange Presentation and interviewing skills.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to pharmaceutical marketing	**a1, b1**	Methods of Economic Evaluation	**1**	**2**
2	Marketing definition and importance	**a3, b1,a2**	The professional sales person	**1**	**2**
3	pharmaceutical Marketing promotional mix and promotional activities in the	**a2**	Communication	**1**	**2**
4	Element of pharmaceutical marketing plan and planning	**b1, c3**	Marketing Plain and Marketing Mix	**1**	**2**
5	pharmaceutical Marketing analysis	**a3, a5**	Selling	**1**	**2**

6	Management of product life cycle	**c2**	Definitions, classifications	**1**	**2**
7	Mid-term exam	**a1-5, b1, c2-3**		**1**	**2**
8	Finance and accounting – relationship between marketing and finance	**b1, b2**	Electronic Information Management	**1**	**2**
9	Managing profitability of business/brand	**b2**	Definitions, classifications	**1**	**2**
10	Balance sheet and operating income management	**a4, c1**	Definitions, classifications	**1**	**2**
11	Pharmacy management- category management	**c2, c5**	Definitions, classifications	**1**	**2**
12	Merchandizing and stock management	**b2, c4**	Definitions, classifications	**1**	**2**
13	Skills development- selling and negotiation skills	**b3, c5,d2,d3**	Definitions, classifications	**1**	**2**
14	Interviewing skills	**b3, b2, b3**	Applications	**1**	**2**
15	Writing Curriculum Vitae	**d1**	Professional Writing	**1**	**2**
16	Final-term exam	**a1-5, b1-3, c1-5**		**1**	**2**
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark

1	Homework Assignments	**a1-5, b1-3, d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-5, d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Quizzes, Attendance, Participation, reports	All weeks	**10**	10%	**a1-5, b2-3, c1, c4-5,d1-3**
2	Written Mid exam, Oral exam, reports, projects	2-14	**30**	30%	**a1-5, b1, c2-3**
3	Written Final exam	16th	**60**	60%	**a1-5, b1-3, c1-5**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2hrs/week	

X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

A book prepared by the staff members

Mickey C. Smith., 1991, Pharmaceutical Marketing: Strategy and cases. Haworth Press Inc .

6- Recommended Readings and Reference Materials

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	.: Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London. Kotler, Philip, and Gary Armstrong., 2010, Principles of marketing. Pearson Education,.
7- Electronic Materials and Web Sites *etc*.	
	www.pubmed.com http://www.sciencedirect.com http://www.wikipedia.com
	https://scholar.google.com.eg/
8- Other Learning Material:	
	J. Pharm. Sci Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

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	▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	
	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

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XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.
	▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Pharmacoepidemiology & Pharmacovigilance

I. Course Identification and General Information:							
1	Course Title:	Pharmacoepidemiology & Pharmacovigilance					
2	Course Number & Code:	Ph21028					
3	Credit hours: 2hrs	C.H				Total	
		Theoretical	Practical	Training	Seminar		
		2				2	
4	Study level / semester at which course is offered:	Level: - Fifth years/ Second Semester					
5	Pre –requisite (if any):	Pharmaceutics I,II,III and IV, Pharmacy care, Clinical pharm, ,pharmacokinetics, advanced drug delivery systems, Pharmaceutical Marketing, Applied and Evaluation of Pharmaceutical Research, Pharmaceutical Biostatistics, Pharmacy Management					
6	Co –requisite (if any):	-					
7	Programs in which course is offered:	Bachelor of Pharmacy					
8	Language of teaching the course:	English					
9	Department in which course is offered:	Pharmaceutics and Industrial Pharmacy					
10	Location of teaching the course:	Faculty of Pharmacy- Sana`a University					
11	Prepared by:	Prof. Dr. Maged Alwan					
12	Date of approval:						

II. Course description:

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This course covers the fundamentals of drug safety and pharmacoepidemiology, pharmacovigilance, including regulatory requirements, adverse event reporting, signaling reports and risk management. Also provide learners with regulatory references, processes, best practices, and analysis and investigation techniques to minimize risk, avoid product recall, and meet authorities safety reporting standards

III. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Demonstrate the basic knowledge of pharmacoepidemiology, pharmacovigilance and the principles of regulatory framework for clinical drug safety;
2. Describe good clinical trials and pharmacovigilance practice
3. Describe the concepts of , pharmacoepidemiology, pharmacovigilance and assessment
4. Describe the different types of adverse drug reactions and the variables that affect their incidence and severity.
5. Develop standard operating procedures for pharmacovigilance activities.
6. Plan pharmacovigilance activities.
7. Develop risk-benefit assessment procedures.
8. Assess seriousness, expectedness and causality of adverse drug events..
9. Utilize the different sources of pharmaceutical information.
10. Analysis all the encountered pharmaceutical problems and plan the strategies for their solution.
11. Use a protocol for assessment of pharmacovigilance activities.
12. Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.
13. Conduct research studies and utilize the results in different pharmaceutical fields.
14. Retrieve information from a variety of sources, including libraries, databases and internet.
15. Apply information and communication technology and work independently or as a part of team in different pharmacovigilance fields.
16. Implement presentation, writing reports and interviewing skills.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Demonstrate the basic knowledge of pharmacoepidemiology, pharmacovigilance and the principles of regulatory framework for clinical drug safety;
A3-	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a2-**	Describe good clinical trials and pharmacovigilance practice.
		a3	Describe the concepts of pharmacoepidemiology, pharmacovigilance and assessment
		a4	Describe the different types of adverse drug reactions and the variables that affect their incidence and severity

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		▪ Lectures brainstorming and discussion	▪ Attendance ▪ Written and oral exams ▪ Quiz and Small Projects
a1-	Demonstrate the basic knowledge of pharmacoepidemiology, pharmacovigilance and the principles of regulatory framework for clinical drug safety;		
a2-	Describe good clinical trials and pharmacovigilance practice.		
a3	Describe the concepts of pharmacoepidemiology, pharmacovigilance and assessment		

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a4	Describe the different types of adverse drug reactions and the variables that affect their incidence and severity		

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		**Course Intended Learning Outcomes (CILOs) of Intellectual Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B2-	Categorize the synthetic and natural drugs according to their mechanism of action,	**b1-**	Develop standard operating procedures for pharmacovigilance activities;
	systemic effect, therapeutic uses, contraindication and toxicity.		
B5-	5. Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	**b2-**	Plan pharmacovigilance activities;
		b3-	Develop risk-benefit assessment procedures;
		b4	Assess seriousness, expectedness and causality of adverse drug events.
		b5	Utilize the different sources of pharmaceutical information. .
		b6	Analysis all the encountered pharmaceutical problems and plan the strategies for their solution.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		Lectures, discussion and brain storming	Written , report and oral exams
b1-	Develop standard operating procedures for pharmacovigilance activities;		
b2-	Plan pharmacovigilance activities;		
b3-	Develop risk-benefit assessment procedures;		

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b4	Assess seriousness, expectedness and causality of adverse drug events.		
b5	Utilize the different sources of pharmaceutical information. .		
b6	Analysis all the encountered pharmaceutical problems and plan the strategies for their solution.		

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c1-**	Use a protocol for assessment of pharmacovigilance activities
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	**c2-**	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.
		c3-	Conduct research studies and utilize the results in different pharmaceutical fields

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures, Problem solving sessions, tutorials, discussion and brain storming	Written and oral exams
c1-	Use a protocol for assessment of pharmacovigilance activities		

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c2-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.		
c3-	Conduct research studies and utilize the results in different pharmaceutical fields		

(D) General / Transferable Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Practice independent learning needed for continuous professional Development	**d1-**	Retrieve information from a variety of sources, including libraries, databases and internet.
D4-	Take responsibility for adaptation to change needs in pharmacy practice	**d2**	Apply information and communication technology and work independently or as a part of team in different pharmacovigilance
			fields.
D5-	Apply information and communication technology and working effectively in a team.	**d3**	Implement presentation, writing reports and interviewing skills.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		Lectures and discussion	Reports, project, Written and oral exams
d1-	Retrieve information from a variety of sources, including libraries, databases and internet.		

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d2	Apply information and communication technology and work independently or as a part of team in different pharmacovigilance fields.		
d3	Implement presentation, writing reports and interviewing skills.		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to Pharmacoepidemiology & Pharmacovigilance	a1,a2, b1-4,c1-3, d13	Definition, causes, spreading, , classification	**1**	**2**
2	Harmful effect of medication and the ways of prevention	a1, b4, c1-3, d1-3	Definition, causes, spreading, Thalidomide, classification	**1**	**2**
3	Pharmacoepidemiology & Pharmacovigilance	a3,b1-3 ,c1-3, d1-3	- Definition, why, aim, main objectives, specific objectives of Pharmacoepidemiology	1	2

			& Pharmacovigilance. - Spontaneous Reporting, aim, strength and weakness of Spontaneous Reporting, other reporting, - Identification of harmful effect of medication, Evaluation of reports - Types of evaluation reports, What we record in the harmful effect of medication reports, example of harmful effect of medication.		
4	Role health professional in Pharmacovigilance	a4, b4, b5,c1-3, d1-3	- Systems of submitting Pharmacovigilance reports, objective of - Spontaneous Reporting, factors considered in shortage of submitted reports. - The perticpation of the health care team and health professional on interaction and communication on harmful effect	1	2
5	Roles of patient and consumer notification about the harmful effects of medication	a3, b3, b4,b5,c1-3, d1-3	- Benefits and positivity. - Quality of patients reports. - Importance of patients and consumers for the adverse effect of medicine	1	2

6	How to create and resolve pharmaceutical center	a4,b2, b5,b6 ,c1-3, d1-3	Objective of Pharmacovigilance	1	2
			centers, Function of Pharmacovigilance centers, The main steps for stablishment of Pharmacovigilance centers, Practical application to organize the center for Pharmacovigilance quality. Staff, equipment, etc…		
7	**Mid. Exam.**	**a1-4, b1-6,c1-3**		1	2
8	Methods used in Pharmacovigilance	a2-4,b1, b2,b6,c1-3, d1-3	- Passive surveillance. - Stimulated reporting. - Active surveillance. - Comparative observational studies. - Targeted clinical investigations. - Descriptive studies.	2	4
9	Signal identification in pharmacovigilance	a2-3,b3, b4,b6,c1-3, d1-3	- Definition of Signal. - References sources on negative responses. - Test cafeteria for events that are verified. - Ways to determine the signal. - Clinical evaluation of individual events. - Strengthen the signals.	1	2
10	Evaluation of the causal relationship in the pharmacovigilance.	a1-3,b2, b4,b5,c1-3, d1-3	Introduction Evaluation of individual situation.	1	2

11	Contact in pharmacovigilance	a2,a3,b3, b4,b5,c1-3, d1-3	- Knowledge of basic skills.	1	2
12	New information - Sources of pharmacovigilance	a2,a3,b1, b2,b4,c1-3, d1-3	Update information of Pharmacoepidemiology & Pharmacovigilance	1	2
13	Pharmacovigilance prospects	a1-4, b2-6,c1-3, d1-3	- Pharmacovigilance in national pharmaceutical policy - Elements of Pharmacovigilance in national pharmaceutical policy. - Pharmacovigilance in regulation of pharmaceutical trading. - Pharmacovigilance in clinical practice. - Future prospective of Pharmacovigilance in the Arab world.	2	4
16	Final Exam.	**a1-4, b1-6,c1-3**		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark

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1	Homework Assignments	**a1-4, b1-6,d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3,d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-15**	**10**	10%	**a1-4, b1-6,c1-3,d1-3**
2	**Assignments**	1-15	**10**	10%	**a1-4, b1-6,c1-3,d1-3**
3	**Mid-semester exam**	**7**	**20**	20%	**a1-4, b1-6,c1-3**
5	**Final Exam**	**16**	**60**	60%	**a1-4, b1-6,c1-3**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

1. Notes on Pharmacovigilance prepared by department staff members.
2. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
3. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.
4. Janet woodcock M:D ,2017, Drug Safety, FDA. www.fda.gov

2- Recommended Readings and Reference Materials

5. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
6. Modern Pharmaceutics, 3rd edn. (1999) (Eds Banker, G.S., Rhodes, C.T.) Marcel Dekker.

3- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com www.fda.gov

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
2 - Computing resources:	- Computer laboratory with internet facilities.

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XII. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

5- Procedures for periodically reviewing of course effectiveness and planning for improvement

- Student rating and feedback
- Peer rating and feedback
- Regular meeting of the Curriculum Committee of the faculty.

6- Course development plans

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	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty.
	▪ Absence from assignments or exams will dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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Course Plan of Pharmacoepidemiology & Pharmacovigilance

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Prof. Dr. Maged Alwan	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Identification and General Information:						
1-	Course Title:	Pharmacoepidemiology & Pharmacovigilance				
2-	Course Number & Code:	Ph21028				
3-	Credit hours: 2hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	

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		2	-	-		2
4-	**Study level/year at which this course is offered:**	5th year/Second semester				
5-	**Pre –requisite (if any):**	Pharmaceutics I,II,III and IV, Pharmacy care, Clinical pharm, ,pharmacokinetics, advanced drug delivery systems, Pharmaceutical Marketing, Applied and Evaluation of Pharmaceutical Research, Pharmaceutical Biostatistics, Pharmacy Management				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy-Sana'a University				

III. Course description:

This course covers the fundamentals of drug safety and pharmacoepidemiology, pharmacovigilance, including regulatory requirements, adverse event reporting, signaling reports and risk management. Also provide learners with regulatory references, processes, best practices, and analysis and investigation techniques to minimize risk, avoid product recall, and meet authorities safety reporting standards

IV. Intended learning outcomes (ILOs) of the course:

At the end of this course, the students will be able to:

1. Demonstrate the basic knowledge of pharmacoepidemiology, pharmacovigilance and the principles of regulatory framework for clinical drug safety;
2. Describe good clinical trials and pharmacovigilance practice
3. Describe the concepts of , pharmacoepidemiology, pharmacovigilance and assessment
4. Describe the different types of adverse drug reactions and the variables that affect their incidence and severity.
5. Develop standard operating procedures for pharmacovigilance activities.
6. Plan pharmacovigilance activities.
7. Develop risk-benefit assessment procedures.
8. Assess seriousness, expectedness and causality of adverse drug events..
9. Utilize the different sources of pharmaceutical information.
10. Analysis all the encountered pharmaceutical problems and plan the strategies for their solution.
11. Use a protocol for assessment of pharmacovigilance activities.
12. Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.
13. Conduct research studies and utilize the results in different pharmaceutical fields.
14. Retrieve information from a variety of sources, including libraries, databases and internet.
15. Apply information and communication technology and work independently or as a part of team in different pharmacovigilance fields.
16. Implement presentation, writing reports and interviewing skills.

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours

1	Introduction to Pharmacoepidemiology & Pharmacovigilance	a1,a2, b1-4,c1-3, d13	Definition, causes, spreading, , classification	**1**	**2**
2	Harmful effect of medication and the ways of prevention	a1, b4, c1-3, d1-3	Definition, causes, spreading, Thalidomide, classification	**1**	**2**
3	Pharmacoepidemiology & Pharmacovigilance	a3,b1-3 ,c1-3, d1-3	- Definition, why, aim, main objectives, specific objectives of Pharmacoepidemiology & Pharmacovigilance. - Spontaneous Reporting, aim, strength and weakness of Spontaneous Reporting, other reporting, - Identification of harmful effect of medication, Evaluation of reports - Types of evaluation reports, What we record in the harmful effect of medication reports, example of harmful effect of medication.	1	2
4	Role health professional in Pharmacovigilance	a4, b4, b5,c1-3, d1-3	- Systems of submitting Pharmacovigilance reports, objective of - Spontaneous Reporting, factors considered in	1	2

			shortage of submitted reports. - The perticpation of the health care team and health professional on interaction and communication on harmful effect		
5	Roles of patient and consumer notification about the harmful effects of medication	a3, b3, b4,b5,c1-3, d1-3	- Benefits and positivity. - Quality of patients reports. - Importance of patients and consumers for the adverse effect of medicine	1	2
6	How to create and resolve pharmaceutical center	a4,b2, b5,b6 ,c1-3, d1-3	Objective of Pharmacovigilance centers, Function of Pharmacovigilance centers, The main steps for stablishment of Pharmacovigilance centers, Practical application to organize the center for Pharmacovigilance quality. Staff, equipment, etc…	1	2
7	**Mid. Exam.**	**a1-4, b1-6,c1-3**		1	2
8	Methods used in Pharmacovigilance	a2-4,b1, b2,b6,c1-3, d1-3	- Passive surveillance. - Stimulated reporting. - Active surveillance. - Comparative observational studies. - Targeted clinical investigations. - Descriptive studies.	2	4

9	Signal identification in pharmacovigilance	a2-3,b3, b4,b6,c1-3, d1-3	- Definition of Signal. - References sources on negative responses. - Test cafeteria for events that are verified. - Ways to determine the signal. - Clinical evaluation of individual events. - Strengthen the signals.	1	2
10	Evaluation of the causal relationship in the pharmacovigilance.	a1-3,b2, b4,b5,c1-3, d1-3	Introduction Evaluation of individual situation.	1	2
11	Contact in pharmacovigilance	a2,a3,b3, b4,b5,c1-3, d1-3	- Knowledge of basic skills.	1	2
12	New information - Sources of pharmacovigilance	a2,a3,b1, b2,b4,c1-3, d1-3	Update information of Pharmacoepidemiology & Pharmacovigilance	1	2
13	Pharmacovigilance prospects	a1-4, b2-6,c1-3, d1-3	- Pharmacovigilance in national pharmaceutical policy - Elements of Pharmacovigilance in national pharmaceutical policy. - Pharmacovigilance in regulation of pharmaceutical trading. - Pharmacovigilance in clinical practice. - Future prospective of Pharmacovigilance in the Arab world.	2	4
16	Final Exam.	**a1-4, b1-6,c1-3**		1	2

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Number of Weeks /and Units Per Semester	16	32

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions**,** tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	**a1-4, b1-6,d1-3**	Sporadic through the semester	**10**
2	Reports	**c1-3,d1-3**		

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation and quizzes**	**1-15**	**10**	10%	**a1-4, b1-6,c1-3,d1-3**
2	**Assignments**	1-15	**10**	10%	**a1-4, b1-6,c1-3,d1-3**
3	**Mid-semester exam**	**7**	**20**	20%	**a1-4, b1-6,c1-3**
5	**Final Exam**	**16**	**60**	60%	**a1-4, b1-6,c1-3**
	Total		**100**	**100%**	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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X. Learning Resource (MLA style or APA style)S:

5- Required Textbook(s) (maximum two)

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7. Notes on Pharmacovigilance prepared by department staff members.
8. Ansel; H.C., (2011) Pharmaceutical Dosage Forms and drug Delivery Systems'. 9th ed ,Lea Febiger; Philadelphia; London.
9. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editio Churchill Livingstone, Edinburgh.
10. Janet woodcock M:D ,2017, Drug Safety, FDA. www.fda.gov

6- Recommended Readings and Reference Materials

11. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition, Pharmaceutical Press, London.
12. Modern Pharmaceutics, 3rd edn. (1999) (Eds Banker, G.S., Rhodes, C.T.) Marcel Dekker.

7- Electronic Materials and Web Sites *etc*.

www.pubmed.com
http://www.sciencedirect.com www.fda.gov

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics

XI. Facilities Required:

- Well-equipped lecture halls with data show facilities, whiteboards,

1 - Accommodation:	net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.

XII. Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
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	▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Specification of Research project

I. Course Identification and General Information:

1	**Course Title**	Research project				
2	**Course Number & Code:**	Ph9102				
3	**Credit hours:**	**C.H**				**Total**
		Th.	**Pr.**	**Tr.**	**Seminar.**	
		-	**4**			**2**
4	**Study level/ semester at which this course is offered:**	5th level /2nd semester				
5	**Pre –requisite (if any):**	Applied and Evaluation of Pharmaceutical Research, Pharmaceutical Biostatistics and all specialized courses				
6	**Co –requisite (if any):**	-				
7	**Program (s) in which the course is offered:**	Bachelor of pharmacy				
8	**Language of teaching the course:**	English				
9	**The department in which the course is offered:**	All faculty departments				
10	**Location of teaching the course:**	Faculty of pharmacy- Sana`a University				
11	**Prepared by:**	Associate Prof. Dr. Tawfeek A. Al-Obaidy				
12	**Date of approval:**					

II. Course description:

The course is concerned with the providing the students with fundamental knowledge about various pharmaceutical fields to participate in solving health problems through practical research project. It demonstrates the skills of data collecting, research proposals, writing, implementation and presentation of the pharmaceutical research project.

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II. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Demonstrate the research ideas, aims and its importance in solving the health problems.
2. Illustrate all stages of the research process from the preparation, planning, management, execution of their work, analysis and dissemination of results
3. Determine different and updated sources of data.
4. Recognize the principles and guidelines of research ethics
5. Use language properly to write different types of reports and pharmaceutical research project.
6. Develop and enhance rational thinking to design a research plan and protocol.
7. Identify the encountered problems and suggest reasonable scientific solutions.
8. Explore and select the validated experimental techniques and methods for the pharmaceutical research field.
9. Interpret experimental data and results based on relevant pharmaceutical and statistical principles.
10. Apply knowledge of basic and applied pharmaceutical sciences to solve health problems
11. Operate different pharmaceutical equipments and instruments safely to implement properly the experimental procedures in the field of the pharmaceutical research project.
12. Outline of all parts of the research project and write them properly.
13. Record, analyze and interpret the obtained results
14. Efficiently use computer and internet to gather up-to-date information and gain knowledge about pharmaceutical, clinical and other drug information from different sources.
15. Work independently or collaboratively to prepare seminars/ presentations or write reports and research project.
16. Generate effective and reasonable solutions for rising problems based on the available information.

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IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		**After participating in the course, students would b able to:**	
A1.	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	**a1-**	Demonstrate the research ideas, aims and its importance in solving the health problems.
A2.	Recognize the physicochemical properties, preparation, structure activity relationship (SAR), toxicity and the modern methods of analysis of various substances of chemical and natural products of therapeutic potential as well as the basic principle of drug discovery, design and development.	**a2-**	Illustrate all stages of the research process from the preparation, planning, management, execution of their work, analysis and dissemination of results
		a3-	Determine different and updated sources of data.
A3.	Describe the general cellular, biochemical and physiological aspects of human body and recognize the pharmacokinetics, pharmacodynamics, disease pathophysiology, and pharmacogenetic of therapeutic agents to provide pharmaceutical care and facilitate management of patient's medication, rationalize drug use and overall health needs.	**a4-**	Recognize the principles and guidelines of research ethics
		a5-	Use language properly to write different types of reports and pharmaceutical research project.
A4.	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.		

A5.	Demonstrate the basic knowledge of pharmacoecnomics, pharmacovigilence, policy, legislation, marketing, administration and distribution of pharmaceutical and cosmetic products as well as ethics of health care.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Demonstrate the research ideas, aims and its importance in solving the health problems.	Practical sessions Brainstorming Discussion sessions Field visits Research assignment, Problem solving sessions.	Quizzes, Attendance, Participation, Short answers, reports, homework oral exam Discussion
a2-	Illustrate all stages of the research process from the preparation, planning, management, execution of their work, analysis and dissemination of results		
a3-	Determine different and updated sources of data.		presentation
a4-	Recognize the principles and guidelines of research ethics		
a5-	Use language properly to write different types of reports and pharmaceutical research project.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub- PILOs) in Intellectual skills	Course Intended Learning Outcomes (CILOs) of Intellectual Skills

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After completing this program, students would be able to:		After participating in the course, students would be able to:	
B1.	Consolidate the chemical, biochemical and physiological principles to construct the n pharmacophores of the structure and their effect on the stability,pharmacokinetic and pharmacodynamic profiles of the drug.	**b1-**	Develop and enhance rational thinking to design a research plan and protocol.
B2.	Categorize the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity.	**b2-**	Identify the encountered problems and suggest reasonable scientific solutions.
		b3-	Explore and select the validated experimental techniques and methods for the pharmaceutical research field.
B3.	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.		
B4.	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing	**b4-**	Interpret experimental data and results based on relevant pharmaceutical and statistical principles.
B5.	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

*Course Intended Learning Outcomes (*CILOs*) in* Intellectual Skills. After participating in the course, students would be able to:		Teaching strategies/methods to be used.	*Methods of assessment*
b1-	Develop and enhance rational thinking to design a research plan and protocol.	Practical sessions Brainstorming Discussion sessions Field visits	Attendance, reports, Participation, homework and oral exam.
b2-	Identify the encountered problems and suggest reasonable scientific solutions.		

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b3-	Explore and select the validated experimental techniques and methods for the pharmaceutical research field.	Research assignment, Problem solving sessions.	
b4-	Interpret experimental data and results based on relevant pharmaceutical and statistical principles.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students would be able to:		**After participating in the course, students would be able to:**	
C1-	Operate different pharmaceutical equipments and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to GLP, GSP and cGMP guidelines.	**c1-**	Apply knowledge of basic and applied pharmaceutical sciences to solve health problems
C2-	Handle and dispose chemicals and pharmaceutical	**c2-**	Operate different pharmaceutical equipments and instruments safely to implement properly the experimental procedures in the field of the pharmaceutical research project.
	preparations including radiopharmaceuticals safely and effectively.	**c3-**	Outline of all parts of the research project and write them properly.
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use.		
C4-	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.	**c4-**	Record, analyze and interpret the obtained results.

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C5-	Conduct research studies and utilize the results in different pharmaceutical fields.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Apply knowledge of basic and applied pharmaceutical sciences to solve health problems	Practical sessions Brainstorming Discussion sessions Field visits Research assignment	Observation, Practical Works, Homework, Practical Exam Practical Reports Discussion presentation
c2-	Operate different pharmaceutical equipments and instruments safely to implement properly the experimental procedures in the field of the pharmaceutical research project.		
c3-	Outline of all parts of the research project and write them properly.		
c4-	Record, analyze and interpret the obtained results.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills

Program Intended Learning Outcomes (PILOs) in General / Transferable skills		Course Intended Learning Outcomes (CILOs) in General / Transferable skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
D1.	Practice independent learning needed for continuous professional development	**d1-**	Efficiently use computer and internet to gather up-to-date information and gain knowledge

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D2.	Employ proper documentation and filing systems in different pharmaceutical fields		about pharmaceutical, clinical and other drug information from different sources.
D3.	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	**d2-**	Work independently or collaboratively to prepare seminars/ presentations or write reports and research project.
D4.	Take responsibility for adaptation to change needs in pharmacy practice.	**d3-**	Generate effective and reasonable solutions for rising problems based on the available information.
D5.	Apply information and communication technology and working effectively in a team.		

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills **After participating in the course, students would be able to:**		**Teaching strategies/methods to be used.**	**Methods of assessment**
d1-	Efficiently use computer and internet to gather up-to-date information and gain knowledge about pharmaceutical, clinical and other drug information from different sources.	Practical sessions Discussion sessions Field visits Research assignment Problem solving sessions.	Homework Discussion presentation and reports.
d2-	Work independently or collaboratively to prepare seminars/ presentations or write reports and research project.		
d3-	Generate effective and reasonable solutions for rising problems based on the available information.		

V. Course Content:

1 - Practical Aspect

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Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1)	Planning, protocol and setting up the pharmaceutical research project; Aims and objectives and the rationale of the research project Literature review and preliminary fieldwork Ethical issues	a1, a2, a4, b1,b2, c1, d1	2	4
2)	Data Collection and sources of information and how to read papers, journals……	a3, b1, b2, d1	2	4
3)	Discussion and seminar for the research proposal before the execution of the pharmaceutical research project.	a1-2, b2, d2	1	2
4)	The experimental work	a2-4, b3,c2-3,	3	6
5)	Interpretation and analysis and discussion of the obtained results	b2, b4, c4, d3	3	6
6)	**Writing the pharmaceutical research project:** Writing the title and the cover page. Writing the Abstract: Writing the Introduction Writing the Aim and Objectives. Writing the Research Methods and experimental part Writing the Results Writing the discussion of the results Writing the Conclusion Writing the Recommendation Writing the Bibliography Writing Arabic Summary	a3-5, b2,c3, d2-3	3	6
7)	Final Project Presentation Practical and Oral Discussion	b4, d2,	2	4
Number of Weeks /and Units Per Semester			**16**	**32**

VI. a-Teaching strategies of the course:

Practical sessions, Brainstorming, Discussion sessions, Field visits, Research assignment and Problem solving sessions.

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b- Assessment Methods:
Quizzes, Attendance, Participation, homework, oral exam Practical works, practical exam, discussion, presentation and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a1,a2, a4, b1, c1-2, d1-3	Sporadic through the semester	**20**
2	Reports	a1-a3, a5, b2-3, c3-4, d1-3		

II. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1.	Attendance, Quizzes, Participation, homework, oral exam Practical works, practical exam, discussion, presentation and practical reports.	**All Weeks**	70	70%	a1-5, b1-4, c1-4, d1-3
2.	Final discussion and presentation	Sporadic through the semester	30	30%	a1-5, b1-4, c1-4, d2
	Total		**100**	**100%**	

V

الموصف
ا.م.د.توفيق العبيدي

نائب العميد لشؤون الجودة
ا.د. محمود البريهي

رئيس القسم

عميد الكلية
د.خالد الشوبة

عميدة مركز التطوير وضمان الجودة
ا.م.د. هدى العماد

رئيس الجامعة
ا.د. القاسم محمد عباس

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III. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

IX. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Mark C Stuart, (2007), The Complete Guide to Medical Writing, Pharmaceutical Press, London, UK. Felicity Smith, Sally-Anne Francis, Ellen Schafheutle, (2008), International Research in Healthcare, Pharmaceutical Press, London, UK.
-Aparasu R, (2010), Research Methods for Pharmaceutical Practice and Policy, 1st edition, Pharmaceutical Press, London, UK.
- Babar Z, (2015), Pharmacy Practice Research Methods, 1st edition , ADIS, Switzerland.
- Stuart MC, (2007), The complete guide to medical writing, 1st edition, Pharmaceutical Press, London. - Trisha Greenhalgh, (2014), How to Read a Paper; The Basics of Evidence-Based Medicine, 5th edition, John Wiley & Sons, Oxford, UK.

2- Recommended Readings and Reference Materials

Notes and instructions prepared by research supervisors.

3- Essential References

4- Electronic Materials and Web Sites *etc*.

All web sites, papers, journals of pharmaceutical sciences

5- Other Learning Material:

Study tour :

X. Facilities Required:

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1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

2 - Computing resources:	- Computer laboratory with internet facilities.

XI. Course Improvement Processes:

1- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

2- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

3- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

4- Processes for verifying standards of students' achievement

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	▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback
	▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.

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4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Research project

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Tawfeek A. Al-Obaidy	**Office Hours**					
Location & Telephone No.	770507931	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Tawfik_93@yahoo.com						

II- Course Identification and General Information:			
1-	**Course Title:**	Research project	
2-	**Course Number & Code:**	Ph9102	
3-	**Credit hours:**	**C.H**	**Total**

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		Th.	Seminar	Pr.	F. Tr.	
			-	4		2
4-	**Study level/year at which this course is offered:**	5th level /2nd semester				
5-	**Pre –requisite (if any):**	Applied and Evaluation of Pharmaceutical Research, Pharmaceutical Biostatistics and all specialized courses				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of pharmacy				
8-	**Language of teaching the course:**	English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**	Regular				
11-	**Location of teaching the course:**	Faculty of Pharmacy- Sana`a university				

III- Course description:

The course is concerned with the providing the students with fundamental knowledge about various pharmaceutical fields to participate in solving health problems through practical research project. It demonstrates the skills of data collecting, research proposals, writing, implementation and presentation of the pharmaceutical research project.

IV- Intended learning outcomes (ILOs) of the course:

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At the end of this course the students should be able to:

17. Demonstrate the research ideas, aims and its importance in solving the health problems.
18. Illustrate all stages of the research process from the preparation, planning, management, execution of their work, analysis and dissemination of results
19. Determine different and updated sources of data.
20. Recognize the principles and guidelines of research ethics
21. Use language properly to write different types of reports and pharmaceutical research project.
22. Develop and enhance rational thinking to design a research plan and protocol.
23. Identify the encountered problems and suggest reasonable scientific solutions.
24. Explore and select the validated experimental techniques and methods for the pharmaceutical research field.
25. Interpret experimental data and results based on relevant pharmaceutical and statistical principles.
26. Apply knowledge of basic and applied pharmaceutical sciences to solve health problems
27. Operate different pharmaceutical equipments and instruments safely to implement properly the experimental procedures in the field of the pharmaceutical research project.
28. Outline of all parts of the research project and write them properly.
29. Record, analyze and interpret the obtained results
30. Efficiently use computer and internet to gather up-to-date information and gain knowledge about pharmaceutical, clinical and other drug information from different sources.
31. Work independently or collaboratively to prepare seminars/ presentations or write reports and research project.
32. Generate effective and reasonable solutions for rising problems based on the available information.

V- Course Content:

1 - Practical Aspect

Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours

8)	Planning, protocol and setting up the pharmaceutical research project; Aims and objectives and the rationale of the research project Literature review and preliminary fieldwork Ethical issues	a1, a2, a4, b1,b2, c1, d1	1,2	4
9)	Data Collection and sources of information and how to read papers, journals……	a3, b1, b2, d1	3,4	4
10)	Discussion and seminar for the research proposal before the execution of the pharmaceutical research project.	a1-2, b2, d2	5	2
11)	The experimental work	a2-4, b3,c2-3,	6-8	6
12)	Interpretation and analysis and discussion of the obtained results	b2, b4, c4, d3	9-11	6
13)	**Writing the pharmaceutical research project:** Writing the title and the cover page. Writing the Abstract: Writing the Introduction Writing the Aim and Objectives. Writing the Research Methods and experimental part Writing the Results Writing the discussion of the results Writing the Conclusion Writing the Recommendation Writing the Bibliography Writing Arabic Summary	a3-5, b2,c3, d2-3	12-14	6
14)	Final Project Presentation Practical and Oral Discussion	b4, d2,	15,16	4
Number of Weeks /and Units Per Semester			**16**	**32**

VI- a-Teaching strategies of the course:
Practical sessions, Brainstorming, Discussion sessions, Field visits, Research assignment and Problem solving sessions.
b- Assessment Methods:

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Quizzes, Attendance, Participation, homework, oral exam Practical works, practical exam, discussion, presentation and practical reports.

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a1,a2, a4, b1, c1-2, d1-3	Sporadic through the semester	**20**
2	Reports	a1-a3, a5, b2-3, c3-4, d1-3		

VII- Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
3.	Attendance, Quizzes, Participation, homework, oral exam Practical works, practical exam, discussion, presentation and practical reports.	**All Weeks**	70	70%	a1-5, b1-4, c1-4, d1-3
4.	Final discussion and presentation	Sporadic through the semester	30	30%	a1-5, b1-4, c1-4, d2
	Total		**100**	**100%**	

VIII- Students' Support:

Office Hours/week	Other Procedures (if any)

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Two contact hours per week	None

IX- Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

- Mark C Stuart, (2007), The Complete Guide to Medical Writing, Pharmaceutical Press, London, UK. Felicity Smith, Sally-Anne Francis, Ellen Schafheutle, (2008), International Research in Healthcare, Pharmaceutical Press, London, UK.
-Aparasu R, (2010), Research Methods for Pharmaceutical Practice and Policy, 1st edition, Pharmaceutical Press, London, UK.
- Babar Z, (2015), Pharmacy Practice Research Methods, 1st edition , ADIS, Switzerland.
- Stuart MC, (2007), The complete guide to medical writing, 1st edition, Pharmaceutical Press, London. - Trisha Greenhalgh, (2014), How to Read a Paper; The Basics of Evidence-Based Medicine, 5th edition, John Wiley & Sons, Oxford, UK.

7- Recommended Readings and Reference Materials

Notes and instructions prepared by research supervisors.

8- Essential References

9- Electronic Materials and Web Sites *etc*.

All web sites, papers, journals of pharmaceutical sciences

10- Other Learning Material:

Study tour :

X- Facilities Required:

1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.

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3 - **Computing resources:**	- Computer laboratory with internet facilities.

XI- Course Improvement Processes:

6- Strategies for obtaining student feedback on effectiveness of teaching

- Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester.
- Meeting with students and faculty (once per semester).

7- Other strategies for evaluation of teaching by the instructor or by the department.

- Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.
- Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).

8- Processes for improvement of teaching.

- Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.
- Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.

9- Processes for verifying standards of students' achievement

- Checking of a sample of students' work by an independent faculty member.
- Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.
- Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).
- Regular follow-up of laboratory logbooks to assess the practical achievement of students.

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10- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	▪ Student rating and feedback
	▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to ----------	
1	**Class Attendance:** ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	**Assignments & Projects:** ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	**Cheating:** ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	**Plagiarism:** ▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	**Other policies:** ▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.

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مواصفات مقرر: مهارات الحاسوب

Course Specification of: Computer Skills

معلومات عامة عن المقرر General information about the course:					
	اسم المقرر Course Title	مهارات الحاسوب Computer Skills			
	رمز المقرر ورقمه Course Code and Number	...			
	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		2	1	0	3
	المستوى والفصل الدراسي Study Level and Semester	المستوى الاول/ الفصل الثاني First Year/ second Semester			
	المتطلبات السابقة المقرر (إن وجدت) Pre-requisites (if any)	لا توجد None			
	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	لا توجد None			
	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	جميع البرامج الاكاديمية في كليات الجامعة			
	لغة تدريس المقرر Language of teaching the course	عربي/ انجليزي			
	نظام الدراسة Study System	فصلي / انتظام			
	معد(و) مواصفات المقرر Prepared By	أ.م.د/ هلال أحمد علي القباطي			
	تاريخ اعتماد مواصفات المقرر				

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	Date of Approval	

ملاحظة: الساعة المعتمدة للعملي والتمارين تساوى ساعتين فعليتين خلال التدريس.

وصف المقرر Course Description:
يهدف هذا المقرر الى تزويد الطالب بالمفاهيم والمهارات الأساسية للحاسوب واهمية توظيفه في مجالات الحياة المختلفة؛ حيث يتناول مفهوم الحاسوب ومكوناته المادية والبرمجية والمفاهيم ذات العلاقة، وكيفية تمثيل البيانات ومعالجتها، ونظم تشغيل الحاسوب مع التركيز على مهارات التعامل مع نظام تشغيل النوافذ Windows10 وعدد من البرامج الخدمية المساعدة، والمهارات الاساسية للتعامل مع بعض برامج حزمة Microsoft Office (Ms. Word وExcel PowerPoint وAccess)، إضافة الى مفهوم الإنترنت وأهم خدماتها وشبكات الحاسوب وحمايتها وكيفية الإفادة منها؛ بما يُمكن الطالب من توظيف الحاسوب والانترنت بكفاءة في دراسته الجامعية وفي حياته المهنية مستقبلا.

مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):
بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 - يُظهر معرفة وفهما سليما للمفاهيم الأساسية للحاسوب والانترنت والمفاهيم ذات العلاقة.
a2 - يوضح مكونات الحاسوب المادية والبرمجية وأهمية توظيف الحاسوب والانترنت وتطبيقاتهما في مجال تخصصه ومجالات الحياة المختلفة.
b1- يُميز بين البرامج الحاسوبية من حيث الوظيفة ومجال الاستخدام بما يضمن التوظيف الأمثل لاستخدامها.
b2 - يفسر كيفية تعامل الحاسوب مع البيانات من حيث تمثيلها ومعالجتها.
c1 - يستخدم الحاسوب ويتعامل مع نظام تشغيل النوافذ (Windows10) وبرامجه المساعدة والخدمية بفاعلية.
c2 - يتعامل مع برامج حزمة Microsoft Office (Word وExcel PowerPoint وAccess) وبرامج مكافحة الفيروسات.
c3 - يوظف تطبيقات الحاسوب والانترنت في عملية البحث والتعلم وفي مجال تخصصه بكفاءة.
d1 - يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار إمكانات الحاسوب والانترنت وتطبيقاتهما المختلفة.
d2- يتواصل مع الاخرين الكترونيا بفاعلية مراعيا في ذلك معايير الاستخدام وقيم المجتمع.

ثالثاً: مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):

رابعاً: مواءمة مخرجات تعلم المقرر مع مخرجات تعلم البرنامج:

الرمز والرقم	مخرجات التعلم المقصودة من البرنامج	الرمز والرقم	مخرجات التعلم المقصودة من المقرر

A1	يظهر المعرفة والفهم للمفاهيم والمبادئ والنظريات في مجال العلوم والرياضيات.	a1	يشرح مكونات الحاسوب المادية والبرمجيات المختلفة مراعيا الدقة والوضوح.
B1	يحلل المفاهيم والمبادئ و النظريات المتعلقة بالعلوم والرياضيات .	b1	يفرق بين وحدات الحاسوب المختلفة ويربط بينها وبين أنظمة التشغيل والبرمجيات المختلفة التي تساعد في حل المساءل.
C1	يجري التجارب ويحلل البيانات ويعبر عن النتائج بطريقة علمية.	c1	ينفذ المهارات الأساسية في الحاسوب من أنظمة التشغيل والبرامج الأخرى ويكتب تقاريرها بمهارة.
		c2	يستخدم المصادر الموثوقة للمعرفة بشكل فعال.
C5	يتبع تعليمات السلامة واللوائح ذات الصلة بالعمل في المعمل والزيارات الميدانية.	c3	يطبق معايير الأمان والسلامة عند تنفيذ التجارب معمليا.
D1	يوظف تكنولوجيا المعلومات والاتصالات الحديثة في تعزيز مهاراته المهنية في التعليم والتعلم.	d1	يعمل في فريق أو بشكل فردي لانجاز التكاليف ويتواصل مع الاخرين بفعالية.

مواءمة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقويم Alignment of CILOs to Teaching and Assessment Strategies		
أولا: مواءمة مخرجات تعلم المقرر (المعارف والفهم) باستراتيجية التعليم والتعلم والتقويم: First: Alignment of Knowledge and Understanding CILOs		
مخرجات المقرر/ المعرفة والفهم Knowledge and Understanding CILOs	استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies

a1-	يُظهر معرفة وفهما سليما للمفاهيم الأساسية للحاسوب والانترنت والمفاهيم ذات العلاقة.	المحاضرة الحوار والمناقشة. التكاليف والتعلم الذاتي. التعلم التعاوني العصف الذهني.	الاختبارات التحريرية. الاختبارات الشفهية. تقييم تقارير التكاليف الفردية والجماعية. الاختبارات القصيرة (الكوزات).
a2-	يوضح مكونات الحاسوب المادية والبرمجية وأهمية توظيف الحاسوب والانترنت وتطبيقاتهما في مجال تخصصه ومجالات الحياة المختلفة.		
ثانيا: مواءمة مخرجات تعلم المقرر (المهارات الذهنية) باستراتيجية التدريس والتقويم: Second: Alignment of Intellectual Skills CILOs			
	مخرجات المقرر/ المهارات الذهنية Intellectual Skills CILOs	استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
b1-	يُميز بين البرامج الحاسوبية من حيث الوظيفة ومجال الاستخدام بما يضمن التوظيف الأمثل لاستخدامها.	المحاضرة الحوار والمناقشة. العصف الذهني. التعلم الذاتي حل المشكلات. المهام والتكاليف ومجموعات العمل.	لاختبارات التحريرية. الاختبارات القصيرة. تقييم التقارير.
b2-	يفسر كيفية تعامل الحاسوب مع البيانات من حيث تمثيلها ومعالجتها.		
ثالثا: مواءمة مخرجات تعلم المقرر (المهارات المهنية والعملية) باستراتيجية التدريس والتقويم: Third: Alignment of Professional and Practical Skills CILOs			
	مخرجات المقرر/ المهارات المهنية والعملية Professional and Practical Skills CILOs	استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
c1-	يستخدم الحاسوب ويتعامل مع نظام تشغيل النوافذ (Windows10) وبرامجه المساعدة والخدمية بفاعلية.	العروض العملية والمحاكاة. التطبيقات العملية والتكاليف.	ملاحظة الاداء. الاختبارات التحريرية.

c2-	يتعامل مع برامج حزمة Microsoft Office (Word وPowerPoint Excel وAccess) وبرامج مكافحة الفيروسات.	حل المشكلات. التعلم التعاوني تبادل الخبرات بين الزملاء. الحوار والمناقشة. التعلم الذاتي	تقييم تقارير الواجبات والتكليفات التطبيقية. الاختبارات الشفهية.
c3-	يوظف تطبيقات الحاسوب والانترنت في عملية البحث والتعلم وفي مجال تخصصه بكفاءة.		
رابعا: مواءمة مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقويم: Fourth: Alignment of Transferable (General) Skills CILOs			
	مخرجات المقرر Transferable (General) Skills CILOs	استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
d1-	يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار إمكانات الحاسوب والانترنت وتطبيقاتهما المختلفة.	الحوار والمناقشة التعلم الذاتي التعلم التعاوني. المهام والتكاليف. تبادل الخبرات بين الزملاء	ملاحظة الأداء. تقييم تقارير التكليفات والمشاريع. تقييم العروض التقديمية.
d2-	يتواصل مع الاخرين الكترونيا بفاعلية مراعيا في ذلك معايير الاستخدام وقيم المجتمع.		

موضوعات محتوى المقرر Course Content					
أولا: موضوعات الجانب النظري Theoretical Aspect					
الرقم Order	الموضوعات الرئيسة/ الوحدات Topic List / Units	الموضوعات التفصيلية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم للمقرر (CILOs)
1	مفهوم الحاسوب ومكوناته الاساسية	مفاهيم أساسية للحاسوب وتقنية المعلومات. مفهوم الحاسوب واجياله وأنواع الحاسبات ومجالات ومبررات استخدامه.	W2	5	a1, a2, b2, c1, d1

		مكونات الحاسوب المادية Hardware، وتصنيفها ووظيفة كل مكون فيها. مكونات الحاسوب البرمجية Software: مفهومها وأنواع برامج الحاسوب (تشغيلية، مساعدة، تطبيقية) واهمية كل منها. تمثيل البيانات حاسوبيا والعوامل المؤثرة على أداء الحاسوب.			
2	نُظم تشغيل الحاسوب وحماية المعلومات والبيانات	نظم تشغيل الحاسوب: مفهومها وأنواعها وخصائصها، وواجهات المستخدم فيها. نظام تشغيل النوافذ Windows: اصداراته ومميزاته، مكونات واجهة سطح المكتب فيه. مع التركيز على نظام تشغيل النوافذ Windows10، سطح المكتب ومكوناته، الفأرة، النوافذ، وشريط المهام Task Bar، ولوحة التحكم Control Panel.	3 W	6	a1, a2, b2, c1, b1, d1
		البرامج الملحقة Accessories بنظام تشغيل النوافذ Windows10. إدارة الملفات والمجلدات في نظام النوافذ Windows10.			
		فيروسات الحاسوب: ماهيتها وانواعها وطرق الاصابة بها والوقاية منها وأشهر برامج مكافحتها. امن وحماية المعلومات: مفهوم امن وحماية المعلومات، المخاطر التي تواجه أي نظام معلومات، الخصوصية وحماية البيانات والنسخ الاحتياطي لها.			
3	المهارات الاساسية للتعامل مع برامج حزمة Microsoft Office	برنامج معالجة النصوص Ms. Word: واجهة المستخدم فيه، أوامر تبويبات: الصفحة الرئيسية، تحرير النصوص، تنسيق الخط، تنسيق الفقرة، الأنماط، الحافظة، والبحث والاستبدال، إدراج الصفحات	W7	14	a1, a2, b1, c2, c3, d1, d2
		تابع معالجة النصوص (Word): أوامر تبويبات: ملف، الصفحة الرئيسية، إدراج، تصميم، تخطيط، عرض، مراجعة، وحفظ المستند وتأمينه وطباعته.			
		برنامج جدولة البيانات Microsoft Excel: مقدمة عن برنامج جدولة البيانات Excel، واجهة المستخدم فيه وادارة اوراق العمل، والتعامل مع الجداول			

		والصفوف والأعمدة والخلايا وتحرير البيانات وتنسيقها، وتأمين الخلايا وفرز البيانات وتصفيتها والمحاذة وتأثيرات الحدود.			
		تابع .. معالجة جداول البيانات Excel: انشاء المخططات والرسوم البيانية وتنسيقها، والصيغ والدوال، وحفظ المصنف وتأمينه وطباعته ومعاينة ورقة عمل وطباعة مساحة محددة من ورقة العمل.			
		برنامج العروض التقديمية Ms. Office PowerPoint: مقدمة عن العروض التقديمية واهميتها، وواجهة المستخدم فيPPT، إدراج النصوص والجداول والمخططات والاشكال الصور والصوت والفيديو وتنسيقها واضافة التأثيرات اليها، واضافة حركات وتأثيرات على عناصر داخل الشريحة، عرض الشرائح والانتقال بينها والتحكم فيها، حفظ العرض وتأمينه وطباعته.			
		برنامج قواعد البيانات Access: أهمية قواعد البيانات Database، أشهر برامجها، خطوات تصميم قاعدة بيانات، كيفية أنشاء قاعدة بيانات فارغة، واجهة برنامج MS-Access، مكونات قاعدة بيانات Access (الجداول Tables، الاستعلامات Queries، النماذج Forms، التقارير Reports، الصفحات Pages، الماكرو Macros، الوحدات النمطية Modules)، حفظ قاعدة البيانات، أنواع البيانات Data Type.			
4	الانترنت وشبكات الحاسوب	الانترنت والمفاهيم ذات العلاقة (البروتكول، الانترانت، الاكسترانت، المتصفح، محرك البحث)، وأهم خدماتها ومجالات توظيفها، مفهوم الويب وأجيالها وخصائص وأدوات ومميزات كل منها.	W2	4	a1, a2, b1, c1, c3, d1, d2
		مفهوم تراسل البيانات واهميته. شبكات الحاسوب: مفهومها، انواعها، اهميتها، واهم المعدات الخاصة بربطها.			
اجمالي عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			14	29	

ثانيا: موضوعات الجانب العملي Practical Aspect

الرقم Order	الموضوعات العملية/ التدريبات Practical / Tutorials topics	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم Course ILOs
1	مكونات الحاسوب المادية والبرمجية	1	2	a1, a2, b2, c1
2	مهارات التعامل مع نظام النوافذ Win10: سطح المكتب ومكوناته وتغيير مظهره، التعامل مع الفأرة، التعامل مع النوافذ، استعراض معلومات النظام، التعامل مع شريط المهام Task Bar، التعامل مع قائمة ابدأStart Menu ونقل وإضافة زر إليها.	1	2	a1, a2, b2, c1, d1
3	تابع مهارات التعامل مع نظام النوافذ Win10: التعامل مع لوحة التحكم Control Panel، تثبيت برنامج تطبيقي وإزالته، تعديل الوقت والتأريخ، تغيير لغة النظام، التعامل مع البرامج الملحقة لنظام التشغيل Accessories، الحاسبة Calculator، المفكرةNotepad، برنامج تحرير الكلمات WordPad، الرسام Paint، اداة القطع، التقاط صور من الشاشة، إنشاء حساب مستخدم، جدار حماية Windows، تهيئة الأقراص، إضافة جهاز جديد والطباعة.	1	2	a1, a2, b2, c1, d1
4	مهارات إدارة الملفات والمجلدات في نظام النوافذ Windows10: إنشاء مجلد أو ملف وتسميته وحفظه وحذفه واستعادة المحذوفات، نسخ ونقل ملف أو مجلد، إنشاء أيقونة مختصرة Short Cut، إخفاء الملفات والمجلدات وإظهارها، فرز وترتيب الملفات، تغيير طريقة عرض الملفات والمجلدات، مستكشف النوافذ Explorer، البحث عن الملفات والمجلدات، عرض خصائص الملف، ضغط الملفات والمجلدات zip وإلغاء ضغطها، الأدوات الذكية، ادارة أجهزة التخزين (التقسيم، التهيئة).	1	2	a1, a2, b2, c1, d1
5	مهارات التعامل مع برامج حماية الحاسوب من الفيروسات، والنسخ الاحتياطي للبيانات.	1	2	a1, b1, c1
6	مهارات التعامل مع برنامج معالجة الكلمات Microsoft Word: واجهة المستخدم في برنامج Word، التبويبات، الاشرطة المجموعات والاوامر، تخصيص الشريط، شريط الوصول السريع. أوامر تبويب الصفحة الرئيسية: تحرير النصوص، وتنسيقها، الأنماط، الحافظة، والبحث والاستبدال. أوامر تبويب إدراج: الصفحات، الجداول، الرسوم، الرأس والتذييل، الارتباطات، التعليقات، والرموز.	1	2	a1, a2, b1, c1, c2, d1

7	تابع معالجة النصوص (Word)، أوامر تبويبات: ملف وتصميم وتخطيط وعرض ومراجعة، وحفظ المستند وتأمينه وطباعته.	1	2	a1, a2, b1, c2, c3, d1
8	مهارات التعامل مع برنامج جدولة البيانات Microsoft Excel، واجهة المستخدم فيه، وادارة اوراق العمل، والتعامل مع الجداول والصفوف والأعمدة والخلايا وتحرير البيانات وتنسيقها، وتأمين الخلايا وفرز البيانات وتصفيتها والمحاذة وتأثيرات الحدود، وانشاء المخططات البيانية وتنسيقها.	1	2	a1, a2, b1, c2, c3, d1
9	مهارات التعامل مع الصيغ وبعض الدوال الاساسية في برنامج Microsoft Excel، وحفظ المصنف وتأمينه وطباعته.	1	2	a1, a2, b1, b2, c2, c2, d1
10	مهارات التعامل مع أوامر واجهة المستخدم في برنامج PowerPoint، إدراج الشرائح وتنسيقها وحذفها، وادراج النصوص والجداول والاشكال والمخططات والصور والصوت والفيديو وتنسيقها واضافة التأثيرات المناسبة اليها، اضافة حركات وتأثيرات على عناصر داخل الشريحة عرض الشرائح والانتقال بينها والتحكم فيها، حفظ العرض وتأمينه وطباعته.	1	2	a1, a2, b1, c2, c3, d1, d2
11	أنشاء قاعدة بيانات باستخدام برنامج MS-Access.	1	2	a1, a2, b1, c2, c3, d1
12	مهارات التعامل مع الانترنت وبعض خدماتها (التصفح، البريد الالكتروني، القوائم البريدية).	1	2	a1, a2, b1, c3, d1, d2
13	شبكات الحاسوب وتراسل البيانات.	1	2	a1, a2, b1, c3, d1, d2
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		13	26	

استراتيجيات التدريس Teaching Strategies:
المحاضرة التفاعلية Lectures
الحوار والمناقشة discussion
العصف الذهني Brainstorming
حل المشكلاتProblem solving
المحاكاة والعروض العملية Practical presentations& Simulation Method
التطبيق العملي Practical in computer Lab (Lab works)
المشروعات والمهام والتكاليف projects

التعلم الذاتي Self-learning
التعلم التعاوني Cooperative Learning
تبادل الخبرات بين الزملاء

الانشطة والتكليفات Tasks and Assignments:

م No	الانشطة / التكليف Assignments/ Tasks	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due	مخرجات التعلم CILOs (symbols)
1	انشاء مستند نصي يشتمل على نصوص وجداول واشكال ورسوم وعناوين رئيسة وفرعية وجداول واشكال باستخدام برنامج Word	فردي	4	6W	a1, a2, b1, c1, c2, d1
2	تصميم جداول تبرز قدرته على استخدام برنامج Excel في تصميم الجداول وادخال البيانات وتنسيقها وتوظيف بعض الدوال الاساسية وفقا لمحددات يحددها استاذ المقرر.	فردي	4	9W	a1, a2, b1, b2, c1, c2, d1
3	انتاج عرض تعليمي باستخدام برنامج باوربوينتPPT وفقا للتعليمات المعدة لذلك.	فردي	4	11W	a1, a2, b1, c1, c2, d1, d2
4	البحث عن موضوع متعلق بالحاسوب أو الانترنت يحدده استاذ المقرر باستخدام أحد محركات البحث.	جماعي	3	13W	a1, a2, b1, c3, d1, d2
	إجمالي الدرجة Total Score		15		

تقييم التعلم Learning Assessment:

الرقم No.	أنشطة التقييم Assessment Tasks	أسوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة النهائية Proportion of Final Assessment	مخرجات التعلم CILOs (symbols)
1	التكليفات والواجبات Tasks and Assignments	6W, 9, 1311,	15	% 10	a1, a2, b1, b2, c1, c2, c3, d1, d2

2	كوز(1) Quiz	W6	7.5	% 5	a1, a2, b1, b2, c1, c2
3	اختبار نصف الفصل	W8	30	% 20	a1, a2, b1, b2, c1, c2, c3, d1
4	كوز(2) Quiz	W12	7.5	% 5	a1, a2, b1, b2, c1, c2, c3, d1, d2
5	اختبار نهاية الفصل (عملي) Final Exam (practical)	W15	30	% 20	a1, a2, b1, b2, c1, c2, c3, d1
6	اختبار نهاية الفصل (نظري) Final Exam (theoretical)	W16	60	% 40	a1, a2, b1, b2, c1, c2, c3, d1
	Totalالإجمالي		150	%100	

مصادر التعلم Learning Resources:
المراجع الرئيسة Required Textbook(s):
هلال القباطي (2019): اساسيات الحاسوب والانترنت، الامين للطباعة والنشر، صنعاء. هلال القباطي (2020): تطبيقات الحاسوب والانترنت، الامين للطباعة والنشر، صنعاء.
المراجع المساندة Essential References:
فهد الوصابي (2014). تطبيقات الحاسوب وتكنولوجيا المعلومات، مكتبة ابن خلدون للطباعة والنشر والتوزيع، صنعاء. Brandon Heffernan and Tim Paulsen (2010). Introduction to Personal Computers, Windows 10 Edition, Axzo Press. Guy Hart-Davis (2016). Beginning Microsoft Office 2016, Apress
المصادر الإلكترونية ومواقع الإنترنت... Electronic Materials and Web Sites etc.
http://www.ksu.edu.sa/sites/KSUArabic/Deanships/Elearn/Pages/default.aspx http://ecomputernotes.com/fundamental/introduction-to-computer. http://www.grassrootsdesign.com/intro/. http://www.cprogramming.com/tutorial.html. http://www.functionx.com/word/index.htm http://www.functionx.com/powerpoint/index.htm http://www.functionx.com/excel/index.htm

الضوابط والسياسات المتبعة في المقرر Course Policies

بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
1	سياسة حضور الفعاليات التعليمية Class Attendance: يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. يقدم أستاذ المقرر تقريرا بحضور وغياب الطلاب للقسم ويحرم الطالب من دخول الامتحان في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: يسمح للطالب حضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفويا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الامتحان Exam Attendance/Punctuality: لا يسمح للطالب دخول الامتحان النهائي إذا تأخر مقدار (20) دقيقة من بدء الامتحان إذا تغيب الطالب عن الامتحان النهائي تطبق اللوائح الخاصة بنظام الامتحان في الكلية.
4	التعيينات والمشاريع Assignments & Projects: يحدد أستاذ المقرر نوع التعيينات في بداية الفصل ويحدد مواعيد تسليمها وضوابط تنفيذ التكليفات وتسليمها. إذا تأخر الطالب في تسليم التكليفات عن الموعد المحدد يحرم من درجة التكليف الذي تأخر في تسليمه.
5	الغش Cheating: في حال ثبوت قيام الطالب بالغش في الامتحان النصفي أو النهائي تطبق عليه لائحة شؤون الطلاب. في حال ثبوت قيام الطالب بالغش او النقل في التكليفات والمشاريع يحرم من الدرجة المخصصة للتكليف.
6	الانتحال Plagiarism: في حالة وجود شخص ينتحل شخصية طالب لأداء الامتحان نيابة عنه تطبق اللائحة الخاصة بذلك
7	سياسات أخرى Other policies: أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكليفات ..... الخ

مهارات الحاسوب:خطة مقرر

معلومات عن أستاذ المقرر Information about Faculty Member Responsible for the Course								
الاسم Name		الساعات المكتبية (أسبوعيا) Office Hours	(3/ أسبوعيا)					
المكان ورقم الهاتف Location &Telephone No.	معمل الحاسوب	السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE	الأربعاء WED	الخميس THU	
البريد الإلكتروني E-mail								

معلومات عامة عن المقرر General information about the course:					
اسم المقرر Course Title	مهارات الحاسوب Computer Skills				
رمز المقرر ورقمه Course Code and Number	...				
الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			المجموع Total	
	محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial		
	2	1	0	3	
المستوى والفصل الدراسي Study Level and Semester	المستوى الاول/ الفصل الثاني First Year/ second Semester				
المتطلبات السابقة للمقرر Pre-requisites	لا توجد None				
المتطلبات المصاحبة (إن وجدت)– Co requisite	لا توجد None				

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	البرنامج/ البرامج التي يتم فيها تدريس المقرر Program (s) in which the course is offered	جميع البرامج الاكاديمية في كليات الجامعة
	لغة تدريس المقرر Language of teaching the course	عربي/ انجليزي
	مكان تدريس المقرر Location of teaching the course	معمل الحاسوب ( )

ملاحظة: الساعة المعتمدة للعملي وللتمارين تساوى ساعتين فعليتين خلال التدريس.

وصف المقرر Course Description:
يهدف هذا المقرر الى تزويد الطالب بالمفاهيم والمهارات الأساسية للحاسوب واهمية توظيفه في مجالات الحياة المختلفة؛ حيث يتناول مفهوم الحاسوب ومكوناته المادية والبرمجية والمفاهيم ذات العلاقة، وكيفية تمثيل البيانات ومعالجتها، ونظم تشغيل الحاسوب مع التركيز على مهارات التعامل مع نظام تشغيل النوافذ Windows10 وعدد من البرامج الخدمية المساعدة، والمهارات الاساسية للتعامل مع بعض برامج حزمة Microsoft Office (Ms. Word وExcel PowerPoint و Access)، إضافة الى مفهوم الإنترنت وأهم خدماتها وشبكات الحاسوب وحمايتها وكيفية الإفادة منها؛ بما يُمكن الطالب من توظيف الحاسوب والانترنت بكفاءة في دراسته الجامعية وفي حياته المهنية مستقبلا.

مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):
بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 - يُظهر معرفة وفهما سليما للمفاهيم الأساسية للحاسوب والانترنت والمفاهيم ذات العلاقة.
a2 – يوضح مكونات الحاسوب المادية والبرمجية وأهمية توظيف الحاسوب والانترنت وتطبيقاتهما في مجال تخصصه ومجالات الحياة المختلفة.
b1– يُميز بين البرامج الحاسوبية من حيث الوظيفة ومجال الاستخدام بما يضمن التوظيف الأمثل لاستخدامها.
b2 - يفسر كيفية تعامل الحاسوب مع البيانات من حيث تمثيلها ومعالجتها.
c1 - يستخدم الحاسوب ويتعامل مع نظام تشغيل النوافذ (Windows10) وبرامجه المساعدة والخدمية بفاعلية.
c2 - يتعامل مع برامج حزمة Microsoft Office (Word وExcel PowerPoint و Access) وبرامج مكافحة الفيروسات.
c3 - يوظف تطبيقات الحاسوب والانترنت في عملية البحث والتعلم وفي مجال تخصصه بكفاءة.
d1 - يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار إمكانات الحاسوب والانترنت وتطبيقاتهما المختلفة.

d2-	يتواصل مع الاخرين الكترونيا بفاعلية مراعيا في ذلك معايير الاستخدام وقيم المجتمع.

محتوى المقرر Course Content:

أولا: الموضوعات النظرية Theoretical Aspect:

الرقم Order	الوحدات (الموضوعات الرئيسة) Units	الموضوعات التفصيلية Sub Topics	الأسبوع Week Due	الساعات الفعلية Con. H
1	مفهوم الحاسوب ومكوناته الاساسية	مقدمة تعريفية عن المقرر ومتطلباته وخطته الدراسية ومحدداته. مفهوم الحاسوب واجياله وأنواع الحاسبات ومجالات ومبررات استخدامه.	W1	3
		مكونات الحاسوب المادية Hardware، وتصنيفها ووظيفة كل مكون فيها. مكونات الحاسوب البرمجية Software: مفهومها وأنواع البرامج المستخدمة في الحاسوب (تشغيلية، مساعدة، تطبيقية) واهمية كل منها. تمثيل البيانات حاسوبيا والعوامل المؤثرة على أداء الحاسوب.	W2	2
2	نُظم تشغيل الحاسوب وحماية المعلومات والبيانات	نظم تشغيل الحاسوب: مفهومها وأنواعها وخصائصها، وواجهات المستخدم فيها. نظام تشغيل النوافذ Windows: اصداراته ومميزاته، مكونات واجهة سطح المكتب فيه. مع التركيز على نظام تشغيل النوافذ Windows10، سطح المكتب ومكوناته، الفأرة، النوافذ، وشريط المهام Task Bar، ولوحة التحكم Control Panel.	W3	2
		البرامج الملحقة Accessories بنظام تشغيل النوافذ Windows10. إدارة الملفات والمجلدات في نظام النوافذ Windows10.	W4	2
		فيروسات الحاسوب: ماهيتها وانواعها وطرق الاصابة بها والوقاية منها وأشهر برامج مكافحتها. امن وحماية المعلومات: مفهوم امن وحماية المعلومات، المخاطر التي تواجه أي نظام معلومات، الخصوصية وحماية البيانات والنسخ الاحتياطي.	W5	2
3	المهارات الاساسية للتعامل مع برامج حزمة Microsoft Office	اختبار قصير (أول) برنامج معالجة النصوص Ms. Word: واجهة المستخدم فيه، أوامر تبويبات: الصفحة الرئيسية، تحرير النصوص، تنسيق الخط، تنسيق الفقرة، الأنماط، الحافظة، والبحث والاستبدال، إدراج الصفحات	W6	2

		تابع معالجة النصوص (Word): أوامر تبويبات: ملف، الصفحة الرئيسية، إدراج، تصميم، تخطيط، عرض، مراجعة، وحفظ المستند وتأمينه وطباعته.	W7	2
		اختبار تحريري نصفي (نظري)	W8	2
		برنامج جدولة البيانات Microsoft Excel: أهمية جدولة البيانات، مقدمة عن برنامج جدولة البيانات Excel، واجهة المستخدم فيه وادارة اوراق العمل، والتعامل مع الجداول والصفوف والأعمدة والخلايا وتحرير البيانات وتنسيقها، وتأمين الخلايا وفرز البيانات وتصفيتها.	w9	2
		تابع .. معالجة جداول البيانات Excel: انشاء المخططات والرسوم البيانية وتنسيقها، والصيغ والدوال، وحفظ المصنف وتأمينه وطباعته ومعاينة ورقة عمل وطباعة مساحة محددة من ورقة العمل.	W10	2
		برنامج العروض التقديمية Ms. Office PowerPoint: مقدمة عن العروض التقديمية واهميتها، وواجهة المستخدم فيPPT، إدراج النصوص والجداول والمخططات والاشكال الصور والصوت والفيديو وتنسيقها واضافة التأثيرات اليها، واضافة حركات وتأثيرات على عناصر داخل الشريحة، عرض الشرائح والانتقال بينها والتحكم فيها، حفظ العرض وتأمينه.	w11	2
		أنشاء قاعدة بيانات باستخدام برنامج MS-Access.	w 12	2
4	الانترنت وشبكات الحاسوب	الانترنت والمفاهيم ذات العلاقة (البروتكول، الانترانت، الاكسترانت، المتصفح، محرك البحث)، وأهم خدماتها ومجالات توظيفها، مفهوم الويب وأجيالها وخصائص وأدوات ومميزات كل منها.	w13	2
	الانترنت وشبكات الحاسوب	مفهوم تراسل البيانات واهميته. شبكات الحاسوب: مفهومها، انواعها، اهميتها، المعدات الخاصة بربطها.	w14	2
		مراجعة واستعراض ومناقشة عينة من التكاليف والمهام.	w15	2
		اختبار نهاية الفصل (نظري)	W16	2
عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			16	33

ثانيا: خطة تنفيذ الجانب العملي Training/ Tutorials/ Exercises Aspects:

الرقم م	المهام / التمارين Tutorials/ Exercises	الأسبوع Week Due	الساعات الفعلية Cont. H

Order			
1	مكونات الحاسوب المادية والبرمجية	W2	2
2	مهارات التعامل مع نظام النوافذWin10: سطح المكتب ومكوناته وتغيير مظهره، التعامل مع الفأرة والتحكم بسرعتها والتبديل بين أزرارها، التعامل مع النوافذ والتنقل بينها، استعراض معلومات النظام، التعامل مع شريط المهام Task Bar، التعامل مع قائمة ابدأStart Menu ونقل زر منها وإضافة زر جديد إليها، كافة البرامج.	W3	2
3	تابع مهارات التعامل مع نظام النوافذWin10: التعامل مع لوحة التحكم Control Panel، تثبيت برنامج تطبيقي وإزالته، تعديل الوقت والتأريخ، تغيير لغة النظام، سلة المحذوفات، البرامج الملحقة لنظام التشغيل Accessories، مسجل الصوت، الحاسبة Calculator، المفكرةNotepad، برنامج تحرير الكلمات WordPad، الرسام Paint، اداة القطع، التقاط صور من الشاشة، إنشاء حساب مستخدم، جدار حماية Windows، تهيئة الأقراص، إضافة جهاز جديد والطباعة.	W4	2
4	مهارات إدارة الملفات والمجلدات في نظام النوافذ Windows10: إنشاء مجلد أو ملف وتسميته وحفظه وحذفه واستعادة المحذوفات، نسخ ونقل ملف أو مجلد، إنشاء أيقونة مختصرة Short Cut، إخفاء الملفات والمجلدات وإظهارها، فرز وترتيب الملفات، تغيير طريقة عرض الملفات والمجلدات، مستكشف النوافذ Explorer، البحث عن الملفات والمجلدات، عرض خصائص الملف، ضغط الملفات والمجلدات zip وإلغاء ضغطها، الأدوات الذكية، ادارة أجهزة التخزين (التقسيم، التهيئة). مهارات التعامل مع برامج حماية الحاسوب من الفيروسات، والنسخ الاحتياطي للبيانات.	w5	2
5	مهارات التعامل مع برنامج معالجة الكلمات Microsoft Word: واجهة المستخدم في برنامج Word، التبويبات، الاشرطة المجموعات والاوامر، تخصيص الشريط، شريط أدوات الوصول السريع. أوامر تبويب الصفحة الرئيسية: تحرير النصوص، وتنسيقها، الأنماط، الحافظة، والبحث والاستبدال. أوامر تبويب إدراج: الصفحات، الجداول، الرسوم، الرأس والتذييل، الارتباطات، التعليقات، والرموز.	W6	2
6	تابع معالجة النصوص (Word)، أوامر تبويبات: ملف وتصميم وتخطيط وعرض ومراجعة، وحفظ المستند وتأمينه وطباعته.	w7	2
7	اختبار نصف الفصل (Midterm Exam)	W8	2
8	مهارات التعامل مع برنامج جدولة البيانات Microsoft Excel، واجهة المستخدم فيه، وادارة اوراق العمل، والتعامل مع الجداول والصفوف والأعمدة والخلايا وتحرير البيانات وتنسيقها، وتأمين الخلايا وفرز البيانات وتصفيتها والمحاذة وتأثيرات الحدود، وانشاء المخططات البيانية وتنسيقها.	w9	2
9	مهارات التعامل مع الصيغ وبعض الدوال الاساسية في برنامج Microsoft Excel، وحفظ المصنف وتأمينه وطباعته.	W10	2

10	مهارات التعامل مع أوامر واجهة المستخدم في برنامج PowerPoint، إدراج الشرائح وتنسيقها وحذفها، وادراج النصوص والجداول والاشكال والمخططات وتنسيقها، ادراج الصور والصوت والفيديو وتنسيقها واضافة التأثيرات المناسبة اليها، اضافة حركات وتأثيرات على عناصر داخل الشريحة عرض الشرائح والانتقال بينها والتحكم فيها، حفظ العرض وتأمينه وطباعته.	w11	2
11	أنشاء قاعدة بيانات باستخدام برنامج MS-Access.	W12	2
12	مهارات التعامل مع الانترنت وبعض خدماتها (التصفح، البريد الالكتروني، القوائم البريدية).	w13	2
13	شبكات الحاسوب وتراسل البيانات.	w14	2
14	اختبار نهاية الفصل (عملي) Final Exam	5W1	2
	اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester	14	28

استراتيجيات التدريس Teaching Strategies:
المحاضرة التفاعلية Lectures
الحوار والمناقشة discussion
العصف الذهني Brainstorming
حل المشكلاتProblem solving
المحاكاة والعروض العملية Practical presentations& Simulation Method
التطبيق العملي Practical in computer Lab (Lab works)
المشروعات والمهام والتكاليف projects
التعلم الذاتي Self-learning
التعلم التعاوني Cooperative Learning
تبادل الخبرات بين الزملاء

VII . الأنشطة والتكليفات Tasks and Assignments:

م No	النشاط/ التكليف Assignments	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due
1	انشاء مستند نصي يشتمل على نصوص وجداول واشكال ورسوم وعناوين رئيسة وفرعية وجداول واشكال باستخدام برنامج Word	فردي	4	6W
2	تصميم جداول تبرز قدرته على استخدام برنامج Excel في تصميم الجداول وادخال البيانات وتنسيقها وتوظيف بعض الدوال الاساسية وفقا لمحددات يحددها استاذ المقرر.	فردي	4	9W
3	انتاج عرض تعليمي باستخدام برنامج باوربوينتPPT وفقا للتعليمات المعدة لذلك.	فردي	4	11W
4	البحث عن موضوع متعلق بالحاسوب أو الانترنت يحدده استاذ المقرر باستخدام أحد محركات البحث.	جماعي	3	13W
	Total Score0إجمالي الدرجة		15	

تقويم التعلم Learning Assessment:

م No	أساليب التقويم Assessment Method	موعد(أسبوع) التقويم Week Due	الدرجة Mark	الوزن النسبي% Proportion of Final Assessment
1	التكليفات والواجبات Tasks and Assignments	, 1311, 9, 6W	15	% 10
2	اختبار قصير (1) Quiz	W6	7.5	% 5
3	اختبار نصفي Midterm Exam (نظري وعملي)	W8	30	% 20
4	اختبار قصير (2) Quiz	W12	7.5	% 5
5	اختبار عملي نهائي	W15	30	% 20
6	اختبار تحريري نهائي	W16	60	% 40
	المجموع Total		150	100 %

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة
ا.د. ماجد علوان ا.د. محمود البريهي ا.د. ماجد علوان د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس

مصادر التعلم Learning Resources:
المراجع الرئيسة Required Textbook(s): (لا تزيد عن مرجعين)
هلال القباطي (2019): اساسيات الحاسوب والانترنت، الامين للطباعة والنشر، صنعاء. هلال القباطي (2020): تطبيقات الحاسوب والانترنت، الامين للطباعة والنشر، صنعاء.
المراجع المساندة Essential References:
فهد الوصابي (2014). تطبيقات الحاسوب وتكنولوجيا المعلومات، مكتبة ابن خلدون للطباعة والنشر والتوزيع، صنعاء. Brandon Heffernan and Tim Poulsen (2010). Introduction to Personal Computers, Windows 10 Edition, Axzo Press. Guy Hart-Davis(2010). Beginning Microsoft Office 2010, Apress
المصادر الإلكترونية ومواقع الإنترنت... Electronic Materials and Web Sites etc.
http://www.ksu.edu.sa/sites/KSUArabic/Deanships/Elearn/Pages/default.aspx http://ecomputernotes.com/fundamental/introduction-to-computer. http://www.grassrootsdesign.com/intro/. http://www.cprogramming.com/tutorial.html. http://www.functionx.com/word/index.htm http://www.functionx.com/powerpoint/index.htm http://www.functionx.com/excel/index.htm

الضوابط والسياسات المتبعة في المقرر Course Policies	
بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
سياسة حضور الفعاليات التعليمية Class Attendance: يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. يقدم أستاذ المقرر تقريرا بحضور وغياب الطلاب للقسم ويحرم الطالب من دخول الامتحان في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.	1
الحضور المتأخر Tardy:	2

	يسمح للطالب حضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفويا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الامتحان Exam Attendance/Punctuality: لا يسمح للطالب دخول الامتحان النهائي إذا تأخر مقدار (20) دقيقة من بدء الامتحان إذا تغيب الطالب عن الامتحان النهائي تطبق اللوائح الخاصة بنظام الامتحان في الكلية.
4	التعيينات والمشاريع Assignments & Projects: يحدد أستاذ المقرر نوع التعيينات في بداية الفصل ويحدد مواعيد تسليمها وضوابط تنفيذ التكليفات وتسليمها. إذا تأخر الطالب في تسليم التكليفات عن الموعد المحدد يحرم من درجة التكليف الذي تأخر في تسليمه.
5	الغش Cheating: في حال ثبوت قيام الطالب بالغش في الامتحان النصفي أو النهائي تطبق عليه لائحة شؤون الطلاب. في حال ثبوت قيام الطالب بالغش او النقل في التكليفات والمشاريع يحرم من الدرجة المخصصة للتكليف.
6	الانتحال Plagiarism: في حالة وجود شخص ينتحل شخصية طالب لأداء الامتحان نيابة عنه تطبق اللائحة الخاصة بذلك
7	سياسات أخرى Other policies: أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكليفات ..... الخ

مواصفات مقرر: اللغة العربية(101)

معلومات عامة عن المقرر General information about the course:					
	اسم المقرر Course Title	اللغة العربية 101			
	رمز المقرر ورقمه Course Code and Number	101UR			
	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		1	-	0	1
	المستوى والفصل الدراسي Study Level and Semester	المستوى الأول/ الفصل الأول			
	المتطلبات السابقة المقرر (إن وجدت)	لا توجد			

	Pre-requisites (if any)	
	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	لا توجد
	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	برنامج المتطلبات الجامعية
	لغة تدريس المقرر Language of teaching the course	اللغة العربية
	نظام الدراسة Study System	فصلي / انتظام
	معد(و) مواصفات المقرر Prepared By	أ.د/سعاد سالم السبع
	تاريخ اعتماد مواصفات المقرر Date of Approval	

وصف المقرر Course Description:
يتناول هذا المقرر موضوعات تتعلق بالمهارات اللغوية الأساسية في الاستماع والقراءة وكتابة الملخصات والخط والإملاء، وبعض القواعد النحوية والصرفية والبلاغية التي تساعد غير المتخصصين في اللغة العربية على الاتصال والتواصل الفعال، ويتم عرض المهارات اللغوية من خلال بعض النصوص اللغوية من القرآن الكريم ومن الحديث الشريف ومن النصوص الأدبية العربية (الشعرية والنثرية) التي تنمي لديهم المهارات اللغوية وتذوق جمال اللغة العربية، وفهم ما تحمله من طاقات تعبيرية وتصويرية تؤكد لديهم الاعتزاز بالعربية، والإيمان بكفاءتها التواصلية وطاقاتها التعبيرية، وأنها لغة حياة متجددة. وتلي هذه النصوص تدريبات لغوية متنوعة تنمي قدرات الطلبة على المهارات اللغوية وعلى فهم النصوص وتحليلها وتلخيصها وتوظيفها في تحسين قدراتهم اللغوية المستهدفة، والتعبير عن أفكارهم وأحاسيسهم، واحتياجاتهم بلغة عربية سليمة.

مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):
بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 - يُظهر معرفة وفهما سليما لقواعد اللغة العربية الأساسية وأساليبها المساعدة في تنمية مهارتي الاتصال والتواصل.
a2 - يشرح النصوص المسموعة والمقروءة بطريقة صحيحة.
a3- يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.
b1- يُميز بين القواعد اللغوية الأساسية بما يضمن التوظيف الأمثل عند استخدامها.
b2 - يقارن بين الأساليب اللغوية المساعدة على التعبير السليم عن المعاني المختلفة.
b3- يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية.
c1 - يوظف قواعد الإملاء في قراءاته وكتاباته بصورة صحيحة.
c2 - يطبق قواعد الرسم الكتابي الصحيح في كتاباته .
c3 - يوظف قواعد اللغة العربية الأساسية في عمليتي البحث والتعلم في مجال تخصصه بكفاءة.
d1 - ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في التعبير عن نفسه وعن محيطه.
d2 – يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.
d3- يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية وقيم المجتمع.

مواءمة مخرجات تعلم المقرر مع مخرجات التعلم للبرنامج:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

مخرجات التعلم المقصودة من المقرر (Course Intended Learning Outcomes)		مخرجات التعلم المقصودة من البرنامج (Program Intended Learning Outcomes)
a1 -	يُظهر معرفة وفهما سليما لقواعد اللغة العربية الأساسية وأساليبها المساعدة في تنمية مهارتي الاتصال والتواصل.	A1 يُظهر معرفة وفهما سليما باللغة العربية وتدريسها وتطويرها وتعميم استعمالها كلغة علمية وتعليمية في مختلف المجالات العلمية والمعرفية.
a2 –	يشرح النصوص المسموعة والمقروءة بطريقة صحيحة.	
a3 –	يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.	

–b1	يُميز بين القواعد اللغوية الأساسية بما يضمن التوظيف الأمثل عند استخدامها.	B1 يمارس مهارات التفكير المختلفة بشكل منهجي وإيجابي في تشخيص المشكلات والقضايا التي تواجهه أثناء العمل ويقترح الحلول المناسبة لها.
- b2	يقارن بين الأساليب اللغوية المساعدة على التعبير السليم عن المعاني المختلفة.	B2- يعبر عن أفكاره بوضوح وموضوعية ، ويتحاور بإيجابية مع زملائه ورؤسائه ومرؤوسيه في العمل.
b3	يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية.	B3 - يناقش ويقيم الدراسات والأبحاث المرتبطة بقضايا المجتمع بطريقة منهجية وموضوعية.
-c1	يوظف قواعد الإملاء في قراءاته وكتاباته بصورة صحيحة.	C3يعد بحوثا ودراسات علمية في مجال تخصصه باللغة العربية.
-c2	يطبق قواعد الرسم الكتابي الصحيح في كتاباته .	
-c3	يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم في مجال تخصصه بكفاءة.	
-d1	ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في التعبير عن نفسه وعن محيطه.	D4– يطور قدراته المعرفية والمهنية والبحثية في مجال تخصصه ذاتيا.
-d2	يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.	
-d3	يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية وقيم المجتمع.	D3– يتواصل باللغة العربية بطلاقة وفاعلية في مجال تخصصه.

مواءمة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقويم Alignment of CILOs to Teaching and Assessment Strategies			
أولا: مواءمة مخرجات تعلم المقرر (المعارف والفهم) باستراتيجية التعليم والتعلم والتقويم: First: Alignment of Knowledge and Understanding CILOs			
مخرجات المقرر/ المعرفة والفهم Knowledge and Understanding CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
- a1	يُظهر معرفة وفهما سليما لقواعد اللغة العربية الأساسية وأساليبها المساعدة في تنمية مهارتي الاتصال والتواصل.	المحاضرة . الحوار والمناقشة. الاكتشاف الموجه. التعلم الذاتي. التعلم التعاوني. العصف الذهني. المحاكاة.	الاختبارات التحريرية النصفية والنهائية. الاختبارات الشفهية. تقييم تقارير المهام و التكاليف الفردية والجماعية. الاختبارات القصيرة (الكوزات).
– a2	يشرح النصوص المسموعة والمقروءة بطريقة صحيحة.		
– a3	يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.		
ثانيا: مواءمة مخرجات تعلم المقرر (المهارات الذهنية) باستراتيجية التدريس والتقويم: Second: Alignment of Intellectual Skills CILOs			
مخرجات المقرر/ المهارات الذهنية Intellectual Skills CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
–b1	يُميز بين القواعد اللغوية الأساسية بما يضمن التوظيف الأمثل عند استخدامها.	المحاضرة الحوار والمناقشة. الاكتشاف الموجه. العصف الذهني. التعلم الذاتي.	الاختبارات التحريرية النصفية والنهائية. الاختبارات الشفهية. تقييم تقارير المهام و التكاليف الفردية والجماعية.
- b2	يقارن بين الأساليب اللغوية المساعدة على التعبير السليم عن المعاني المختلفة.		
b3	يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية.		

		حل المشكلات. مجموعات العمل.	الاختبارات القصيرة (الكوزات).
ثالثا: مواءمة مخرجات تعلم المقرر (المهارات المهنية والعملية) باستراتيجية التدريس والتقويم: Third: Alignment of Professional and Practical Skills CILOs			
مخرجات المقرر/ المهارات المهنية والعملية Professional and Practical Skills CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
c1-	يوظف قواعد الإملاء في قراءاته وكتاباته بصورة صحيحة.	العروض العملية والمحاكاة. التطبيقات العملية والتكاليف. حل المشكلات. التعلم التعاوني. تبادل الخبرات بين الزملاء. الحوار والمناقشة. التعلم الذاتي.	ملاحظة الاداء. الاختبارات التحريرية. تقييم تقارير المهام والتكليفات التطبيقية. الاختبارات الشفهية.
c2-	يطبق قواعد الرسم الكتابي الصحيح في كتاباته .		
c3-	يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم في مجال تخصصه بكفاءة.		

رابعا: مواءمة مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقويم: Fourth: Alignment of Transferable (General) Skills CILOs			
مخرجات المقرر Transferable (General) Skills CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
-d1	ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في التعبير عن نفسه وعن محيطه.	الحوار والمناقشة التعلم الذاتي التعلم التعاوني. المهام والتكاليف. تبادل الخبرات بين الزملاء	ملاحظة الأداء. تقييم تقارير التكليفات والمشاريع. تقييم العروض التقديمية.
-d2	يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.		
-d3	يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية وقيم المجتمع.	الحوار والمناقشة التعلم الذاتي التعلم التعاوني. المهام والتكاليف. تبادل الخبرات بين الزملاء	ملاحظة الأداء. تقييم تقارير التكليفات والمشاريع. تقييم العروض التقديمية.

موضوعات محتوى المقرر Course Content					
أولا: موضوعات الجانب النظري Theoretical Aspect					
الرقم Order	الموضوعات الرئيسة/ الوحدات Topic List / Units	الموضوعات التفصيلية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم للمقرر (CILOs)
1	الاتصال والتواصل باللغة العربية.	مفهوم عمليتي الاتصال والتواصل وطبيعتهما	W1	2	a1, a2, a3, b2, b3. c1, d1
		مفهوم اللغة ووظائفها . خصائص اللغة العربية.			

2	نصوص للاستماع والقراءة	نصوص قرآنية(للحث على التفكير والعلم). نصوص من الحديث الشريف(للحث على العمل). نصوص شعرية ونثرية (للحث على القيم الإنسانية)	3 W	6	a1, a2, a3, b2, b3. c1, c2, d1
3	قواعد الرسم الكتابي (الخط)	الأخطاء الشائعة في الرسم الكتابي للحروف. رسم الحروف العربية في المواقع المختلفة من الكلمة.	W1	2	a1, a2, b1, c2, c3, d1, d2, d3
4	قواعد الإملاء الأساسية.	التاء المربوطة والتاء المفتوحة والهاء. همزة الوصل وهمزة القطع. الهمزة المتوسطة والمتطرفة. الحذف والزيادة في الكلمات العربية.	W4	8	a1, a2, a3, b1,b3. c1, c2, c3, d1, d2, d3
5	أقسام الكلمة العربية	مفهوم الاسم وعلاماته. مفهوم الفعل وعلاماته. مفهوم الحرف وعلاماته.	W1	2	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
6	أنواع الجملة العربية	الجملة الاسمية. نواسخ الجملة الاسمية. الجملة الفعلية.	W3	6	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
7	الأساليب العربية	الأسلوب الأدبي والأسلوب العلمي. بعض الأساليب النحوية.	W1	2	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
		إجمالي عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester	14	28	

ثانيا: موضوعات الجانب العملي Practical Aspect

الرقم Order	التجارب العملية/ تدريبات Practical / Tutorials topics	عدد الأسابيع	الساعات الفعلية	رموز مخرجات التعلم Course ILOs

		Number of Weeks	Contact Hours	
1	تدريبات لغوية على الاشتقاق والتوليد.	1	1	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
2	تدريبات على تحليل النصوص .	3	3	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
3	تدريبات على رسم الحروف العربية في مواضعها المختلفة.	1	1	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
4	تدريبات على قواعد الإملاء.	4	4	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
5	تدريبات لتمييز أقسام الكلمة العربية.	1	1	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
6	تدريبات لتمييز أنواع الجملة العربية.	3	3	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
7	تدريبات للتمييز بين الأساليب العربية.	1	1	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		14	14	

استراتيجيات التدريس Teaching Strategies:
المحاضرة التفاعلية Lectures
الاكتشاف الموجه.targeted detection,
الحوار والمناقشة discussion
العصف الذهني Brainstorming
حل المشكلاتProblem solving
المحاكاة والعروض العملية Practical presentations& Simulation Method
التطبيق العملي Practical in computer Lab (Lab works)
المهام والتكاليف projects

التعلم الذاتي Self-learning
التعلم التعاوني Cooperative Learning
تبادل الخبرات بين الزملاء Exchange experiences

الأنشطة والتكليفات Tasks and Assignments:

م No	الأنشطة / التكليف Assignments/ Tasks	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due	مخرجات التعلم CILOs (symbols)
	قراءة وتلخيص بعض النصوص.	فردي	4	W2	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	تحليل كتابات الزملاء لاكتشاف أخطاء الرسم الكتابي والإملائي وتصويبها.	تعاوني	2	W4	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	نقل نص من النصوص بخط اليد مع التركيز على رسم الحروف بطريقة صحيحة، والتفكر في كتابته كتقييم ذاتي.	فردي	3	W5	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	تحليل نصوص مختارة بوضع قائمة بالأفعال والأسماء والحروف التي تضمنتها .	فردي	2	W6	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	تكليف بإنشاء جمل اسمية وجمل فعلية وفق القواعد النحوية.	فردي	3	W7	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	تكليف بإدخال الحروف الناسخة ثم الأفعال الناسخة على عدد من الجمل الاسمية وتغيير ما يلزم تغييره في الجملة.	فردي	3	W8	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3

	تكليف بمحاكاة الأساليب المعطاة بأساليب جديدة من إنشاء الطالب.	فردي	3	W9	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	إجمالي الدرجة Total Score		20		

تقييم التعلم Learning Assessment:

الرقم No.	أنشطة التقييم Assessment Tasks	أسبوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة النهائية Proportion of Final Assessment	مخرجات التعلم CILOs (symbols)
1	المهام والواجبات Tasks and Assignments	W2, 4, 5 ,6, 7,8 ,9.	20	% 20	a1, a2, a3, b1, b2, b3.c1, c2, c3, d1, d2, d3
2	كوز(1) Quiz	W3	5	% 5	a1, a2, a3, c1, c2
3	اختبار نصف الفصل	W6	10	% 10	a1, a2, b1, b2,b3. c1, c2,
4	كوز(2) Quiz	W9	5	% 5	a1, a2, a3, b1, b2, c1, c2, d1,
5	اختبار نهاية الفصل Final Exam	W13	60	% 40	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3
	Totalالإجمالي		100	%100	a1, a2, a3, b1, b2,b3. c1, c2, c3, d1, d2, d3

مصادر التعلم Learning Resources: كتابة المراجع للمقرر (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
المراجع الرئيسة Required Textbook(s): (لا تزيد عن مرجعين)
سعاد سالم السبع(2017) : التدريبات اللغوية في قواعد الإملاء والنحو والصرف ، مكتبة الصادق صنعاء.
المراجع المساندة Essential References:
أحمد نعيم الكراعين وزميلاه(د-ت): أسس وتطبيقات نحوية، منشورات جامعة صنعاء. صنعاء. حسن محمد نور الدين(1996): الدليل إلى قواعد اللغة العربية، دار العلوم العربية للطباعة والنشر، بيروت لبنان. ضرغام الأجودي(2019) : أكثر الأخطاء اللغوية والإملائية شيوعا، دار الأمل للنشر، بغداد. عبد السلام هارون(د-ت): الأساليب الإنشائية في النحو العربي، مكتبة الخانجي، القاهرة. عبد السلام هارون(1993): قواعد الإملاء، مكتبة الأنجلو المصرية، القاهرة. علي الجارم ومصطفى أمين(2003): النحو الواضح في قواعد اللغة العربية ، دار المعارف، القاهرة.
المصادر الإلكترونية ومواقع الإنترنت... Electronic Materials and Web Sites etc.
http://ar.islamway.net/book. cmawdoo3.com. // https: http://www.ballighofiles.com/umzayd/na7w-watheefi.pdf http://ia700508.us.archive.org/18/items/waq112462/112462.pdf http://archive.org/do http://mybook4u.com/%D9%85%D9%86%D9%88%D8%B9%D8%A9/download/download/3600 http://lisaanularab.blogspot.com/2015/11/blog-post_93.html

الضوابط والسياسات المتبعة في المقرر Course Policies	
بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
1	سياسة حضور الفعاليات التعليمية Class Attendance: يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. يقدم أستاذ المقرر تقريرا بحضور وغياب الطلبة للقسم، ويحرم الطالب من دخول الاختبار في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: يسمح للطالب بحضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفهيا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الاختبار Exam Attendance/Punctuality: لا يسمح للطالب بدخول الاختبار النهائي إذا تأخر مقدار (20) دقيقة من بدء الاختبار إذا تغيب الطالب عن الاختبار النهائي تطبق اللوائح الخاصة بنظام الاختبار في الكلية.
4	التعيينات والمشاريع Assignments & Projects: يحدد أستاذ المقرر نوع التعيينات والمهام في بداية الفصل، ويحدد مواعيد تسليمها وضوابط تنفيذها وتسليمها. إذا تأخر الطالب في تنفيذ المهام وتسليم التكليفات عن الموعد المحدد يحرم من درجة المهمة أو التكليف الذي تأخر في تسليمه.
5	الغش Cheating: في حال ثبوت قيام الطالب بالغش في الاختبار النصفي أو النهائي تطبق عليه لائحة شؤون الطلبة. في حال ثبوت قيام الطالب بالغش او النقل في التكليفات والمهام يحرم من الدرجة المخصصة للمهام أو التكاليف .
6	الانتحال Plagiarism: في حالة وجود شخص ينتحل شخصية طالب لأداء الاختبار نيابة عنه تطبق اللائحة الخاصة بذلك.
7	سياسات أخرى Other policies: أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكليفات ...الخ

خطة مقرر: لغة عربية 101

معلومات عن أستاذ المقرر Information about Faculty Member Responsible for the Course								
الاسم Name		الساعات المكتبية (أسبوعيا) Office Hours	(3/ أسبوعيا)					
المكان ورقم الهاتف Location &Telephone No.	مكتب أعضاء هيئة التدريس	السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE	الأربعاء WED	الخميس THU
البريد الإلكتروني E-mail	sss						

معلومات عامة عن المقرر General information about the course:					
	اسم المقرر Course Title	اللغة العربية 101			
	رمز المقرر ورقمه Course Code and Number	101UR			
	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		1	-	0	1
	المستوى والفصل الدراسي Study Level and Semester	المستوى الأول/ الفصل الأول			
	المتطلبات السابقة المقرر (إن وجدت) Pre-requisites (if any)	لا توجد			
	المتطلبات المصاحبة (إن وجدت)	لا توجد			

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	Co-requisites (if any)	
	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	برنامج المتطلبات الجامعية.
	لغة تدريس المقرر Language of teaching the course	اللغة العربية
	نظام الدراسة Study System	فصلي / انتظام
	معد(و) مواصفات المقرر Prepared By	أ.د/سعاد سالم السبع
	تاريخ اعتماد مواصفات المقرر Date of Approval	

ملاحظة: الساعة المعتمدة للعملي وللتمارين تساوى ساعتين فعليتين خلال التدريس.

وصف المقرر Course Description:
يتناول هذا المقرر موضوعات تتعلق بالمهارات اللغوية الأساسية في الاستماع والقراءة وكتابة الملخصات والخط والإملاء، وبعض القواعد النحوية والصرفية والبلاغية التي تساعد غير المتخصصين في اللغة العربية على الاتصال والتواصل الفعال، ويتم عرض المهارات اللغوية من خلال بعض النصوص اللغوية من القرآن الكريم ومن الحديث الشريف ومن النصوص الأدبية العربية (الشعرية والنثرية) التي تنمي لديهم المهارات اللغوية وتذوق جمال اللغة العربية، وفهم ما تحمله من طاقات تعبيرية وتصويرية تؤكد لديهم الاعتزاز بالعربية، والإيمان بكفاءتها التواصلية وطاقاتها التعبيرية، وأنها لغة حياة متجددة. وتلي هذه النصوص تدريبات لغوية متنوعة تنمي قدرات الطلبة على المهارات اللغوية وعلى فهم النصوص وتحليلها وتلخيصها وتوظيفها في تحسين قدراتهم اللغوية المستهدفة، والتعبير عن أفكارهم وأحاسيسهم، واحتياجاتهم بلغة عربية سليمة.

مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):
بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 - يُظهر معرفة وفهما سليما لقواعد اللغة العربية الأساسية وأساليبها المساعدة في تنمية مهارتي الاتصال والتواصل.
a2 - يشرح النصوص المسموعة والمقروءة بطريقة صحيحة..
a3- يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.
b1- يُميز بين القواعد اللغوية الأساسية بما يضمن التوظيف الأمثل عند استخدامها.
b2 - يقارن بين الأساليب اللغوية المساعدة على التعبير السليم عن المعاني المختلفة.

b3	يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية.
c1 -	يوظف قواعد الإملاء في قراءاته وكتاباته بصورة صحيحة.
c2 -	يطبق قواعد الرسم الكتابي الصحيح في كتاباته .
c3 -	يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم وفي مجال تخصصه بكفاءة.
d1 -	ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في التعبير عن نفسه وعن محيطه.
d2 –	يُطور قدراته العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.
d3-	يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية وقيم المجتمع.

محتوى المقرر Course Content

أولا: موضوعات الجانب النظري Theoretical Aspect

الرقم Order	الموضوعات الرئيسة/ الوحدات Topic List / Units	الموضوعات التفصيلية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours
1	الاتصال والتواصل باللغة العربية.	-مفهوم عمليتي الاتصال والتواصل وطبيعتهما مفهوم اللغة ووظائفها . خصائص اللغة العربية.	W1	2
2	نصوص للاستماع والقراءة	نصوص قرآنية(للحث على التفكير والعلم). نصوص من الحديث الشريف(للحث على العمل). نصوص شعرية ونثرية (للحث على القيم الإنسانية)	3 W	6
3	قواعد الرسم الكتابي (الخط)	الأخطاء الشائعة في الرسم الكتابي للحروف رسم الحروف العربية في المواقع المختلفة من الكلمة.	W1	2
4	قواعد الإملاء الأساسية.	التاء المربوطة والتاء المفتوحة والهاء. همزة الوصل وهمزة القطع	W4	8

		الهمزة المتوسطة والمتطرفة.		
		الحذف والزيادة في الكلمات العربية.		
5	أقسام الكلمة العربية	مفهوم الاسم وعلاماته.	W1	2
		مفهوم الفعل وعلاماته.		
		مفهوم الحرف وعلاماته.		
6	أنواع الجملة العربية	الجملة الاسمية.	W3	6
		نواسخ الجملة الاسمية.		
		الجملة الفعلية.		
7	الأساليب العربية	الأسلوب الأدبي والأسلوب العلمي	W1	2
		بعض الأساليب النحوية.		
إجمالي عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			14	28

ثانيا: خطة تنفيذ الجانب العملي Practical Aspect

الرقم Order	المهام / التمارين Tutorials/ Exercises	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours
1	تدريبات لغوية على الاشتقاق والتوليد.	1	1
2	تدريبات على تحليل النصوص .	3	3
3	تدريبات على رسم الحروف العربية في مواضعها المختلفة.	1	1
4	تدريبات على قواعد الإملاء.	4	4
5	تدريبات على أقسام الكلمة العربية.	1	1
6	تدريبات على أنواع الجملة العربية.	3	3

7	تدريبات على أنواع الأساليب العربية.	1	1
	إجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester	14	14

استراتيجيات التدريس Teaching Strategies:
المحاضرة التفاعلية Lectures
الاكتشاف الموجه.,targeted detection
الحوار والمناقشة discussion
العصف الذهني Brainstorming
حل المشكلاتProblem solving
المحاكاة والعروض العملية Practical presentations& Simulation Method
التطبيق العملي Practical in computer Lab (Lab works)
المهام والتكاليف projects
التعلم الذاتي Self-learning
التعلم التعاوني Cooperative Learning
تبادل الخبرات بين الزملاء Exchange experiences

الأنشطة والتكليفات Tasks and Assignments:

م No	الأنشطة / التكليف Assignments/ Tasks	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due
	قراءة وتلخيص بعض النصوص.	فردي	4	W2
	تحليل كتابات الزملاء لاكتشاف أخطاء الرسم الكتابي والإملائي وتصويبهما.	تعاوني	2	W4
	نقل نص من النصوص بخط اليد مع التركيز على رسم الحروف بطريقة صحيحة.	فردي	3	W5

	تحليل نصوص بوضع قائمة بالأفعال والأسماء والحروف التي تضمنتها.	فردي	2	W6
	تكليف بإنشاء جمل اسمية و جمل فعلية وفق القواعد النحوية.	فردي	3	W7
	تكليف بإدخال الحروف الناسخة ثم الأفعال الناسخة على عدد من الجمل الاسمية وتغيير ما يلزم تغييره في الجملة.	فردي	3	W8
	تكليف بمحاكاة الأساليب المعطاة بأساليب جديدة من إنشاء الطالب.	فردي	3	W9
	إجمالي الدرجة Total Score		20	

تقويم التعلم Learning Assessment :

الرقم No.	أساليب التقويم Assessment Method	موعد(أسبوع) التقويم Week Due	الدرجة Mark	الوزن النسبي% Proportion of Final Assessment
1	التكليفات والواجبات Tasks and Assignments	W2, 4, 5 ,7,8 ,6, ,9.	20	% 20
2	كوز(1) Quiz	W3	5	% 5
3	اختبار نصف الفصل	W6	10	% 10
4	كوز(2) Quiz	W9	5	% 5
5	اختبار نهاية الفصل Final Exam	W13	60	% 40
	Totalالإجمالي		100	%100

مصادر التعلم Learning Resources: كتابة المراجع للمقرر (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
المراجع الرئيسة Required Textbook(s): (لا تزيد عن مرجعين)
سعاد سالم السبع(2017) : التدريبات اللغوية في قواعد الإملاء والنحو والصرف ، مكتبة الصادق صنعاء.
المراجع المساندة Essential References:
أحمد نعيم الكراعين وزميلاه(د-ت): أسس وتطبيقات نحوية، منشورات جامعة صنعاء. صنعاء. حسن محمد نور الدين(1996): الدليل إلى قواعد اللغة العربية، دار العلوم العربية للطباعة والنشر، بيروت لبنان. ضرغام الأجودي(2019) : أكثر الأخطاء اللغوية والإملائية شيوعا، دار الأمل للنشر، بغداد. عبد السلام هارون(د-ت): الأساليب الإنشائية في النحو العربي، مكتبة الخانجي، القاهرة. عبد السلام هارون(1993): قواعد الإملاء، مكتبة الأنجلو المصرية، القاهرة. علي الجارم ومصطفى أمين(2003): النحو الواضح في قواعد اللغة العربية ، دار المعارف، القاهرة.
المصادر الإلكترونية ومواقع الإنترنت... Electronic Materials and Web Sites etc.
http://ar.islamway.net/book. cmawdoo3.com. // https: http://www.ballighofiles.com/umzayd/na7w-watheefi.pdf http://ia700508.us.archive.org/18/items/waq112462/112462.pdf http://archive.org/do http://mybook4u.com/%D9%85%D9%86%D9%88%D8%B9%D8%A9/download/download/3600 http://lisaanularab.blogspot.com/2015/11/blog-post_93.html

!! الضوابط والسياسات المتبعة في المقرر Course Policies	
بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
1	سياسة حضور الفعاليات التعليمية Class Attendance: يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. يقدم أستاذ المقرر تقريرا بحضور وغياب الطلبة للقسم، ويحرم الطالب من دخول الاختبار في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: يسمح للطالب بحضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفهيا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الاختبار Exam Attendance/Punctuality: لا يسمح للطالب بدخول الاختبار النهائي إذا تأخر مقدار (20) دقيقة من بدء الاختبار إذا تغيب الطالب عن الاختبار النهائي تطبق اللوائح الخاصة بنظام الاختبار في الكلية.
4	التعيينات والمشاريع Assignments & Projects: يحدد أستاذ المقرر نوع التعيينات والمهام في بداية الفصل، ويحدد مواعيد تسليمها وضوابط تنفيذها وتسليمها. إذا تأخر الطالب في تنفيذ المهام وتسليم التكليفات عن الموعد المحدد يحرم من درجة المهمة أو التكليف الذي تأخر في تسليمه.
5	الغش Cheating: في حال ثبوت قيام الطالب بالغش في الاختبار النصفي أو النهائي تطبق عليه لائحة شؤون الطلبة. في حال ثبوت قيام الطالب بالغش او النقل في التكليفات والمهام يحرم من الدرجة المخصصة للمهام أو التكاليف .
6	الانتحال Plagiarism: في حالة وجود شخص ينتحل شخصية طالب لأداء الاختبار نيابة عنه تطبق اللائحة الخاصة بذلك.
7	سياسات أخرى Other policies: أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكليفات ...الخ

مواصفات مقرر: اللغة العربية (102)

معلومات عامة عن المقرر General information about the course:						
	اسم المقرر Course Title	اللغة العربية 102				
	رمز المقرر ورقمه Course Code and Number	102UR				
	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total	
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial		
		1	-	0	1	
	المستوى والفصل الدراسي Study Level and Semester	المستوى الأول/ الفصل الثاني				
	المتطلبات السابقة المقرر (إن وجدت) Pre-requisites (if any)	لا توجد				
	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	لا توجد				
	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	برنامج المتطلبات الجامعية				
	لغة تدريس المقرر Language of teaching the course	اللغة العربية				
	نظام الدراسة Study System	فصلي / انتظام				
	معد(و) مواصفات المقرر Prepared By	أ.د/سعاد سالم السبع				
	تاريخ اعتماد مواصفات المقرر					

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	Date of Approval	

وصف المقرر Course Description:
يتناول هذا المقرر موضوعات تتعلق باستخدام المعاجم العربية ، وبعلامات الترقيم، واستخدام مصادر المعرفة، كما يتناول قواعد أساسية تتعلق بالمهارات اللغوية الأساسية في الكتابة الوظيفية التي تساعد غير المتخصصين في اللغة العربية على الاتصال والتواصل الكتابي الفعال، ويتضمن هذا المقرر المعارف والقواعد الأساسية المتصلة بالكتابة الوظيفية، وبالذات المقالات و التقارير، والرسائل الوظيفية، والسير الذاتية، كما يتضمن نماذج لأنواع الكتابة الوظيفية يتم من خلالها تدريب الطلبة على مهارات كتابة المقالة والتقرير والرسائل الوظيفية وعلى مهارة الكشف عن الكلمات في المعاجم العربية، وعلى كيفية استخدام علامات الترقيم وتسهم هذه التدريبات المتنوعة في تنمية قدرات الطلبة على توظيف ما تعلموه في كتابة مقالات وتقارير عن تخصصاتهم بلغة عربية سليمة.
مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):
بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن: a1 - يُظهر معرفة وفهما سليما بطرائق الكشف عن معاني الكلمات في المعاجم العربية، وبقواعد وخطوات الكتابة الوظيفية ، وبعلامات الترقيم في الكتابة العربية . a2 - يوضح أنواع الكتابة الوظيفية، وأهمية استخدامها في مجال تخصصه وفي مجالات الاتصال والتواصل المختلفة. a3- يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة. b1- يُميز بين مكونات أنواع الكتابة الوظيفية: (المقالة- التقرير- الرسالة الوظيفية- والسيرة الذاتية). b2 - يشرح مكونات نماذج الكتابات الوظيفية المعروضة عليه بصورة سليمة. b3- يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية. c1 - يطبق قواعد الكتابة الوظيفية في كتابة مقالات وتقارير متصلة بتخصصه وبمحيطه بصورة صحيحة. c2 - يستخدم المعاجم اللغوية وعلامات الترقيم في كتاباته بصورة صحيحة . c3 - يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم وفي كتاباته الوظيفية بمجال تخصصه بكفاءة. d1- ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في كتاباته الوظيفية في مجال تخصصه. d2 - يُطور قدراته اللغوية و العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة. d3 - يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية كتابيا وشفهيا وقيم المجتمع.

مواءمة مخرجات تعلم المقرر مع مخرجات التعلم للبرنامج: Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)		
مخرجات التعلم المقصودة من المقرر (Course Intended Learning Outcomes)		مخرجات التعلم المقصودة من البرنامج (Program Intended Learning Outcomes)
- a1	- يُظهر معرفة وفهما سليما بطرائق الكشف عن معاني الكلمات في المعاجم العربية، وبقواعد وخطوات الكتابة الوظيفية ، وبعلامات الترقيم في الكتابة العربية .	A1 يُظهر معرفة وفهما سليما باللغة العربية وتدريسها وتطويرها وتعميم استعمالها كلغة علمية وتعليمية في مختلف المجالات العلمية والمعرفية.
– a2	- يوضح أنواع الكتابة الوظيفية، وأهمية استخدامها في مجال تخصصه وفي مجالات الاتصال والتواصل المختلفة.	
-a3	يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.	
–b1	- يُميز بين مكونات أنواع الكتابة الوظيفية: (المقالة- التقرير- الرسالة الوظيفية- والسيرة الذاتية).	B1 يمارس مهارات التفكير المختلفة بشكل منهجي وإيجابي في تشخيص المشكلات والقضايا التي تواجهه أثناء العمل ويقترح الحلول المناسبة لها.
- b2	يشرح مكونات نماذج الكتابات الوظيفية المعروضة عليه بصورة سليمة.	B2- يعبر عن أفكاره بوضوح وموضوعية ، ويتحاور بإيجابية مع زملائه ورؤسائه ومرؤوسيه في العمل.
b3	يناقش ويقيم النصوص والقضايا اللغوية المعروضة عليه بموضوعية ومنهجية.	B3- يناقش ويقيم الدراسات والأبحاث المرتبطة بقضايا المجتمع بطريقة منهجية وموضوعية.
-c1	يطبق قواعد الكتابة الوظيفية في كتابة مقالات وتقارير متصلة بتخصصه وبمحيطه بصورة صحيحة.	C3يعد بحوثا ودراسات علمية في مجال تخصصه باللغة العربية.
-c2	يستخدم المعاجم اللغوية وعلامات الترقيم في كتاباته بصورة صحيحة .	
-c3	يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم وفي كتاباته الوظيفية بمجال تخصصه بكفاءة.	
-d1	ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في كتاباته الوظيفية في مجال تخصصه وفي التعبير عن نفسه.	D4– يطور قدراته المعرفية والمهنية والبحثية في مجال تخصصه ذاتيا.
-d2	يُطور قدراته اللغوية و العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.	
-d3	يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية كتابيا وشفهيا وقيم المجتمع.	D3– يتواصل باللغة العربية بطلاقة وفاعلية في مجال تخصصه.

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

مواءمة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقويم Alignment of CILOs to Teaching and Assessment Strategies			
أولا: مواءمة مخرجات تعلم المقرر (المعارف والفهم) باستراتيجية التعليم والتعلم والتقويم: First: Alignment of Knowledge and Understanding CILOs			
مخرجات المقرر/ المعرفة والفهم Knowledge and Understanding CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
a1 -	- يُظهر معرفة وفهما سليما بطرائق الكشف عن معاني الكلمات في المعاجم العربية، وبقواعد وخطوات الكتابة الوظيفية ، وبعلامات الترقيم في الكتابة العربية .	المحاضرة . الحوار والمناقشة. الاكتشاف الموجه. التعلم الذاتي. التعلم التعاوني. العصف الذهني. المحاكاة.	الاختبارات التحريرية النصفية والنهائية. الاختبارات الشفهية. تقييم تقارير المهام و التكاليف الفردية والجماعية. الاختبارات القصيرة (الكوزات).
a2 –	- يوضح أنواع الكتابة الوظيفية، وأهمية استخدامها في مجال تخصصه وفي مجالات الاتصال والتواصل المختلفة.		
a3 –	يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.		
ثانيا: مواءمة مخرجات تعلم المقرر (المهارات الذهنية) باستراتيجية التدريس والتقويم: Second: Alignment of Intellectual Skills CILOs			
مخرجات المقرر/ المهارات الذهنية Intellectual Skills CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
b1–	- يُميز بين مكونات أنواع الكتابة الوظيفية: (المقالة- التقرير- الرسالة الوظيفية- والسيرة الذاتية).	المحاضرة الحوار والمناقشة. الاكتشاف الموجه.	الاختبارات التحريرية النصفية والنهائية. الاختبارات الشفهية.
b2 -	يشرح مكونات نماذج الكتابات الوظيفية المعروضة عليه بصورة سليمة.		

b3	يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية.	العصف الذهني. التعلم الذاتي. حل المشكلات. مجموعات العمل.	تقييم تقارير المهام و التكاليف الفردية والجماعية. الاختبارات القصيرة (الكوزات).
ثالثا: مواءمة مخرجات تعلم المقرر (المهارات المهنية والعملية) باستراتيجية التدريس والتقويم: Third: Alignment of Professional and Practical Skills CILOs			
	مخرجات المقرر/ المهارات المهنية والعملية Professional and Practical Skills CILOs	استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
c1-	يطبق قواعد الكتابة الوظيفية في كتابة مقالات وتقارير متصلة بتخصصه وبمحيطه بصورة صحيحة.	العروض العملية والمحاكاة. التطبيقات العملية والتكاليف. حل المشكلات. التعلم التعاوني. تبادل الخبرات بين الزملاء. الحوار والمناقشة. التعلم الذاتي.	ملاحظة الاداء. الاختبارات التحريرية. تقييم تقارير المهام والتكليفات التطبيقية. الاختبارات الشفهية.
c2-	يستخدم المعاجم اللغوية وعلامات الترقيم في كتاباته بصورة صحيحة .		
c3-	يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم وفي كتاباته الوظيفية بمجال تخصصه بكفاءة.		

رابعا: مواءمة مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقويم:

Fourth: Alignment of Transferable (General) Skills CILOs

مخرجات المقرر Transferable (General) Skills CILOs		استراتيجية التدريس Teaching Strategies	استراتيجية التقويم Assessment Strategies
d1-	ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في كتاباته الوظيفية في مجال تخصصه، وعند التعبير عن نفسه ومحيطه.	الحوار والمناقشة التعلم الذاتي التعلم التعاوني. المهام والتكاليف. تبادل الخبرات بين الزملاء	ملاحظة الأداء. تقييم تقارير التكليفات والمشاريع. تقييم العروض التقديمية.
d2-	يُطور قدراته اللغوية و العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.		
d3-	يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية كتابيا وشفهيا وقيم المجتمع.	الحوار والمناقشة التعلم الذاتي التعلم التعاوني. المهام والتكاليف. تبادل الخبرات بين الزملاء	ملاحظة الأداء. تقييم تقارير التكليفات والمشاريع. تقييم العروض التقديمية.

موضوعات محتوى المقرر Course Content

أولا: موضوعات الجانب النظري Theoretical Aspect

الرقم Order	الموضوعات الرئيسة/ الوحدات Topic List / Units	الموضوعات التفصيلية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم للمقرر (CILOs)
1	استخدام المعاجم العربية.	لسان العرب (لام الكلمة). القاموس المحيط (لام الكلمة) مختار الصحاح (فاء الكلمة)	2 W	4	a1, a3, b3. c2,c3 d1. d2.d3

		المعجم الوسيط(فاء الكلمة)			
2	علامات الترقيم	مفهوم علامات الترقيم وأهميتها.	W2	4	a1, a3, b3. c2,c3 d1. d2.d3
		أنواع علامات الترقيم.			
		مواضع استخدام علامات الترقيم.			
3	الكتابة الوظيفية	مفهوم الكتابة الوظيفية وأهميتها .	7 W	14	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
		قواعد الكتابة الوظيفية وخطواتها.			
		كتابة المقالة.			
		كتابة التقرير.			
		كتابة الرسالة الوظيفية.			
		كتابة السيرة الذاتية.			
4	استخدام مصادر المعرفة.	أهمية المعرفة، والبحث عنها.	3 W	6	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
		أنواع مصادر المعرفة.			
		الاقتباس والتضمين.			
		التوثيق بطريقة صحيحة.			
إجمالي عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			14	28	

ثانيا: موضوعات الجانب العملي Practical Aspect

الرقم Order	التجارب العملية/ تدريبات Practical / Tutorials topics	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم Course ILOs
1	تدريبات لغوية على الكشف عن معاني الكلمات في المعاجم العربية.	2	2	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
2	تدريبات لغوية على استخدام علامات الترقيم .	2	2	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة
ا.د. ماجد علوان ا.د. محمود البريهي ا.د. ماجد علوان د.خالد الشوبة ا.م.د. هدى العماد ا.د. القاسم محمد عباس

3	تدريبات لغوية على الكتابة الوظيفية.	6	6	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
4	تدريبات لغوية على استخدام مصادر المعرفة.	4	4	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
	إجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester	14	14	

استراتيجيات التدريس Teaching Strategies:
المحاضرة التفاعلية Lectures
الاكتشاف الموجه.,targeted detection
الحوار والمناقشة discussion
العصف الذهني Brainstorming
حل المشكلاتProblem solving
المحاكاة والعروض العملية Practical presentations& Simulation Method
التطبيق العملي Practical in computer Lab (Lab works)
المهام والتكاليف projects
التعلم الذاتي Self-learning
التعلم التعاوني Cooperative Learning
تبادل الخبرات بين الزملاء Exchange experiences

الأنشطة والتكليفات Tasks and Assignments:

م No	الأنشطة / التكليف Assignments/ Tasks	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due	مخرجات التعلم CILOs (symbols)

	تكليف بالكشف عن عدد من المفردات في معجم لسان العرب والقاموس المحيط.	فردي	4	W2	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
	تكليف بوضع علامات الترقيم لنص خال من هذه العلامات.	جماعي	4	W4	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
	تحليل مقال وإعداد تقريرعنه في ضوء مكوناته.	فردي	4	W5	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
	كتابة مقال وتقرير عن موضوعين متصلين بتخصصه.	فردي	5	W6	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
	تكليف باقتباس نصوص من الكتب والمجلات والإنترنت وتوثيقها بطريقة صحيحة.	جماعي	3	W7	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
	إجمالي الدرجة Total Score		20		

تقييم التعلم Learning Assessment:

الرقم No.	أنشطة التقييم Assessment Tasks	أسوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة النهائية Proportion of Final Assessment	مخرجات التعلم CILOs (symbols)
1	التكليفات والواجبات Tasks and Assignments	W2, 4, 5, 6, 7,8 ,9.	20	% 20	a1,a2. a3, b1. b2. b3. c1 c2,c3 d1. d2.d3
2	كوز(1) Quiz	W3	5	% 5	a1, a2,a3.b3. c1, c2.
3	اختبار نصف الفصل	W6	10	% 10	a1, a2,a3. b1, b2,b3. c1, c2,
4	كوز(2) Quiz	W9	5	% 5	a1, a2,a3. b1, b2, c1, c2, d1,
5	اختبار نهاية الفصل Final Exam	W13	60	% 40	a1,a2. a3, b1. b2. b3. c1 c2,c3
	Totalالإجمالي		100	%100	a1, a2, b1, b2, c1, c2, c3, d1.

مصادر التعلم Learning Resources: كتابة المراجع للمقرر (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
المراجع الرئيسة Required Textbook(s): (لا تزيد عن مرجعين)
يفضل تأليف كتاب خاص بالمقرر وفق الموضوعات المشار إليها في محتوى المقرر لتحقيق المخرجات. وبما أن الموضوعات لا يشتملها كتاب واحد فينبغي الرجوع إلى المراجع الآتية: إبراهيم صبيح وزملاؤه(2013): فن الكتابة والتعبير، دار الفؤاد للطبع والنشر، القاهرة .(تحميل الكتاب : https://drive.google.com/file/d/1rbq_FzIvCCazURby8dLprTd646-Y2ATP/view?usp=sharing) أنس غسان الشيخ الخفاجي: السيرة الذاتية خطوات كتابة السيرة الذاتية، مركز الضيافة الدولية للتدريب السياحي والفندقي نس الشيخ الخفاجي، سوريا، دمشق،(pdf Facebook: facebook.com/anas.alsheikh1 خالد مصطفى(2018): مبادئ عامة لكتابة مقالة علمية ، الأرشيف العربي العلمي :DOI https://dx.doi.org/10.31221/osf.io/urbjg عبد العليم إبراهيم(1975) : الإملاء والترقيم في الكتابة العربية، مكتبة غريب، القاهرة. ماهر شعبان عبد الباري(2010): الكتابة الوظيفية والإبداعية(المجالات/ المهرات، الأنشطة، والتقويم) دار المسيرة للنشر والتوزيع والطباعة، عمَّان. (PDF RAR على موقع www.massira.jo). فخري خليل النجار(2011): الأسس الفنية للكتابة والتعبير، دار صفاء للنشر والتوزيع، عمان.(ملف الكتاب: PDF RAR على موقع www.darwafa.net
المراجع المساندة Essential References:
أحمد زكي باشا (1913): الترقيم في اللغة العربية ، دار الكتب الخديوية / مصر رشدي الأشهب (1983): فن الكتابة وأساليبها ، مؤسسة ابن رشد للنشر، القدس . عبد السلام هارون: (د-ت) الأساليب الإنشائية في النحو العربي، القاهرة، مكتبة الخانجي. عزب محمد عزب : مهارات كتابة السيرة الذاتية واجتياز المقابلة الشخصية، المكتب العربي لخدمات التدريب، أبو ظبي، ملف الكتاب: PDF RAR على موقع مكتبة نور. نبيل راغب(1982): القواعد الذهبية لإتقان اللغة العربية في النحو و الصرف و البلاغة، القاهرة، دار غريب منشور p d f على موقع: http://lisaanularab.blogspot.com/2015/11/blog-post_93.html - نبيل مسعد السيد غزي الخلاصة في قواعد الإملاء وعلامات الترقيم، ، دار غريب، القاهرة 2000م مجموعة من المؤلفين: تقنيات الكتابة : (1995) ، ترجمة :رعد عبد الجليل جواد، دار الحوار للنشر والتوزيع، اللاذقية، سوريا. منشور على موقع (noor-book.com)
المصادر الإلكترونية ومواقع الإنترنت... Electronic Materials and Web Sites etc.

مصادر التعلم Learning Resources: كتابة المراجع للمقرر (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
-1https// takwween.com -2https//sasapost.com -3 Noor –b00k.com -4https//mawdooa.com 5- fgs.najah.edu/ar/facult

الضوابط والسياسات المتبعة في المقرر Course Policies	
بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
1	سياسة حضور الفعاليات التعليمية Class Attendance: يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. يقدم أستاذ المقرر تقريرا بحضور وغياب الطلبة للقسم، ويحرم الطالب من دخول الاختبار في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: يسمح للطالب بحضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفهيا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الاختبار Exam Attendance/Punctuality: لا يسمح للطالب بدخول الاختبار النهائي إذا تأخر مقدار (20) دقيقة من بدء الاختبار إذا تغيب الطالب عن الاختبار النهائي تطبق اللوائح الخاصة بنظام الاختبار في الكلية.
4	التعيينات والمشاريع Assignments & Projects: يحدد أستاذ المقرر نوع التعيينات والمهام في بداية الفصل، ويحدد مواعيد تسليمها وضوابط تنفيذها وتسليمها. إذا تأخر الطالب في تنفيذ المهام وتسليم التكليفات عن الموعد المحدد يحرم من درجة المهمة أو التكليف الذي تأخر في تسليمه.
5	الغش Cheating: في حال ثبوت قيام الطالب بالغش في الاختبار النصفي أو النهائي تطبق عليه لائحة شؤون الطلاب. في حال ثبوت قيام الطالب بالغش او النقل في التكليفات والمهام يحرم من الدرجة المخصصة للمهام أو التكاليف .
6	الانتحال Plagiarism: في حالة وجود شخص ينتحل شخصية طالب لأداء الاختبار نيابة عنه تطبق اللائحة الخاصة بذلك.
7	سياسات أخرى Other policies: أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكليفات ...الخ

معلومات عن أستاذ المقرر Information about Faculty Member Responsible for the Course								
الاسم Name		الساعات المكتبية (أسبوعيا) Office Hours	(3/ أسبوعيا)					
المكان ورقم الهاتف Location &Telephone No.	مكتب أعضاء هيئة التدريس	السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE	الأربعاء WED	الخميس THU
البريد الإلكتروني E-mail	sss						

	معلومات عامة عن المقرر General information about the course:				
	اسم المقرر Course Title	اللغة العربية 102			
	رمز المقرر ورقمه Course Code and Number	102UR			
	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		2	-	0	2
	المستوى والفصل الدراسي Study Level and Semester	المستوى الأول/ الفصل الثاني			
	المتطلبات السابقة المقرر (إن وجدت) Pre-requisites (if any)	لا توجد			
	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	لا توجد			
	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	برنامج البكالوريوس (كلية الهندسة جميع الأقسام)			

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

	لغة تدريس المقرر Language of teaching the course	اللغة العربية
	نظام الدراسة Study System	فصلي / انتظام
	معد(و) مواصفات المقرر Prepared By	أ.د/سعاد سالم السبع
	تاريخ اعتماد مواصفات المقرر Date of Approval	

ملاحظة: الساعة المعتمدة للعملي وللتمارين تساوى ساعتين فعليتين خلال التدريس.

وصف المقرر Course Description:
يتناول هذا المقرر موضوعات تتعلق باستخدام المعاجم العربية ، وبعلامات الترقيم، واستخدام مصادر المعرفة، كما يتناول قواعد أساسية تتعلق بالمهارات اللغوية الأساسية في الكتابة الوظيفية التي تساعد غير المتخصصين في اللغة العربية على الاتصال والتواصل الكتابي الفعال، ويتضمن هذا المقرر المعارف والقواعد الأساسية المتصلة بالكتابة الوظيفية، وبالذات المقالات و التقارير، والرسائل الوظيفية، والسير الذاتية، كما يتضمن نماذج لأنواع الكتابة الوظيفية يتم من خلالها تدريب الطلبة على مهارات كتابة المقالة والتقرير والرسائل الوظيفية وعلى مهارة الكشف عن الكلمات في المعاجم العربية، وعلى كيفية استخدام علامات الترقيم وتسهم هذه التدريبات المتنوعة في تنمية قدرات الطلبة على توظيف ما تعلموه في كتابة مقالات وتقارير عن تخصصاتهم بلغة عربية سليمة.

مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs):
بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 - يُظهر معرفة وفهما سليما بطرائق الكشف عن معاني الكلمات في المعاجم العربية، وبقواعد وخطوات الكتابة الوظيفية ، وبعلامات الترقيم في الكتابة العربية .
a2 - يوضح أنواع الكتابة الوظيفية، وأهمية استخدامها في مجال تخصصه وفي مجالات الاتصال والتواصل المختلفة.
a3- يلخص المسموع و المقروء شفهيا وكتابيا بلغة عربية سليمة.
b1- يُميز بين مكونات أنواع الكتابة الوظيفية: (المقالة- التقرير- الرسالة الوظيفية- والسيرة الذاتية).
b2 - يشرح مكونات نماذج الكتابات الوظيفية المعروضة عليه بصورة سليمة.
b3- يناقش ويقيم القضايا اللغوية المعروضة عليه بموضوعية ومنهجية.
c1 - يطبق قواعد الكتابة الوظيفية في كتابة مقالات وتقارير متصلة بتخصصه وبمحيطه بصورة صحيحة.
c2 - يستخدم المعاجم اللغوية وعلامات الترقيم في كتاباته بصورة صحيحة .

c3 - يوظف قواعد اللغة العربية الأساسية في عملية البحث والتعلم وفي كتاباته الوظيفية بمجال تخصصه بكفاءة.
d1- ينمي ثروته اللغوية باستخدام ما تعلمه من مفردات وأساليب لغوية في كتاباته الوظيفية في مجال تخصصه.
d2 - يُطور قدراته اللغوية و العلمية والمهنية ذاتيا من خلال استثمار قواعد اللغة العربية وأساليبها المختلفة.
d3 - يتواصل مع الآخرين مراعيا في ذلك قواعد استخدام اللغة العربية كتابيا وشفهيا وقيم المجتمع.

محتوى المقرر Course Content				
أولا: موضوعات الجانب النظري Theoretical Aspect:				
الرقم Order	الموضوعات الرئيسة/ الوحدات Topic List / Units	الموضوعات التفصيلية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours
1	استخدام المعاجم العربية.	لسان العرب (لام الكلمة).	2 W	4
		القاموس المحيط (لام الكلمة)		
		مختار الصحاح (فاء الكلمة)		
		المعجم الوسيط(فاء الكلمة)		
2	علامات الترقيم	مفهوم علامات الترقيم وأهميتها.	W2	4
		أنواع علامات الترقيم.		
		مواضع استخدام علامات الترقيم.		
3	الكتابة الوظيفية	مفهوم الكتابة الوظيفية وأهميتها .	7 W	14
		قواعد الكتابة الوظيفية وخطواتها.		
		كتابة المقالة.		
		كتابة التقرير.		
		كتابة الرسالة الوظيفية.		
		كتابة السيرة الذاتية.		
4	استخدام مصادر المعرفة.	أهمية المعرفة، والبحث عنها.	3 W	6
		أنواع مصادر المعرفة.		

		الاقتباس والتضمين.		
		التوثيق بطريقة صحيحة.		
إجمالي عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			14	28

ثانيا: خطة تنفيذ الجانب العملي Practical Aspect

الرقم Order	المهام / التمارين Tutorials/ Exercises	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours
1	تدريبات لغوية على الكشف عن معاني الكلمات في المعاجم العربية.	2	2
2	تدريبات لغوية على استخدام علامات الترقيم .	2	2
3	تدريبات لغوية على الكتابة الوظيفية.	6	6
4	تدريبات لغوية على استخدام مصادر المعرفة.	4	4
إجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		14	14

استراتيجيات التدريسTeaching Strategies:
المحاضرة التفاعليةLectures
الاكتشاف الموجه.targeted detection,
الحوار والمناقشةdiscussion
العصف الذهنيBrainstorming
حل المشكلات Problem solving
المحاكاة والعروض العمليةSimulation Method Practical presentations&

التطبيق العملي Practical in computer Lab) Lab works(
المهام والتكاليف projects
التعلم الذاتي Self-learning
التعلم التعاوني Cooperative Learning
تبادل الخبرات بين الزملاء Exchange experiences

i. الأنشطة والتكليفات Tasks and Assignments:

م No	الأنشطة / التكليف Assignments/ Tasks	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due
	تكليف بالكشف عن عدد من المفردات في معجم لسان العرب والقاموس المحيط.	فردي	4	W2
	تكليف بوضع علامات الترقيم لنص خال من هذه العلامات.	جماعي	4	W4
	تحليل مقال وتقرير في ضوء مكونات كل نوع.	فردي	4	W5
	كتابة مقال وتقرير عن موضوعين متصلين بتخصصه.	فردي	5	W6
	تكليف باقتباس نصوص من الكتب والمجلات والإنترنت وتوثيقها بطريقة صحيحة.	جماعي	3	W7
	إجمالي الدرجة Total Score		20	

تقويم التعلم Learning Assessment

الرقم No.	أساليب التقويم Assessment Method	موعد(أسبوع) التقويم Week Due	الدرجة Mark	الوزن النسبي% Proportion of Final Assessment
1	التكليفات والواجبات Tasks and Assignments	W2, 4, 5, 7,8, 6, 9.	20	% 20

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

2	كوز(1) Quiz	W3	5	% 5
3	اختبار نصف الفصل	W6	10	% 10
4	كوز(2) Quiz	W9	5	% 5
5	اختبار نهاية الفصل Final Exam	W13	60	% 40
	Total الإجمالي		100	%100

مصادر التعلم Learning Resources: كتابة المراجع للمقرر (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
المراجع الرئيسة Required Textbook(s): (لا تزيد عن مرجعين)
يفضل تأليف كتاب خاص بالمقرر وفق الموضوعات المشار إليها في محتوى المقرر لتحقيق المخرجات. وبما أن الموضوعات لا يشتملها كتاب واحد فينبغي الرجوع إلى المراجع الآتية: إبراهيم صبيح وزملاؤه(2013): فن الكتابة والتعبير، دار الفؤاد للطبع والنشر، القاهرة .(تحميل الكتاب : https://drive.google.com/file/d/1rbq_FzIvCCazURby8dLprTd646-Y2ATP/view?usp=sharing) أنس غسان الشيخ الخفاجي: السيرة الذاتية خطوات كتابة السيرة الذاتية، مركز الضيافة الدولية للتدريب السياحي والفندقي نس الشيخ الخفاجي، سوريا، دمشق،(pdf Facebook: facebook.com/anas.alsheikh1 خالد مصطفى(2018): مبادئ عامة لكتابة مقالة علمية ، الأرشيف العربي العلمي :DOI https://dx.doi.org/10.31221/osf.io/urbjg عبد العليم إبراهيم(1975) : الإملاء والترقيم في الكتابة العربية، مكتبة غريب، القاهرة. ماهر شعبان عبد الباري(2010): الكتابة الوظيفية والإبداعية(المجالات/ المهرات، الأنشطة، والتقويم) دار المسيرة للنشر والتوزيع والطباعة، عمَّان. (PDF RAR على موقع www.massira.jo). فخري خليل النجار(2011): الأسس الفنية للكتابة والتعبير، دار صفاء للنشر والتوزيع، عمان.(ملف الكتاب: PDF RAR على موقع www.darwafa.net
المراجع المساندة Essential References:
أحمد زكي باشا (1913): الترقيم في اللغة العربية ، دار الكتب الخديوية / مصر رشدي الأشهب (1983): فن الكتابة وأساليبها ، مؤسسة ابن رشد للنشر، القدس .

مصادر التعلم Learning Resources: كتابة المراجع للمقرر (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
عبد السلام هارون: (د-ت) الأساليب الإنشائية في النحو العربي، القاهرة، مكتبة الخانجي. عزب محمد عزب : مهارات كتابة السيرة الذاتية واجتياز المقابلة الشخصية، المكتب العربي لخدمات التدريب، أبو ظبي، ملف الكتاب: PDF RAR على موقع مكتبة نور. نبيل راغب(1982): القواعد الذهبية لإتقان اللغة العربية في النحو و الصرف و البلاغة، القاهرة، دار غريب منشور p d f على موقع: http://lisaanularab.blogspot.com/2015/11/blog-post_93.html نبيل مسعد السيد غزي الخلاصة في قواعد الإملاء وعلامات الترقيم، ، دار غريب، القاهرة 2000م مجموعة من المؤلفين: تقنيات الكتابة : (1995) ، ترجمة :رعد عبد الجليل جواد، دار الحوار للنشر والتوزيع، اللاذقية، سوريا. منشور على موقع (noor-book.com)
المصادر الإلكترونية ومواقع الإنترنت... Electronic Materials and Web Sites etc.
-1https// takwween.com -2https//sasapost.com -3 Noor –b00k.com -4https//mawdooa.com 5- fgs.najah.edu/ar/facult

الضوابط والسياسات المتبعة في المقرر Course Policies	
بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
1	سياسة حضور الفعاليات التعليمية Class Attendance: يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. يقدم أستاذ المقرر تقريرا بحضور وغياب الطلبة للقسم، ويحرم الطالب من دخول الاختبار في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: يسمح للطالب بحضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفهيا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الاختبار Exam Attendance/Punctuality: لا يسمح للطالب بدخول الاختبار النهائي إذا تأخر مقدار (20) دقيقة من بدء الاختبار إذا تغيب الطالب عن الاختبار النهائي تطبق اللوائح الخاصة بنظام الاختبار في الكلية.

4	التعيينات والمشاريع Assignments & Projects: يحدد أستاذ المقرر نوع التعيينات والمهام في بداية الفصل، ويحدد مواعيد تسليمها وضوابط تنفيذها وتسليمها. إذا تأخر الطالب في تنفيذ المهام وتسليم التكليفات عن الموعد المحدد يحرم من درجة المهمة أو التكليف الذي تأخر في تسليمه.
5	الغش Cheating: في حال ثبوت قيام الطالب بالغش في الاختبار النصفي أو النهائي تطبق عليه لائحة شؤون الطلاب. في حال ثبوت قيام الطالب بالغش او النقل في التكليفات والمهام يحرم من الدرجة المخصصة للمهام أو التكاليف .
6	الانتحال Plagiarism: في حالة وجود شخص ينتحل شخصية طالب لأداء الاختبار نيابة عنه تطبق اللائحة الخاصة بذلك.
7	سياسات أخرى Other policies: أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكليفات ...الخ

مواصفات مقرر : الثقافة الإسلامية

I. مواصفات المقرر الدراسي:المعلومات العامة عن المقرر:						
.1	اسم المقرر:	الثقافة الإسلامية				
.2	رمز المقرر ورقمه:					
.3	الساعات المعتمدة:	محاضرة	سمنار	عملي	تدريب	الإجمالي
		2	-	-	-	2
.4	المستوى والفصل الدراسي:	الأول. الأول.				
.5	المتطلبات السابقة لدراسة المقرر (إن وجدت):	لا يوجد.				
.6	المتطلبات المصاحبة لدراسة المقرر(إن وجدت):	لا يوجد				
.7	البرنامج/التي يتم فيها تدريس المقرر:	البكالوريوس. متطلب علمي في جميع أقسام وكليات الجامعة.				
.8	لغة تدريس المقرر:	العربية				
.9	نظام الدراسة:	فصلي.				
.10	أسلوب الدراسة في البرنامج:	منتظم.				

.11	مكان تدريس المقرر:	جامعة صنعاء
.12	اسم معد مواصفات المقرر:	د. حسان شريان
.13	تاريخ اعتماد مجلس الجامعة:	

II. وصف المقرر:

يتناول هذا المقرر مناقشة المفاهيم المتعلقة بالثقافة الإسلامية خصائصها، وأهم الموضوعات المرتبطة بها، وأبرز التحديات الثقافية المعاصرة التي تواجهها، وبيان التصور الإسلامي للكون والإنسان والحياة، وطبيعة الحضارة الإسلامية، وبيان الموقف الصحيح للمسلم من بعض القضايا الفكرية المتعلقة بالقرآن والسنة، مع التركيز على أهم القضايا والمبادئ الحقوقية المعاصرة، وغرس قيم التسامح والحوار، ونبذ الغلو والتطرف والتفريط، والرد على بعض الشبهات التي تستهدف عقيدة المسلم وفكره؛ لأَجْل تكوين شخصية مسلمة وسطية معتدلة فكريًا وعمليًا، مع تناوله بعض القضايا الاقتصادية والاجتماعية المعاصرة المرتبطة بالواقع، وعلى وجه الخصوص ما يتعلق بالمرأة، مبينا الدور التنموي المنوط بالشباب على كافة الأصعدة، وإيمانا من الجامعة الوطنية بأهمية وضرورة التحصين الفكري والدور الريادي للثقافة الإسلامية؛ فقد جعلت من مادة ومقرر الثقافة الإسلامية متطلبًا جامعيًا، يُدَرَّسُ في جميع كلياتها وأقسامها.

III. مخرجات التعلم:

بعد إكمال المقرر يتوقع من الطالب أن يكون قادرا على:

1- يُعَرّف الثقافة الإسلامية، والفكر الإسلامي، وأبرز خصائصهما.
2- يوضح الموقف الصحيح والمعتدل للشريعة الإسلامية وللإنسان المسلم من المسائل الجدلية والفكرية، المرتبطة بالعقيدة والكون والإنسان، وما يتصل بها من أحكام فقهية.
3- يناقش مبادئ وأسس وضوابط كلا من الحرية والسلام والتسامح في الإسلام وما يتعلق بها.
4- يبرز مكانة ودور ووظيفة المرأة في الإسلام وحقوقها وواجباتها وآدابها.
5- يستنتج المخاطر والتحديات التي تواجه الثقافة الإسلامية، ومصادرها.
6- يقارن بين نظرة وتشريعات الإسلام المتعلقة بالإنسان وحقوقه ومتطلباته، ونظرة وتشريعات الأديان والثقافات الأخرى المتعلقة به وبحقوقه.
7- ينزّل الأحكام الشرعية على القضايا والنوازل الفقهية المعاصرة في المجال الفكري، والسياسي، والاقتصادي، والاجتماعي.
8- يستطيع أن يجمع ويكتب مادة علمية في القضايا الفكرية والثقافية.
9- يناقش ويرد على غيره في القضايا الفكرية والثقافية المعاصرة.

10- ينقل الثقافة الإسلامية الوسطية -بمفهومها الشامل- للآخرين، خلال تجسيده للقيم والأخلاق الإسلامية خلال تعاملاته معهم.

IV. مواءمة مخرجات التعلم باستراتيجيات التدريس والتقويم

أولا: مواءمةمخرجات تعلم المقرر(المعارف والفهم) بإستراتيجيةالتدريس والتقويم:

مخرجات المقرر / المعرفة والفهم	إستراتيجية التدريس	إستراتيجية التقويم	مخرجات البرنامج
A-1يُعَرِّف الثقافة الإسلامية، والفكر الإسلامي، وأبرز خصائصهما، وما يميزهما عن غيرهما.	المحاضرات النظرية	الامتحانات بصورها المتعددة (شفهي، تحريري، نصفي نهائي)	يعتز الطالب بدينه وعقيدته.
A-2يوضح الموقف الصحيح والمعتدل للشريعة الإسلامية وللإنسان المسلم من المسائل الجدلية والفكرية، المرتبطة بالعقيدة والكون والإنسان، وما يتعلق بها من أحكام فقهية.	التعليم الذاتي	الامتحانات النصفية والنهائية	يلم الطالب بموقف الشريعة الإسلامية من بعض القضايا الفكرية والفقهية المعاصرة
A-3 يناقش مبادئ وأسس وضوابط كل من: الحرية، والسلام، والتسامح، والتعايش مع الآخر في الإسلام، وما يتعلق بها من مسائل وأحكام.	العرض المرئي، والشرائح ، والصور التوضيحية	التكاليف والواجبات	تبني الطالب ثقافة التسامح والحوار والقبول بالآخر
A-4يبرز مكانة ودور ووظيفة المرأة في الإسلام وحقوقها وواجباتها وآدابها.	العصف الذهني	استطلاع	يُحَكِّم الطالب الرأي الشرعي في كثير من قضايا المرأة، مبتعدا عن الأعراف والتقاليد المجتمعية المخالفة للشريعة الإسلامية، والمناهضة للمرأة وحقوقها.

ثانيا: مواءمة مخرجات تعلم المقرر(المهارات الذهنية) بإستراتيجية التدريس والتقويم:

مخرجات المقرر/ المهارات الذهنية	إستراتيجية التدريس	إستراتيجية التقويم	مخرجات البرنامج
b-1يستنتج المخاطر والتحديات التي تواجه الثقافة الإسلامية، ومصادرها.	الحوار الفردي والجماعي	التقارير العلمية ومناقشتها	اكتساب مهارات التفكير التحليلي والنقدي

b-2يقارن بين نظرة وتشريعات الإسلام المتعلقة بالإنسان وحقوقه ومتطلباته، ونظرة وتشريعات الأديان والثقافات الأخرى المتعلقة به وبحقوقه.	التعليم التعاوني	الامتحانات بصورها المتنوعة	الثقة بعدالة التشريعات الإسلامية، وأحقيتها في التشريع؛ كونها الأنسب والأصلح للبشرية.
b-3ينزِّل الأحكام الشرعية على القضايا والنوازل الفقهية المعاصرة في المجال الفكري، والسياسي، والاقتصادي، والاجتماعي، والطبي.	التعليم الذاتي	الحوار والمناقشة	التمكن من التعامل مع مصادر التراث الإسلامي وتوظيفها بما يخدم الحياة، ويجسد الفكر السليم والمعتدل.

ثالثا: مواءمة مخرجات تعلم المقرر(المهارات المهنية والعملية)بإستراتيجية التدريس والتقويم:

مخرجات المقرر/ المهارات المهنية والعملية	إستراتيجية التدريس	إستراتيجية التقويم	مخرجات البرنامج
c-1يستطيع أن يجمع ويكتب مادة علمية في القضايا الفكرية والثقافية، والمسائل الفقهية.	التعليم التعاوني	التقارير العلمية	القدرة على تنمية الذات علميا ومهاريا. ومواكبة المستجدات المعاصرة والقدرة على التعامل معها.
c-2يناقش ويرد على غيره في القضايا الفكرية والثقافية المعاصرة.	التقارير الكتابية	الحوار والمناقشة	خلق روح الاجتهاد ونبذ التقليد، والاسهام في حركة التجديد العلمي.

رابعا: مواءمة مخرجات تعلم المقرر(المهارات العامة) بإستراتيجية التدريس والتقويم:

مخرجات المقرر	إستراتيجية التدريس	إستراتيجية التقويم	مخرجات البرنامج
d-1 ينقل الثقافة الإسلامية الوسطية - بمفهومها الشامل- للآخرين، خلال تجسيده للقيم والأخلاق الإسلامية خلال تعاملاته معهم.	التعليم الذاتي	بحوث علمية	التحلي بأخلاق وأحكام الإسلام وبفهمه الصحيح المجافي للغلو والتفريط

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

V. تحديد وكتابة مواضيع المقرر الرئيسة والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات المعتمدة لها.

كتابة وحدات /مواضيع محتوى المقرر					
أولا:الجانب النظري					
الرقم	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر
-1	مفهوم الثقافة الإسلامية ومصادرها التشريعية	مفهوم الثقافة الإسلامية، خصائص الثقافة الإسلامية، وما يميزها عن غيرها، ومصادرها التشريعية	1	2	A1-b1-c2
-2	قضايا عقدية	مراتب الدين: الإسلام ، الإيمان، الإحسان. أنواع التوحيد: الألوهية، الربوبية، الأسماء والصفات.	2	4	A2-b2-c1
-3		الفرق والمذاهب الإسلامية، النشأة والمعتقد(أهل السنة، المعتزلة، الإسماعيلية)			
-4	الإعجاز القرآني	الإعجاز البلاغي، الإعجاز العلمي، الإعجاز التشريعي، الإعجاز الطبي.	1	2	A1-b2-c2
-5	الغزو الفكري	تعريف الغزو الفكري، مؤسساته، أهدافه، وسائله، والاستشراق، التنصير، وأهدافها، أخطارها وطرق الحماية منها.	1	2	A1-b1-c2

-6	الإسلام والتنمية	مقومات النهوض الحضاري، الشباب ودوره في التغيير المجتمعي. الوسطية والاعتدال في الإسلام، الوطنية في الإسلام.	1	2	Aa1-a3-b3-c2
-7	اختبار نصف الفصل	اختبار نصف الفصل	1	2	A2-b3-c1-c2
-8	قضايا الحقوق والحريات في الإسلام	مفهوم الحقوق والحريات في الإسلام، وضوابطها الشرعية، حقوق الإنسان في الإسلام، حقوق الإنسان في القوانين والمواثيق الدولية.	1	2	A1-a3-b2-c1
-9	الإسلام والمرأة	مكانة المرأة في الإسلام، الحقوق والواجبات الشرعية للمرأة، موقف الإسلام من بعض القضايا المعاصرة المتعلقة بالمرأة.	1	2	A4-b3-c1-d1
10	قضايا مجتمعية وسياسية معاصرة	الانتخابات في الفكر الإسلامي، موقف الإسلام من التطرف والإرهاب، الجهاد مشروعيته وشروطه وضوابطه.	1	2	A2-a3-b3-c2-d1
-11		المعاهدات الدولية وموقف الإسلام منها، أحكام الأقليات المسلمة وغير المسلمة.	1	2	
-12	الإسلام والاقتصاد	المصارف الإسلامية والفرق بينها وبين البنوك التجارية.	1	2	A2-b1-b2-c2
-13		التأمين الإسلامي والتأمين التجاري، مسائل اقتصادية وأحكامها الفقهية: (البيع بالتقسيط، الجمعيات)	2	4	
-14	قضايا طبية وأحكامها في الفقه الإسلامي	عمليات التجميل، الإجهاض، زراعة الأعضاء، أحكام المرضى في شهر رمضان.	1	2	A1-b3-c1
-15	اختبار نهاية الفصل	اختبار نهاية الفصل	1	2	A2-b2-b3-c2
	إجمالي الأسابيع والساعات		16	32	

ثانيا: الجانب العملي:

تكتب تجارب (مواضيع) العملي

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

الرقم	التجارب العملية	عدد الأسابيع	الساعات الفعلية	مخرجات التعلم
.1				
.2	لا يوجد			
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إجمالي الأسابيع والساعات				

VI. إستراتيجية التدريس:

المحاضرات النظرية.
العروض والشرائح الإلكترونية
العصف الذهني
التعليم التعاوني
التعليم الذاتي

VII. التعيينات والتكليفات:

الرقم	التكليف/النشاط	مخرجات التعلم	الأسبوع	الدرجة
-1	كتابة عدد من البحوث عن الموضوعات التالية: - قضايا الفكر الإسلامي المعاصر.	A1-a2-a4-b2-b3-c1	14-2	10

	- ميراث المرأة، دية المرأة. العمل الساسي للمرأة وتوليها المناصب القيادية في الدولة. - علاقة المسلم بغير المسلم. - التطرف والإرهاب والموقف الشرعي منهما. - أضرار الربا على السياسات الاقتصادية. - حرية الرأي وضوابطها في الشريعة الإسلامية. - أخطار ووسائل الغزو الفكري.			
-2	- استطلاع عن متطلبات الفتاة في المرحلة الجامعية. - مبادرات شبابية لمعالجات فكرية وثقافية. - حلقات نقاشية وندوات علمية عن قضايا فكرية.	A3-b3-c2-d1		10

VIII. تقويم التعلم:

الرقم	أنشطة التقويم	الأسبوع	الدرجة	نسبة الدرجة إلى درجة التقويم النهائي	المخرجات التي يحققها
1	واجبات ومشاركة وأنشطة صفية	14-2	10	%10	A1-b1-b3-c2
2	تكاليف، وبحوث وأنشطة لاصفية	14-2	10	%10	A2-a3-a4-b2-b3-c1
3	امتحان نصف الفصل	7	20	%20	A2-b3-c1-c2
4	امتحان نهاية الفصل	15	60	%60	A2-b2-b3-c2
5	المجموع		100	%100	

IX. مصادر التعلم:

المراجع الرئيسة: (لا تزيد عن مرجعين)

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

- الثقافة الإسلامية الجزء الأول، الجامعة الوطنية، تأليف: د. حسان شريان و، د. إبراهيم حيدرة - الثقافة الإسلامية ، د. عبد الوهاب الديلمي، ود. علي هود باعباد، وآخرين، مكتبة الإرشاد، صنعاء، ط10، 2013م.
المراجع المساعدة
- الثقافة الإسلامية (الجزء الثاني) الجامعة الوطنية، تأليف د. فؤاد البناء.
مواد إلكترونية وإنترنت: (إن وجدت)
- موقع ومؤلفات الدكتور عبد الكريم بكَّار.

X. الضوابط والسياسات المتبعة في المقرر.

1.	**سياسة حضور الفعاليات التعليمية:** ▪ الالتزام بالمواعيد المحددة للمحاضرات في بدئها وانتهاءها والانتظام في الحضور، وضرورة حضور (75%) من ساعات المقرر حسب لائحة التعليم العالي. ▪ إذا تجاوز نسبة غياب الطالب عن (25%) من ساعات المقرر يعتبر محروماً في المقرر. إلاّ إذا كان غيابه بسبب مرض أو بعذر قاهر تقبله عمادة الكلية، وبموجب وثائق رسمية ومعمدة.
2.	**الحضور المتأخر:** ▪ ينبغي على الطالب أن يأتي إلى المحاضرات، والمشاركة في مناقشة موضوعات المقرر في الوقت المناسب. ▪ يسمح للطالب المتأخر بدخول المحاضرةإذا تأخر في حدود ربع ساعة فقط وبعذر.
3.	**ضوابط الامتحان:** ▪ يجب على الطالب الوصول إلى قاعة الامتحان في الوقت المحدد. ▪ عدم السماح بدخول الامتحان بعد مرور أكثر منربع ساعة من بدء الامتحان. ▪ لا يسمح للطالب الخروج من القاعة الامتحانية بعد توزيع الأسئلة إلاّ بعد مرور نصف وقت الاختبار. ▪ يعتبر الطالب الغائب في اختبار نهاية الفصل راسباً في المقرر الذي تغيب فيه.
4.	**التعيينات والمشاريع:** **التعيينات: يتعين على الطالب الالتزام بالآتي:**

	▪ تقديم الواجبات في الوقت المحدد تماماً، وإذا ما واجهته مشكلة في تقديم الواجبات المطلوبة منه عليه الاتصال بأستاذ المقرر لكي يتفق معه على موعد آخر، وبناءً على تعليمات أستاذه يمكن أن يعدل ويقرر الموعد الآخر للتسليم. ▪ أن يقدم عرضاً تفصيلياً لما يتضمنه الواجب من خطوات وأفكار أساسية. ▪ أذا تأخر الطالب عن تقديم واجباته في الموعد الذي حدد له بعد أسبوعين من التأخير لن يقبل إلاّ إذا ما وافق الأستاذ على قبول التأخير، بناءً على ظروف قاهرة يتم شرحها والإعلان عنها خطياً. المشاريع: ▪ سيتم تنظيم الطلبة في فرق وكل فريق يختار واحداً من الموضوعات المقدمة لهم في بداية الفصل الدراسي. وعلى الفريق توزيع المسؤولية فيما بينهم، والمشاركة الفاعلة من جميع أعضاء الفريق،وعلى كل فريق أن يقدم تقريراًعن موضوعه، وعرضهأمام الطلبة..
5.	الغش: ▪ يلتزم الطلبة بمبادئ النزاهة الأكاديمية التي تعني: أن يكون الطالب صادقاً مع نفسه، ومع زملائه ومع أساتذته. ▪ لن يتم التسامح مع الغش وهو: محاولة الطالب الغش بالحديث أو النظر في ورقة الغير أو الإشارة أو محاولة استخدام أية وسيلة من وسائل الغش. ▪ الغش في الامتحان النصفي أو الشروع فيه فيعتبر الطالب راسباً في المقرر. ▪ الطالب الذي يغش في الامتحان يحرم من ثلاث مواد هي: المادة التي ضبط متلبساً فيها ومن قبلها والمادة التي تليها. ▪ إذا تكرر غش الطالب أكثر من مرة في الدورة الاختيارية الواحدة يطبق عليه حكم الفصل من الدراسة.
6.	الانتحال:
7.	سياسات أخرى: من مهام الطلبة وواجباتهم وحقوقهم الآتي: ▪ تحمل وتقبل الآراء المختلفة أثناء المناقشات والعمل الجماعي. ▪ التزامه بأسلوب النقاش الايجابي والحوار البناء مع الآخرين. ▪ لا يسمح استخدام الهواتف المحمولة داخل قاعة المحاضرة، أو أثناء سير الامتحان. ▪ إذا سلك الطالب سلوكاً غير مقبول فأنه يُحال إلى الجهات المعنية لاتخاذ اللازم، مشفوعاً بتقرير عن ذلك.

مواصفات مقرر: الثقافة الإسلامية

Course Specification of: Islamic culture

I. معلومات عن مدرس المقرر:							
الاسم		الساعات المكتبية ( )					
المكان ورقم الهاتف		السبت	الأحد	الاثنين	الثلاثاء	الأربعاء	الخميس
البريد الإلكتروني							

I. المعلومات العامة عن المقرر:

.1	اسم المقرر:	الثقافة الاسلامية				
.2	رمزالمقرر ورقمه:					
.3	الساعات المعتمدة:	محاضرة	سمنار	عملي	تدريب	الإجمالي
		2	-	-	-	2
.4	المستوى والفصل الدراسي:	الأول. الأول.				
.5	المتطلبات السابقة لدراسة المقرر (إن وجدت):	لا يوجد.				
.6	المتطلبات المصاحبة لدراسة المقرر(إن وجدت):	لا يوجد				
.7	البرنامج/التي يتم فيها تدريس المقرر:	البكالوريوس. متطلب علمي في جميع أقسام وكليات الجامعة.				
.8	لغة تدريس المقرر:	العربية				
.9	نظام الدراسة:	فصلي.				
.10	أسلوب الدراسة في البرنامج:	منتظم.				
.11	مكان تدريس المقرر:	جامعة صنعاء				
.12	اسم معد مواصفات المقرر:	د. حسان شريان				
.13	تاريخ اعتماد مجلس الجامعة:					

II. وصف المقرر الدراسي:

يتناول هذا المقرر مناقشة المفاهيم المتعلقة بالثقافة الإسلامية خصائصها، وأهم الموضوعات المرتبطة بها، وأبرز التحديات الثقافية المعاصرة التي تواجهها، وبيان التصـور الإسـلامي للكون والإنسـان والحياة،

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

وطبيعة الحضارة الإسلامية،وبيان الموقف الصحيح للمسلم من بعض القضايا الفكرية المتعلقة بالقرآن والسنة، مع التركيز على أهم القضايا والمبادئ الحقوقية المعاصرة، وغرس قيم التسامح والحوار، ونبذ الغلو والتطرف والتفريط، والرد على بعض الشبهات التي تستهدف عقيدة المسلم وفكره؛ لأَجْل تكوين شخصية مسلمة وسطية معتدلة فكريًا وعمليًا، مع تناوله بعض القضايا الاقتصادية والاجتماعية المعاصرة المرتبطة بالواقع، وعلى وجه الخصوص ما يتعلق بالمرأة، مبينا الدور التنموي المنوط بالشباب على كافة الأصعدة، وإيمانا من الجامعة الوطنية بأهمية وضرورة التحصين الفكري والدور الريادي للثقافة الإسلامية؛ فقد جعلت من مادة ومقرر الثقافة الإسلامية متطلبًا جامعيًا، يُدَرَّسُ في جميع كلياتها وأقسامها.

III. مخرجات التعلم المقصودة للمقرر:

بعد إكمال المقرر يتوقع من الطالب أن يكون قادرا على:

1- يُعَرِّف الثقافة الإسلامية، والفكر الإسلامي، وأبرز خصائصهما.
2- يوضح الموقف الصحيح والمعتدل للشريعة الإسلامية وللإنسان المسلم من المسائل الجدلية والفكرية، المرتبطة بالعقيدة والكون والإنسان، وما يتصل بها من أحكام فقهية.
3- يناقش مبادئ وأسس وضوابط كل من الحرية والسلام والتسامح في الإسلام، وما يتعلق بها.
4- يبرز مكانة ودور ووظيفة المرأة في الإسلام وحقوقها وواجباتها وآدابها.
5- يستنتج المخاطر والتحديات التي تواجه الثقافة الإسلامية، ومصادرها.
6- يقارن بين نظرة وتشريعات الإسلام المتعلقة بالإنسان وحقوقه ومتطلباته، ونظرة وتشريعات الأديان والثقافات الأخرى المتعلقة به وبحقوقه.
7- ينزِّل الأحكام الشرعية على القضايا والنوازل الفقهية المعاصرة في المجال الفكري، والسياسي، والاقتصادي، والاجتماعي.
8- يستطيع أن يجمع ويكتب مادة علمية في القضايا الفكرية والثقافية.
9- يناقش ويرد على غيره في القضايا الفكرية والثقافية المعاصرة.
10- ينقل الثقافة الإسلامية الوسطية -بمفهومها الشامل- للآخرين، خلال تجسيده للقيم والأخلاق الإسلامية خلال تعاملاته معهم.

IV. محتوى المقرر:

الجانب النظري:

الرقم	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية
-1	مفهوم الثقافة الإسلامية ومصادرها التشريعية	مفهوم الثقافة الإسلامية، خصائص الثقافة الإسلامية، وما يميزها عن غيرها، ومصادرها التشريعية	1	2
-2	قضايا عقدية	مراتب الدين: الإسلام ، الإيمان، الإحسان. أنواع التوحيد: الألوهية، الربوبية، الأسماء والصفات.	2	2
-3		الفرق والمذاهب الإسلامية، النشأة والمعتقد(أهل السنة، المعتزلة، الإسماعيلية)	3	2
-4	الإعجاز القرآني	الإعجاز البلاغي، الإعجاز العلمي، الإعجاز التشريعي، الإعجاز الطبي.	4	2
-5	الغزو الفكري	تعريف الغزو الفكري، مؤسساته، أهدافه، وسائله، والاستشراق، التنصير، وأهدافها، أخطارها وطرق الحماية منها.	5	2
-6	الإسلام والتنمية	مقومات النهوض الحضاري، الشباب ودوره في التغيير المجتمعي. الوسطية والاعتدال في الإسلام، الوطنية في الإسلام.	6	2
-7	اختبار نصف الفصل	اختبار نصف الفصل	7	2
-8	قضايا الحقوق والحريات في الإسلام	مفهوم الحقوق والحريات في الإسلام، وضوابطها الشرعية، حقوق الإنسان في الإسلام، حقوق الإنسان في القوانين والمواثيق الدولية.	8	2
-9	الإسلام والمرأة	مكانة المرأة في الإسلام، الحقوق والواجبات الشرعية للمرأة، موقف الإسلام من بعض القضايا المعاصرة المتعلقة بالمرأة.	9	2
10	قضايا مجتمعية وسياسية معاصرة	الانتخابات في الفكر الإسلامي، موقف الإسلام من التطرف والإرهاب، الجهاد مشروعيته وشروطه وضوابطه.	10	2
-11		المعاهدات الدولية وموقف الإسلام منها، أحكام الأقليات المسلمة وغير المسلمة.	11	2
-12	الإسلام والاقتصاد	المصارف الإسلامية والفرق بينها وبين البنوك التجارية.	12	2
-13		التأمين الإسلامي والتأمين التجاري، مسائل اقتصادية وأحكامها الفقهية: (البيع بالتقسيط، الجمعيات)	13	4
-14		عمليات التجميل، الإجهاض،	14	2

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

-15	قضايا طبية وأحكامها في الفقه الإسلامي	زراعة الأعضاء، أحكام المرضى في شهر رمضان.	15	2
-16	اختبار نهاية الفصل	اختبار نهاية الفصل	16	2
إجمالي الأسابيع والساعات			16	32

الجانب العملي:

كتابة تجارب (مواضيع / مهام) النشاط العملي

الرقم	المهام / التجارب العملية	عدد الأسابيع	الساعات الفعلية
1	لا يوجد		
2			
3			
4			
5			
إجمالي الأسابيع والساعات			

V. إستراتيجية التدريس

المحاضرات النظرية.
الحوار والمناقشة
العصف الذهني
التعليم التعاوني
التعليم الذاتي

VI. التكليفات / المهام:

الرقم	التكليف/النشاط	الأسبوع	الدرجة
1	كتابة عدد من البحوث عن الموضوعات التالية: - قضايا الفكر الإسلامي المعاصر. - ميراث المرأة، دية المرأة. العمل الساسي للمرأة وتوليها المناصب القيادية في الدولة. - علاقة المسلم بغير المسلم. - التطرف والإرهاب والموقف الشرعي منهما. - أضرار الربا على السياسات الاقتصادية. - حرية الرأي وضوابطها في الشريعة الإسلامية. - أخطار ووسائل الغزو الفكري.	14-2	10
2	- استطلاع عن متطلبات الفتاة في المرحلة الجامعية. - مبادرات شبابية لمعالجات فكرية وثقافية. - حلقات نقاشية وندوات علمية عن قضايا فكرية.	14-2	10

VII. تقويم التعلم:

الرقم	موضوعات التقويم	موعد التقويم/ اليوم والتاريخ	الدرجة	الوزن النسبي *(نسبة الدرجة إلى درجة التقويم النهائي)*
	واجبات ومشاركة وأنشطة صفية	14-2	10	%10
	تكاليف، وبحوث وأنشطة لاصفية	14-2	10	%10
	امتحان نصف الفصل	7	20	%20
	امتحان نهاية الفصل	15	60	%60
	المجموع		100	%100

VIII. مصادر التعلم:

المراجع الرئيسة:

- الثقافة الإسلامية الجزء الأول، الجامعة الوطنية، تأليف: د. حسان شريان و، د.إبراهيم سليمان حيدرة

الموصف	نائب العميد لشؤون الجودة	رئيس القسم	عميد الكلية	عميدة مركز التطوير وضمان الجودة	رئيس الجامعة
ا.د. ماجد علوان	ا.د. محمود البريهي	ا.د. ماجد علوان	د.خالد الشوبة	ا.م.د. هدى العماد	ا.د. القاسم محمد عباس

- الثقافة الإسلامية ، د. عبد الوهاب الديلمي، ود. علي هود باعباد، وآخرين، مكتبة الإرشاد، صنعاء، ط10، 2013م.

المراجع المساعدة

- الثقافة الإسلامية (الجزء الثاني) الجامعة الوطنية، تأليف د. فؤاد البناء.

II. الضوابط والسياسات المتبعة في المقرر.

1.	سياسة حضور الفعاليات التعليمية: ▪ الالتزام بالمواعيد المحددة للمحاضرات في بدئها وانتهاءها والانتظام في الحضور، وضرورة حضور (75%) من ساعات المقرر حسب لائحة التعليم العالي. ▪ إذا تجاوز نسبة غياب الطالب عن (25%) من ساعات المقرر يعتبر محروماً في المقرر. إلاّ إذا كان غيابه بسبب مرض او بعذر قاهر تقبله عمادة الكلية، وبموجب وثائق رسمية ومعمدة.
2.	الحضور المتأخر: ▪ ينبغي على الطالب أن يأتي إلى المحاضرات، والمشاركة في مناقشة موضوعات المقرر في الوقت المناسب. ▪ يسمح للطالب المتأخر بدخول المحاضرة إذا تأخر في حدود ربع ساعة فقط وبعذر مقبول.
3.	ضوابط الامتحان: ▪ يجب على الطالب الوصول إلى قاعة الامتحان في الوقت المحدد. ▪ عدم السماح بدخول الامتحان بعد مرور أكثر منربع ساعة من بدء الامتحان. ▪ لا يسمح للطالب الخروج من القاعة الامتحانية بعد توزيع الأسئلة إلاّ بعد مرور نصف وقت الاختبار. ▪ يعتبر الطالب الغائب في اختبار نهاية الفصل راسباً في المقرر الذي تغيب فيه.
4.	التعيينات والمشاريع: التعيينات: يتعين على الطالب الالتزام بالآتي: ▪ تقديم الواجبات في الوقت المحدد تماماً، وإذا ما واجهته مشكلة في تقديم الواجبات المطلوبة منه عليه الاتصال بأستاذ المقرر لكي يتفق معه على موعد آخر، وبناءً على تعليمات أستاذه يمكن أن يعدل ويقرر الموعد الآخر للتسليم. ▪ أن يقدم عرضاً تفصيلياً لما يتضمنه الواجب من خطوات وأفكار أساسية. ▪ أذا تأخر الطالب عن تقديم واجباته في الموعد الذي حدد له بعد أسبوعين من التأخير لن يقبل إلاّ إذا ما وافق الأستاذ على قبول التأخير، بناءً على ظروف قاهرة يتم شرحها والإعلان عنها خطياً.

	المشاريع: ▪ سيتم تنظيم الطلبة في فرق وكل فريق يختار واحداً من الموضوعات المقدمة لهم في بداية الفصل الدراسي. وعلى الفريق توزيع المسؤولية فيما بينهم، والمشاركة الفاعلة من جميع أعضاء الفريق،وعلى كل فريق أن يقدم تقريراًعن موضوعه، وعرضها أمام الطلبة..
.5	**الغش:** ▪ يلتزم الطلبة بمبادئ النزاهة الأكاديمية التي تعني: أن يكون الطالب صادقاً مع نفسه، ومع زملائه ومع أساتذته. ▪ لن يتم التسامح مع الغش وهو: محاولة الطالب الغش بالحديث أو النظر في ورقة الغير أو الإشارة أو محاولة استخدام أية وسيلة من وسائل الغش. ▪ الغش في الامتحان النصفي أو الشروع فيه فيعتبر الطالب راسباً في المقرر. ▪ الطالب الذي يغش في الامتحان يحرم من ثلاث مواد هي: المادة التي ضبط متلبساً فيها ومن قبلها والمادة التي تليها. ▪ إذا تكرر غش الطالب أكثر من مرة في الدورة الاختيارية الواحدة يطبق عليه حكم الفصل من الدراسة.
.6	**الانتحال:**
.7	**سياسات أخرى:** **من مهام الطلبة وواجباتهم وحقوقهم الآتي:** ▪ تحمل وتقبل الآراء المختلفة أثناء المناقشات والعمل الجماعي. ▪ التزامه بأسلوب النقاش الايجابي والحوار البناء مع الآخرين. ▪ لا يسمح استخدام الهواتف المحمولة داخل قاعة المحاضرة، أو أثناء سير الامتحان. ▪ إذا سلك الطالب سلوكاً غير مقبول فأنه يُحال إلى الجهات المعنية لاتخاذ اللازم، مشفوعاً بتقرير عن ذلك.