



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:	2 nd level / 2 nd 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				

الموصف نائب العميد لشؤون الجودة رئيس القسم عميد الكلية عميدة مركز التطوير وضمان الجودة رئيس الجامعة

د. يحيى الدخين د.د. محمود البريهي ا.م.د. توفيق العبيدي د. خالد الشوية ا.م.د. هدى العماد ا.د. القاسم محمد عباس د. محمد عباس



12	Date of approval:	
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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, cosmetic, fats and lipids is also demonstrated. 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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د. يحيى الدخين
نائب العميد لشؤون الجودة
د.م.د. توفيق العبيدي
رئيس القسم
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عميدة مركز التطوير وضمان الجودة
د.م.د. القاسم محمد عباس
رئيس الجامعة
د.م.د. محمد عباس
عباس



(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 pharmacopeia and their classification.
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 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.
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.		

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a4-	Identify the required calculations that are used in drugs analysis.	
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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-	Select the different methods for water analysis.
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.		Teaching strategies/methods to be used.	Methods of assessment
After participating in the course, students would be able to:			
b1-	Select the different method for water analysis.		

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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.		

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د.م.د. هدى العماد
عميدة مركز التطوير وضمان الجودة
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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-	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 effectively in a team.			d2- Manage the time in an work effectively. working
		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	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 Quizzes, Short	Oral Exam, homework, report, 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 searches.	online	

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

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رئيس القسم د. خالد الشوية
عميد الكلية ا.م.د. هدى العماد
عميدة مركز التطوير وضمان الجودة ا.د. القاسم محمد عباس د. محمد عباس
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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: <u>Physical examination of water:</u> Examination of physical properties of water <u>Chemical examination of water:</u> Analysis of chemical content of water and limits <u>Biological examination of water :</u> Analysis of biological content of water and limits	2	4
5	Midterm exam	a1-4		1	2
6	Analysis of cosmetics	a3, b2, d1-3	-Types and classification -Methods of analysis of cosmetics	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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رئيس القسم ا.م.د. توفيق العبيدي
عميد الكلية د. خالد الشوية
عميدة مركز التطوير وضمان الجودة ا.م.د. هدى العماد
رئيس الجامعة ا.د. القاسم محمد عباس د. محمد عباس



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:

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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 Homework assignments	Sporadic through the semester	10	7%	a2, a3, b1-3, d1-3
2	Attendance, Practical Reports and Practical mid-semester exam	9 th	30	20%	c1-3
3	Theoretical mid-semester exam	7 th	30	20%	a1-4, b1, b2
5	Final Exam (theoretical)	16 th	50	33%	a1-4, b1, b2
6	Final Exam (practical)	16 th	20	13%	c1-3
Total			150	100%	

IX. Students' Support:

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رئيس القسم د. خالد الشوبية
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عميدة مركز التطوير وضمان الجودة ا.د. القاسم محمد عباس د. محمد عباس
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Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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رئيس القسم ا.م.د. توفيق العبيدي
عميد الكلية د. خالد الشوية
عميدة مركز التطوير وضمان الجودة ا.م.د. هدى العماد
رئيس الجامعة ا.د. القاسم محمد عباس د. محمد عباس



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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" 5th Edition, 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.chemweb.com/search/search.exe>)
6. chemweb.com/search/search.exe

I. Facilities Required:

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

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د. يحيى الدخين
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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	
	<ul style="list-style-type: none"> 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.	
	<ul style="list-style-type: none"> 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.	
	<ul style="list-style-type: none"> 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	



	<ul style="list-style-type: none"> ▪ 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.
<p>5⁻ Procedures for periodically reviewing of course effectiveness and planning for improvement</p>	
	<ul style="list-style-type: none"> ▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
<p>6- Course development plans</p>	
	<ul style="list-style-type: none"> ▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

<p>VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)</p>	
<p>The University Regulations on academic misconduct will be strictly enforced. Please refer to -----</p>	
1	<p>Class Attendance:</p> <ul style="list-style-type: none"> ▪ 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	<p>Tardy:</p> <p>- 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.</p>

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3	Exam Attendance/Punctuality: <ul style="list-style-type: none">▪ 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: <ul style="list-style-type: none">▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪Projects: Not applicable.
5	Cheating: <ul style="list-style-type: none">▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	Plagiarism: <ul style="list-style-type: none">▪ 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: <ul style="list-style-type: none">▪ 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:	2 nd level /2 nd 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
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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:

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عميدة مركز التطوير وضمان الجودة
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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
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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: <u>Physical examination of water</u> : Examination of physical properties of water <u>Chemical examination of water</u> : Analysis of chemical content of water and limits <u>Biological examination of water</u> : Analysis of biological content of water and limits	7,8	4
5	Midterm exam	a1-4		9	2
6	Analysis of cosmetics	a3, b2, d1-3	-Types and classification -Methods of analysis of cosmetics	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

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	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 Homework assignments	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	9 th	30	20%	c1-3
3	Theoretical mid-semester exam	7 th	30	20%	a1-4, b1, b2
5	Final Exam (theoretical)	16 th	50	33%	a1-4, b1, b2
6	Final Exam (practical)	16 th	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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رئيس الجامعة ا.د. القاسم محمد عباس د. محمد عباس



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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" 5th Edition, 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.chemweb.com/search/search.exe>)
12. chemweb.com/search/search.exe)

III. Facilities Required:

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

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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	
	<ul style="list-style-type: none"> 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.	
	<ul style="list-style-type: none"> 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.	
	<ul style="list-style-type: none"> 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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	<ul style="list-style-type: none"> ▪ 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	
	<ul style="list-style-type: none"> ▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	<ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▪ 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: <p>- 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.</p>

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3	Exam Attendance/Punctuality: <ul style="list-style-type: none">▪ 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: <ul style="list-style-type: none">▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪Projects: Not applicable.
5	Cheating: <ul style="list-style-type: none">▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	Plagiarism: <ul style="list-style-type: none">▪ 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: <ul style="list-style-type: none">▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.