Republic of Yemen
Ministry of Higher Education and Scientific Research
Sana'a University
Faculty of Pharmacy
Quality Assurance Unit

الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة - صنعاء
كلية الصيدلة
وحدة ضمان الجودة

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 (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-**	Describe properties of different pharmaceutical dosage forms and drug delivery systems.
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 according to GLP, GSP and cGMP guidelines.	**c1-**	Practice the rheological properties of some pharmaceutical substance and develop pharmaceutical preparation
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.		
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
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
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 Homework-assignments**	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	

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

1- Required Textbook(s) (maximum two)

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 Pharmaceu Sciences" 5th edition, Lippincott Williams & Wilkins., Philadelphia.

2- Recommended Readings and Reference Materials

1. Florence, A.T. and Attwood, D., 2006, "Physicochemical Principles Of Pharmacy", edition, Pharmaceutical Press, London.
2. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edi 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'. 9t ,Lea & Febiger; Philadelphia; London.

5. Aulton, M.E. (ed). (2013) Pharmaceutics, the Design And Manufacture Of Medicin 4th edition, 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 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.
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 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, the properties of different pharmaceutical dosage forms, and 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**		

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 Homework-assignments**	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	

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 pharmaceut sciences" 5th edition, Lippincott Williams & Wilkins., Philadelphia.

6- Recommended Readings and Reference Materials

6. Florence, A.T. and Attwood, D., 2006, "Physicochemical Principles of Pharmacy", 4 edition, Pharmaceutical Press, London.
7. Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edi 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 ,Lea & Febiger; Philadelphia; London.
10. Aulton, M.E. (ed). (2013) Pharmaceutics, the Design And Manufacture Of Medicin 4th edition, Churchill Livingstone, Edinburgh.

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 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.
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.