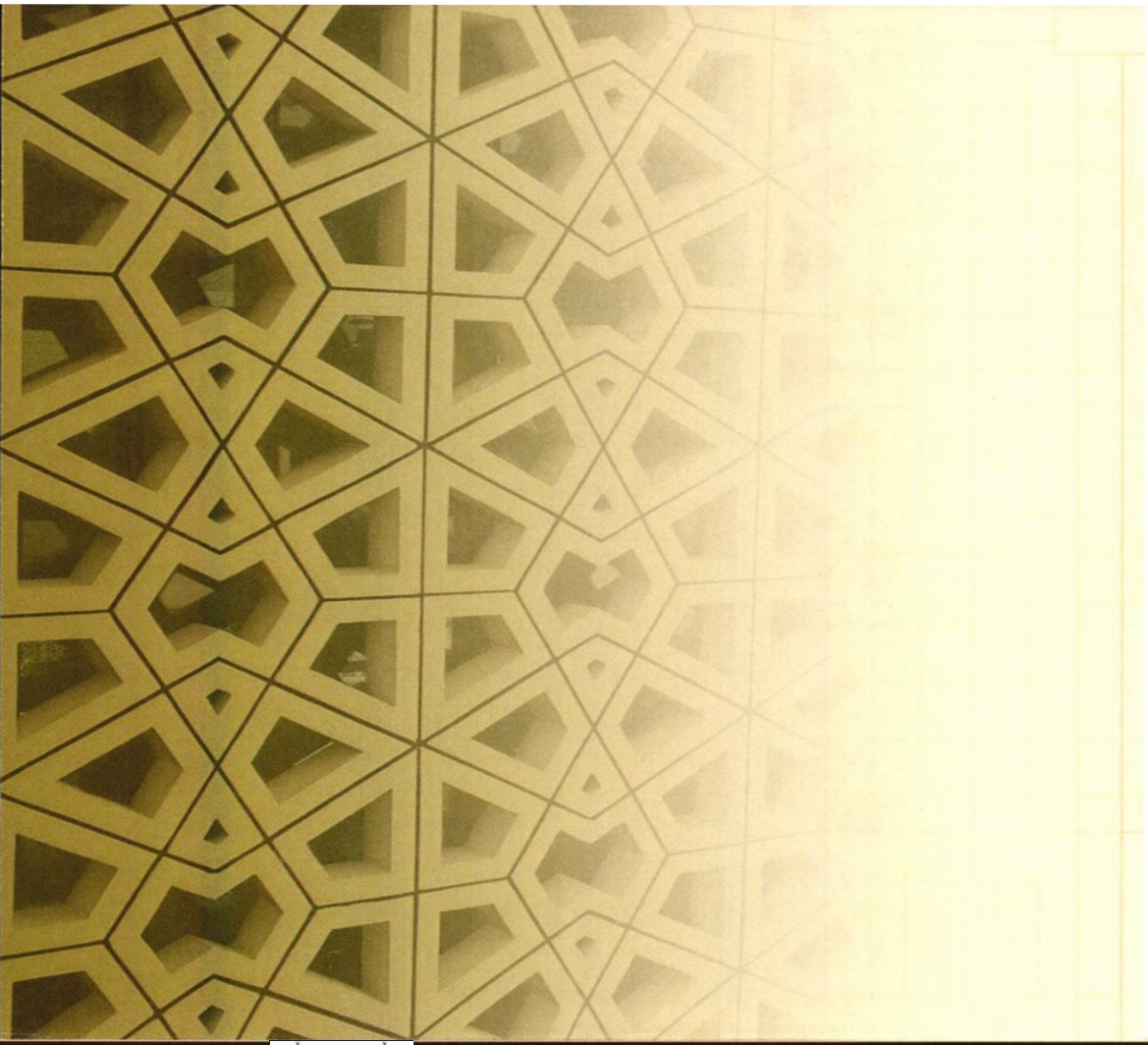
Courses Specifications

Chemistry

Module Book-1419-Plan

كلية العلوم التطبيقية
Faculty of Applied Sciences



قسم الكيمياء
Department of Chemistry

Umm Al-Qura University, 2017

VISION OF CHEMISTRY DEPARTMENT

To make up for shortfall in the job market and training in the field of chemistry to promote our country in the fields of education, scientific research and industry through providing high quality education in line with international standards and principles.

MISSION OF CHEMISTRY DEPARTMENT

To prepare a generation of qualified national scientists and researchers to meet the needs of the job market, and to effectively contribute in solving scientific and industrial problems facing the development plans in the Kingdom of Saudi Arabia.

OBJECTIVES OF CHEMISTRY DEPARTMENT

- Graduating competent and specialized national scientists required to serve the community and the development plans, programs, education and industry in the Kingdom.
- Conducting academic and applied scientific research.
- Contributing to the dissemination of scientific awareness through organizing scientific conferences and symposia.
- Providing technical services in the field of chemistry for the public and private sectors.

Department manual is available for students or other stakeholders and a copy of the information relating to this program also attached to the program specification. This information include required and elective courses, credit hour requirements and department/college and institution requirements, and details of courses to be taken in

each year or semester.

STUDY PLAN

FIRST YEAR			
LEVEL 1			
Course No.	Course Name	Credits	Preq.
402101	GENERAL CHEMISTRY 1	5	-
601101	ISLAMIC CALTURE 1	2	-
401101	BOTANY	2	-
401102	ZOOLOGY	2	-
705101	ENGLISH LANGUAGE	2	-
404101	MATHEMATICS	4	-
605101	QURAN 1	2	-
Total credits		19	

LEVEL 2			
Course No.	Course Name	Credits	Preq
402112	VOLUMETRIC ANALYTICAL CHEMISTRY	3	402101
705102	ENGLISH LANGUAGE	3	705101
402121	GENERAL CHEMISTRY 2	2	402101
402131	ALIPHATIC ORGANIC CHEMISTRY	4	402101
403101	GENERAL PHYSICS 1	4	-
102101	PROPHETIC BIOGRAPHY	2	-
402113	QUALITATIVE ANALYTICAL CHEMISTRY	2	402101
Total credits		20	

SECOND YEAR			
LEVEL 3			
Course No	Course Name	Credits	Preq
402213	GRAVIMETERIC ANALYTICAL CHEMISTRY	2	402112
402221	CHEMISTRY OF MAIN GROUP ELEMENTS	2	402121
402234	AROMATIC ORGANIC CHEMISTRY	3	402131
402243	COLLOIDE CHEMISTRY AND PHASE RULE	2	402121
402235	QUANTUM CHEMISTRY	2	402121
402241	THERMODYNAMICS	3	402112
405123	COMPUTER SCIENCE	3	404101
501101	ARABIC LANGUAGE	2	
Total credits		19	

LEVEL 4			
Course No	Course Name	Credits	Preq
402214	ORGANIC ANALYTICAL CHEMISTRY	2	402112
402223	CHEMISTRY OF TRANISION METALS	3	402221
605201	QURAN 2	2	605101
402235	PHYSICAL ORGANIC CHEMISTRY	3	402234
402242	KINETIC CHEMISTRY AND CATALYSIS	3	402241
402245	ELECTROCHEMISTRY	3	402112
402254	INTRODUCTION TO SPECTROSCOPY	2	402253
601201	ISLAMIC CALTURE 2	2	601101
Total credits		20	

THIRD YEAR			
LEVEL 5			
Course No	Course Name	Credits	Preq
402311	SPECTROPHOTOMETRIC AND ELECTROCHEMICAL TECHNIQUES	3	402112
402332	ORGANIC SPECTROSCOPY	3	402235
402333	CHEMISTRY OF HETEROCYCLIC COMPOUNDS	3	402234
402343	SURFACE CHEMISTRY	3	402243
601301	ISLAMIC CLUTURE 3	3	601201
605301	QURAN 3	2	605201
Total credits		17	

LEVEL 6			
Course No	Course Name	Cerdits	Preq
402317	SEPARATION METHODS AND THERMAL ANALYSIS	3	402311
402325	COORDINATION CHEMISTRY	3	402223
402336	ORGANIC REACTIONS AND PREPARATIONS	3	402332
402385	PETROLEUM CHEMISTRY AND PETROCHEMICALS	3	402333
601401	ISLAMIC CLUTURE 4	2	601301
605401	QURAN 4	2	605301
402335	CHEMISTRY OF NATURAL PRODUCTS	2	402333
Total credits		18	

FOURTH YEAR			
LEVEL 7			
Course No	Course Name	Cerdits	Preq
402426	ORGANOMETALLIC CHEMISTRY	2	402325
402427	MECHANISM OF REACTIONS AND SPECTROSCOPY	2	402325
402428	CHEMISTRY OF SOLID STATE	2	402325
402445	ADVANCED KINETIC CHEMISTRY	2	402343
402447	ADVANCED ELECTROCHEMISTRY	2	402245
402487	POLYMER CHEMISTRY	3	402336
402424	NUCLEAR CHEMISTRY	1	402223
Total credits		14	

LEVEL 8			
Course No	Course Name	Cerdits	Preq
402413	SELECTED TOPICS IN ANALYTICAL CHEMISTRY	2	402317
402429	SELECTED TOPICS IN INORGANIC CHEMISTRY	2	402325
402446	SOLUTION CHEMISTRY AND KINTIC THEORY OF GASES	2	402445
402433	SELECTED TOPICS IN ORGANIC CHEMISTRY	3	402336
402435	ADVANCED ORGANIC CHEMISTRY	3	402336
402495	RESEARCH PROJECT	2	402427
Total credits		14	

2017

COURSES SPECIFICATIONS

(According to the NCAAA template)

2017

A- Analytical Chemistry Courses

2017

Course Specifications

Volumetric Analysis Chemistry
402112-3

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

2017

A. Course Identification and General Information

1. Course title and code: **Volumetric Analysis Chemistry / 402112-3**			
2. Credit hours: **3 (2+1) hrs.**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Prof. Amr L Saber**			
5. Level/year at which this course is offered: **3rd level / 2rd year**			
6. Pre-requisites for this course (if any): **General chemistry 402101**			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	■	What percentage?	**50%**
b. **Blended (traditional and online)**	■	What percentage?	**20%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	■	What percentage?	**30%**
Comments:			

B Objectives

1. What is the main purpose for this course? **1.1.** Know the theoretical principle of neutralization reactions-reduction oxidation reactions – complexiметric and precipitation titrations **1.2.** Familiar with statistical methods and solution concentration parameters in chemical measurements **1.3.** Classify varies titrations and their applications in water analysis and manufacture **1.4.** Using different indicators and pH control in the different titrations **1.5.** Compare between Mohr, Volhard and Fajans methods in precipitation titrations
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
a. Study the classification and applications of volumetric analysis	1	2
b. The analytical process and sample preparation	1	2
c. Using the statistical methods in analytical measurements	1	2
d. Units of solution concentrations and chemical calculations	1	2
e. The principles of volumetric analysis – neutralization titrations theory- pH measurements	1	2
f. Buffer solutions, their working theory and their applications	1	2
g. Indicators in neutralization titrations and the applications of neutralization titrations in manufacture, pharmaceutical and biochemistry fields	1	2
h. Precipitation theory and adsorption indicators	1	2
i. Applications of precipitation titrations and titrations which include complexes formation	1	2
j. Complexiметry titrations and their applications in water analysis and manufacture	1	2
k. Reduction – Oxidation (Redox) titrations and their applications	1	2

Practical Part:

- **Standardization of hydrochloric acid using 0.1N sodium carbonate.**
- **Determination of sodium hydroxide using hydrochloric acid**
- **Determination of sodium hydroxide and sodium carbonate in mixture using hydrochloric acid**
- **Determination of ammonia in ammonium solution using hydrochloric acid**

- **Standardization of potassium permanganate using oxalic acid**
- **Determination of ferrous salt solution using potassium dichromate**
- **Iodometry and Ioditymetry using sodium thiosulphate**
- **Silver nitrate titrations by Volhard and Mohr methods**
- **Standardization of EDTA using zinc sulphate**
- **Determination of total hardness (Ca^{+2}&Mg^{+2}) of water using EDTA**

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-		36		60
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week. 2 h

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize principles of volumetric analysis in analytical chemistry.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Identify the classification of volumetric analysis methods		
1.3	Know the analytical measurements		
1.4	Definethe concentration parameters		
1.5	Recognize the meaning of indicators		
1.6	Describe statistical methods in analytical chemistry.		
1.7	Familiar with neutralization titrations		
1.8	Select the proper method of precipitation titrations methods		
1.9	Name the different reduction-oxidation methods		
1.10	Know the principles of complexiметry titrations		
1.11	Recognize the meaning of metalochromic indicators		
1.12	Outline application important		
2.0	**Cognitive Skills**		
2.1	Apply the suitable methods to refer to concentration parameters	• Lectures • Scientific discussion • Library visits	• Exams • web-based student
2.2	Compare the different types of volumetric analysis		
2.3	Explain principles of volumetric methods and its classification		
2.4	Analyze deferent solutions and pH measurements		

2.5	Summarize the principles of volumetric analysis	• Web-based study	performance systems • portfolios • posters • demonstrations
3.0	**Interpersonal Skills & Responsibility**		
3.1	Illustrate the principles of volumetric methods and its classification	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Analyze neutralization, redox, precipitation and complexiometry titrations		
4.0	**Communication, Information Technology, Numerical**		
4.1	Appraise the volumetric methods in analytical chemistry	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate neutralization, redox, precipitation and complexiometry titrations		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-Term Exam (One Hour Exam)	5-14	20%
2	Assignments	----------	10%
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**

- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks • Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, ***Analytical Chemistry***, 7th edition, Springer (2014)
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, ***Analytical Chemistry***, 7th edition, WILEY (2014) • Dhruba Charan Dash. *Analytical Chemistry*)2018(PHI Learning Private Limited.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity(30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Prof. Amr L Saber**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Qualitative Analytical Chemistry
402113-2

Institution: Umm Al-Qura University	Date of Report 2017
College/Department : Applied Science /Chemistry Department	

A. Course Identification and General Information

1. Course title and code:
Qualitative Analytical Chemistry 402113-2
2. Credit hours : 2
3. Program(s) in which the course is offered. Chemistry
(If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course : **Dr. Marwa Elghalban**
5. Level/year at which this course is offered :02nd level/1st year
6. Pre-requisites for this course (if any) : General Chemistry (1) 402101-3
7. Co-requisites for this course (if any)
8. Location if not on main campus : **both in El-Abdyah(boys side) and El-Zaher (girls side)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	■	What percentage?	60
b. Blended (traditional and online)		What percentage?	
c. e-learning	■	What percentage?	10
d. Correspondence		What percentage?	
f. Other	■	What percentage?	30

Comments:

30 % for the practical part

B Objectives

1. What is the main purpose for this course? By the end of this course student will be able to 1- recognize the fundamentals of qualitative analysis. 2-Diffentiate between different types of chemical analysis. 3-.Develop the practical skills in detection of inorganic chemical compounds. 4- Identify the meaning of buffer solutions and buffer action . 5- Classify various aqueous solution equilibria. 6- Calculate the equilibrium constant for various aqueous solution ionic reactions. 7- Differentiate between different types of solutions. 8- Demonstrate an understanding of factors that affect solubility of slightly soluble salts. 9- Describe and explain factors that affect solubility. 10- Calculate concentrations of solutions using various units of concentration. 11- Identify a coordination compound.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) encourage students to make reports in the recent trends in the field of analytical chemistry, either from the library or by using the Internet

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Inorganic qualitative analysis: its classifications and its applications	1	1
The solutions (Types of solutions – the solubility and factors effecting solubility – Solubility of aqueous ,ionic and non ionic compounds –methods for expression concentrations	1	1
The chemical equilibrium – The rate of chemical reactions.	1	1
Acid- Base equilibrium, Dissociation of water, pH and Neutralization Indicators	1	1
Hydrolysis of salts, acids and weak base	1	1
Buffer solution in qualitative analysis	1	1
Colloidal solutions (colloidal particles and electric charge – pepitization – colloidal particles precipitation – conditions of ideal precipitation)	1	1
The precipitates and law of solubility product	1	1
Mid term exam	1	1

The factors effecting on the solubility of precipitates and separations of ionic groups.	1	1
equilibrium of complex formation (Coordination complexes, its structure and types of bonds in ionic complexes)	1	1
Types of ionic complexes –application of equilibrium law on complexes reactions - application of complex formation in qualitative analysis	1	1
Oxidation reduction equilibrium	2	2
General revision and preparatory exam	1	1
Practical ▪ Identify acidic radicals of first group using dilHCl ▪ Identify acidic radicals of second group and Conc. H_2SO_4 ▪ Identify acidic radicals of third group using $BaCl_2$ ▪ Revision on acidic radicals ▪ Identify basic radicals of first group(Hg_2^{2+}, Pb^{2+}, Ag^{+}) ▪ Identify basic radicals of second group (Hg^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}) ▪ Identify basic radicals of third group (Al^{3+}, Cr^{3+}, Fe^{3+}) ▪ Identify basic radicals of fourth group (Mn^{2+}, Zn^{2+}, Co^{2+}, Ni^{2+}) ▪ Identify basic radicals of fifth group (Sr^{2+}, Ca^{2+}, Ba^{2+}) ▪ Identify basic radicals of sixth group (NH_4^{+}, Mg^{2+}, Na^{+}, K^{+}) ▪ Revision on basic radicals		

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	15	-	-	14		29
Credit	1	-	-	1		2

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize classification and application of qualitative analysis	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays posters lab manuals
1.2	Discover the factors affecting on the solubility, precipitation		
1.3	List the different methods to express concentration		
1.4	Identify chemical , kinetic equilibrium and acid base equilibrium		
1.5	Know Colloidal solutions and conditions of ideal precipitation		
1.6	Recognize ionic and nonionic compounds, electrolytic and non electrolytic		
1.7	Recognize Coordination complexes, its structure and types of bonds in ionic complexes		
1.8	Mention the importance of complex formation as application in qualitative analysis		
1.9	Illustrate Oxidation reduction equilibrium		
2.0	**Cognitive Skills**		
2.1	Develop the reverse think skills and student gains the practical skills to choose the suitable methods for aqueous solutions solubility	1. group discussions 2. case study. 3. home work assignment containing problem thinking activities	1.Midterm exam 2.quizzes 3.Group discussion 4.Final exam
2.2	Gains the skills for acid base equilibrium and Redox equilibrium		
2.3	Select the suitable method for expression concentration		
2.4	Design the different methods to determine the rate of chemical reactions		
2.5	Create conditions of ideal precipitation		
2.6	plan to make research program in qualitative analysis according to systematic steps		
2.7	Compare between the different equations in Redox process		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Take the personality and responsibility for their own learning	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessment of the solution of problems submitted by the students.
3.2	Working effectively in groups and exercise leadership when appropriate		
	Act ethically and consistently with high molar standards in personal and public fourms		

	Community linked thinking		
4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate effectively in oral and written forms	1.Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1.Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks. 2.Evaluation of the report presented
4.2	Use information and communication technologies Use basic mathematical and statistical techniques		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Report, Quizes or team project	----	10%
2	Mid-Term Exam (One Hour Exam)	8	20%
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • We have faculty members to provide counseling and academic advice. • 2 hours per week as office hours are available for discussion with the students.

E. Learning Resources

1. List Required Textbooks • Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch.Fundamentals of analytical chemistry , 9 edition , Brooks Cole (2014) • Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, Analytical Chemistry, 7th edition, WILEY (2014).
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http://en.wikipedia.org/wiki/Petroleum1- http://www.chemhelper.com/ • http://www.chemweb.com/ • http://www.science.uwaterloo.ca/~cchieh/cact/ http://www.sciencedirect.com/
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. - Microsoft Power Point and Microsoft Word - Qualitative analysis video - Teaching CD for qualitative analysis

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Classroomscapacity(30) students. Providinghallof teaching aids includingcomputers andprojector.

2. Computing resources (AV, data show, Smart Board, software, etc.) Roomequippedwithcomputer andprojectorandTV
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Student discussion with the instructor allow for continuous feed back through the course progress. • Student Evaluation Questionnaires.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Discussions within the group of faculty teaching the course. • Peer consultation on teaching strategies and its effectiveness.
3 Processes for Improvement of Teaching • Workshops given by experts on new teaching and learning methodologies will be attended. Improving of the teaching strategies by monitoring the evaluation of the students progress through the semester
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) Not effective yet.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- The course will be evaluated periodically after each semester based on the results of the students and the report presented by the teaching stuff that will be discussed with the course coordinator so as to improve the course.

2017

Faculty or Teaching Staff: Dr Marwa Elghalban

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Gravimetric analysis

402213-2

2017

Institution: Umm Al-Qura University	Date of Report : **2018**
College/Department : Applied Science /Chemistry Department	

A. Course Identification and General Information

1. Course title and code: Gravimetric analysis 402213-2	
2. Credit hours :2 hrs.	
3. Program(s) in which the course is offered. Chemistry (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course : **Dr. Marwa El Ghalban**	
5. Level/year at which this course is offered :03th level /**2st year**	
6. Pre-requisites for this course (if any) :**Volumetric analysis course 402112**	
7. Co-requisites for this course (if any)	
8. Location if not on main campus : **both in El-Abdyah(boys side) and El-Zaher (girls side)**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ■	What percentage? 60
b. Blended (traditional and online) ☐	What percentage?
c. e-learning ■	What percentage? 10
d. Correspondence ☐	What percentage?
f. Other ■	What percentage? 30

Comments:

30 % for the practical part

B Objectives

1. What is the main purpose for this course? The main objective of this course are to: 1. Stress the importance of gravimetric analysis and its applications 2. Introduce students to classical method of analysis and indicate their continuing application in modern-day chemistry 3. know the requirements to obtain a good precipitate 4. Provide the basis for analytical problem solving 5. Provide good laboratory practice and develop technical skills.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) encourage students to make reports in the recent trends in the field of analytical chemistry, either from the library or by using the Internet

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Principles of gravimetric analysis and procedures of the analysis	1	1
The methods and requirements of gravimetric analysis	1	1
Theoretical principles of precipitation	1	1
Stages of saturated, supersaturated and solubility product	1	1
Precipitation formation (nucleation, precipitate growth)	1	1
Factors affecting the solubility of precipitate	1	1
Precipitation from homogeneous solution	1	1
Contamination of precipitates ,Types of contaminates Coprecipitation, post precipitation, surface adsorption)	2	2
Mid Term exam	1	1
The methods of contaminates removing or minimizing	1	1
Organic precipitants, requirements and its application Inorganic precipitants, requirements and its application	1	1
Calculations of gravimetric analysis	2	2
Revisions and preparatory exam	1	1

Practical part : • **Determination of water crystallization in barium chloride salt.** • **Determination of barium ion as barium sulphate.** • **Determination of aluminum in alum.** • **Determination of calcium using ammonium oxalate** • **Determination of lead as lead chromate** • **Determination of iron as ferric oxide** • **Determination of nickel using dimethylglyoxime** • **Determination of both aluminum and iron in mixture** • **Determination of magnesium as $Mg_2P_2O_7$**		

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	15	-	-	14		29
Credit	1	-	-	1		2

3. Additional private study/learning hours expected for students per week. ☐

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge** The student should be able to		
1.1	• know principles of gravimetric analysis	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays posters lab manuals
1.2	• Determine requisites gravimetric analysis		
1.3	• Discover the suitable method for gravimetric analysis and purification		
1.4	• Recognize the theoretical principles of gravimetric analysis		
	• Outline the difference between nucleation, precipitate growth		
1.5	• Identify the suitable condition of gravimetric analysis and removal of contamination		

	• Familiar with organic and inorganic precipitants, requirements and its application		
1.6	• Write the importance of gravimetric analysis and application		
1.7	• Recognize importance of solubility product calculations in gravimetric analysis		
2.0	**Cognitive Skills** The student should be able to		
2.1	• - Develope the reverse think skills and predict the suitable methods for gravimetric analysis	1. group discussions 2. case study. 3. home work assignment containing problem thinking activities	1.Midterm exam 2.quizzes 3.Group discussion 4.Final exam
2.3	• Choose the suitable method to purify the precipitate		
2.4	• Design the standard methods of gravimetric analysis to remove the impurties		
2.5	• Create the different ideas to study the precipitation process, contamination, purification		
2.6	• Plan to make research program in gravimetric analysis according to systematic steps		
2.7	• Compare between the different organic and inorganic precipitants		
	• Calculate percentage , strength of the analyte		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Take the personality and responsibility for their own learning	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessment of the solution of problems submitted by the students.
3.2	Working effectively in groups and exercise leadership when appropriate		
	Act ethically and consistently with high molar standards in personal and public fourms Community linked thinking		
4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate effectively in oral and written forms	1.Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1.Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks.
4.2	Use information and communication technologies Use basic mathematical and statistical techniques		

			2.Evaluation of the report presented
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Report, Quizes or team project	----	10%
2	Mid-Term Exam (One Hour Exam)	8	20%
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- We have faculty members to provide counseling and academic advice.
- 2 hours per week as office hours are available for discussion with the students.

E. Learning Resources

1. List Required Textbooks

- Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, Analytical Chemistry, 7th edition, WILEY (2014).
- Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, Analytical Chemistry, 7th edition, Springer (2014)

2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http://en.wikipedia.org/wiki/Petroleum1- http://www.chemhelper.com/ • http://www.chemweb.com/ • http://www.science.uwaterloo.ca/~cchieh/cact/ http://www.sciencedirect.com/
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. - Microsoft Power Point and Microsoft Word - Qualitative analysis video - Teaching CD for qualitative analysis

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Classrooms capacity (30) students. Providing hall of teaching aids including computers and projector.

2. Computing resources (AV, data show, Smart Board, software, etc.) Roome quipped with computer and projector and TV
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Student discussion with the instructor allow for continuous feed back through the course progress.
- Student Evaluation Questionnaires.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- Discussions within the group of faculty teaching the course.
- Peer consultation on teaching strategies and its effectiveness.

3 Processes for Improvement of Teaching

- Workshops given by experts on new teaching and learning methodologies will be attended.

Improving of the teaching strategies by monitoring the evaluation of the students progress through the semester

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

Not effective yet.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- The course will be evaluated periodically after each semester based on the results of the students and the report presented by the teaching stuff that will be discussed with the course coordinator so as to improve the course.

Faculty or Teaching Staff: ___Dr Marwa El Ghalban_____

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Organic analytical chemistry
402214-2

Institution: **Umm Al-qura University** Date of Report: **2018**

College/Department : **Faculty of Applied Science/ department of chemistry**

2017

A. Course Identification and General Information

1. Course title and code: **Organic Analytical Chemistry 402214-2**
2. Credit hours: **3 (2+1) hrs.**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Prof. Amr L Saber**
5. Level/year at which this course is offered: **4th level / 2rd year**
6. Pre-requisites for this course (if any): **Volumetric Analysis Chemistry 402112**
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	■	What percentage?	**50%**
b. Blended (traditional and online)	■	What percentage?	**20%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	■	What percentage?	**30%**

Comments:

B Objectives

2. What is the main purpose for this course? **2.1.** Demonstration analytical methods which include the analysis of organic compounds **2.2.** Know the different function groups in organic compounds **2.3.** Determination of the state of unsaturation in organic compounds **2.4.** Stress the different analytical methods to determine organic compounds in real samples **2.5.** Recognize the formation method of oxime
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
l. Determination of elements in organic compounds	1	2
m. Determination of Carboxylic acids	1	2
n. Determination of esters	1	2
o. Determination of amino groups	1	2
p. Determination of hydroxylic groups	1	2
q. Determination of carbonyl groups and their derivatives	1	2
r. Determination of nitro and nitroso groups	1	2
s. Determination of the state of unsaturation in organic compounds	1	2
t. Determination of organic peroxide	1	2
u. Determination of isothiocynate and isocynate	1	2
v. Discussion the formation method of oxime (equilibrium and kinetic study) as a model in organic analytical chemistry	1	2

Practical Part:

- **Determination of elements(C, H, O, N,…) in organic compounds.**
- **Determination of formaldehyde concentrations in their solutions**
- **Determination of acetone concentrations in their solutions**
- **Determination of amino and hydroxyl groups**
- **Determination of equivalent weight for carboxylic acid**
- **Determination of the strength of aniline solution**
- **Determination of reduced saccharide**
- **Determination of the equivalence of ester saponification**
- **Determination of amino-acids**

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-		36		60
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week. 2 h

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize principles of organic analysis in analytical chemistry.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Identify the classification of organic analysis methods		
1.3	Know the procedures of elemental analysis		
1.4	Definethe concentration parameters		
1.5	Recognize the meaning of equivalent weight and saponification		
1.6	Describe statistical methods in organic analysis.		
1.7	Select the proper method to determinethe strength of aniline solution		
1.8	Demonstrate the state of unsaturation in organic compounds		
1.9	Recognize the formation method of oxime (equilibrium and kinetic study) as a model in organic analytical chemistry		
1.10	Outline application important		
2.0	**Cognitive Skills**		
2.1	Apply the suitable methods for elemental analysis	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Compare the different types of hetero-organic compounds analysis		
2.3	Explain principles of organic analysis methods and its classification		
2.4	Analyze deferent amino-acids compounds		
2.5	Summarize the principles of organic analysis		

3.0	**Interpersonal Skills & Responsibility**		
3.1	Illustrate the principles of organic methods and its classification	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Analyze amino, carboxylic, halo and sulpha compounds		
4.0	**Communication, Information Technology, Numerical**		
4.1	Appraise the organic analysis in analytical chemistry	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate elemental analysis, saponification and the formation method of oxime		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-Term Exam (One Hour Exam)	8	20%
2	Assignments	-----	10%
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks

• Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, ***Analytical Chemistry***, 7th edition, Springer (2014)
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, ***Analytical Chemistry***, 7th edition, WILEY (2014) • Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, *Analytical Chemistry*, 7th edition, Springer (2014) • Dhruba Charan Dash. *Analytical Chemistry*)2018(PHI Learning Private Limited.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Independent advice of the duties and tasks.**
3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application ofe-learning.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult others staff of the course.**
- **Hosting visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Prof. Amr L Saber**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Spectrophotometric and Electrochemical techniques
402311-3

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Spectrophotometric and Electrochemical techniques / 402311-3**			
2. Credit hours: **3 (2+1)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Prof. Amr L Saber**			
5. Level/year at which this course is offered: **5th level/3rd year**			
6. Pre-requisites for this course (if any):**Volumetric analysis/402112**			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	■	What percentage?	**50%**
b. **Blended (traditional and online)**	■	What percentage?	**20%**
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other	■	What percentage?	**30%**
Comments:			

B Objectives

1. What is the main purpose for this course? **By the end of this course the student** **1- Have all information about the instrumental analysis** **2- Able to determine the trace amounts of different compounds and metals.** **3- Familiar with spectrophotometric and electroanalytical methods**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
w. Principles and applications of spectrophotometric and colormetric analysis	1	2
x. Electromagnetic spectrum and its interaction with matter	1	2
y. Absorption and emission of light by atoms and molecules-types of analysis and devices	1	2
z. Spectrophotometric measurements theory and Beer's law deviation	1	2
aa. Spectrophotometric instrumentation – spectra measurements using UV-vis and IR bb. Beer's law applications	1	2
cc. Turbidity analysis and flame photometry (devices-principles-applications)	1	2
dd. Atomic absorption by electrothermal oven- X ray analysis – Applications	1	2
ee. Atomic emission spectroscopy and the interference study	1	2
ff. Inductively coupled plasma (ICP)– principles and applications	1	2
gg. Electrochemical methods in quantitative analysis – Introduction to the principles hh. Potentiometric methods and Potentiometric titrations	1	2
ii. Electrogravimetric analysis-columetry	1	2
jj. Voltammetry and polarography techniques,Conductmetric methods and their titrations	1	2

Practical Part:

- Determine copper in copper sulphate solution using spectrophotometric methods
- Determine iron in its salt solution using spectrophotometric methods
- Study reduction oxidation reactions by spectrophotometric methods
- Analysis of $KMnO_4$ and $K_2Cr_2O_7$ in mixture using UV-Vis. spectrophotometer
- Determination of copper using potentiometric titration

- Potentiometric EDTA titrations with the mercury electrode
- Determination of ascorbic acid in fruit juice using Polarographic method
- Determination of amino acids in their solutions
- Determination of hydroxyl group number

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-	36	-	-	60
Credit	2	-	1	-	-	3

3. Additional private study/learning hours expected for students per week. 2 h

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Describe the principles and applications of spectrophotometric and colormetric analysis	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Identify electromagnetic spectrum and its interaction with matter		
1.3	Define absorption and emission of light by atoms and molecules-types of analysis and devices		
1.4	Recognize spectrophotometric measurements theory and Beer's law deviation		
1.5	Familiar with spectrophotometric instrumentation – spectra measurements using UV-vis and IR		
1.6	Name atomic absorption by electrothermal oven- X ray analysis – Applications		
1.7	Write about atomic emission spectroscopy and the interference study		
1.8	Determine the electrochemical methods in quantitative analysis		
1.9	Recognize the potentiometric methods and Potentiometric titrations		
1.10	Memorize voltammetry and polarography techniques		
1.11	Outline conductmetric methods and their titrations		
2.0	**Cognitive Skills**		
2.1	Analyze electromagnetic spectrum and its interaction with matter	• Lectures	• Exams

2.2	Summarize the principles and applications of spectrophotometric and colormetric analysis	• Scientific discussion • Library visits • Web-based study	• web-based student performance systems • portfolios • posters • demonstrations
2.3	Explain the turbidity analysis and flame photometry		
2.4	Apply Beer's law in many analytical applications		
2.5	Predict the inductively coupled plasma (ICP)– principles and applications		
2.6	Compare between voltammetry and polarography techniques		
2.7	Account for conductmetric methods and their titrations		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Use absorption and emission of light by atoms and molecules to determine the concentration	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Show spectrophotometric measurements theory and Beer's law deviation		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate atomic absorption by electrothermal oven- X ray analysis – Applications	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate potentiometric methods and Potentiometric titrations		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-Term Exam (One Hour Exam)	8	20%
2	Assignments	---	10%
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks
   - K. Danzer, *Analytical Chemistry, Theoretical and Metrological Fundamentals*, Springer(2014)

2. List Essential References Materials (Journals, Reports, etc.)
   - Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   - Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, *Analytical Chemistry*, 7th edition, WILEY (2014)
   - Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, *Analytical Chemistry*, 7th edition, Springer (2014)
   - Dhruba Charan Dash. *Analytical Chemistry*)2018(PHI Learning Private Limited.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
   - **http://www.chemweb.com**
   - **http://www.sciencedirect.com**
   - **http://www.rsc.org**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - **Classrooms capacity (30) students.**
   - **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.)
   - **Room equipped with computer and projector and TV.**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
   - **No other requirements.**

G Course Evaluation and Improvement Processes

2017

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Complete the questionnaire evaluation of the coursein particular.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic reviewof thecontents ofthe syllabusandmodify thenegatives.**
- **Consultotherstaff ofthe course.**
- **Hosting visiting staffto evaluate of thecourse.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Prof. Amr L Saber**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Separation Methods and Thermal Analysis

402317-3

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Separation Methods and Thermal Analysis / 402317-3**	
2. Credit hours: **3 (2+1)**	
3. Program(s) in which the course is offered. **Chemistry program**	
4. Name of faculty member responsible for the course: **Dr. Mohammed Kassem**	
5. Level/year at which this course is offered: **6th level / 3rd year**	
6. Pre-requisites for this course (if any): **Spectrophotometric and Electrochemical techniques 402311-3**	
7. Co-requisites for this course (if any)---	
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ■	What percentage? **50%**
b. **Blended (traditional and online)** ■	What percentage? **20%**
c. e-learning ☐	What percentage? ☐
d. Correspondence ☐	What percentage? ☐
f. Other ■	What percentage? **30%**
Comments:	

B Objectives

1. What is the main purpose for this course? **By the end of this course the students will** **1- Have all information about mixtures in chemistry** **2- Familiar with separation processand methods of thermal analysis.** **3- Able to use many separation tools for separate both organic and in organic mixtures.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
kk. Separation methods in analytical chemistry, classifications , and solvent extraction technique	1	2
ll. Principles of chromatographic methods and its classification	1	2
mm. Column chromatography	1	2
nn. Liquid-liquid chromatography and Solid-liquid chromatography	1	2
oo. Ion exchanger chromatography, ionic chromatography and HPLC	1	2
pp. Plane chromatography	1	2
qq. Thin layer chromatography (TLC), paper chromatography (PC) and electrophoresis method	1	2
rr. Gas chromatography	1	2
ss. Gas chromatography in qualitative, quantitative, medical and petroleum analysis	1	2
tt. Principles and devices of previous analysis methods	1	2
uu. Thermal analysis methods: thermo gravimetric analysis (TGA), (DTG), (DSC) and (DTA)	1	2
vv. Calometric analysis and thermal titrations	1	2

Practical Part:

- **Solvent extraction of iodine from aqueous layer to organic layer.**
- **Choosing suitable solvent for separation mixture of inks or amino acids using paper chromatography.**
- **Halides separation using thin layer chromatography.**
- **Determination of total concentration of cations in water sample using ion-exchange chromatography.**
- **Using GC to determine retention time, flow rate and internal standard solution then determine pentanol in unknown sample.**
- **Chemical equilibrium measurement using GC for the reaction of methyl acetate with ethyl alcohol.**

- **Determination fatty acid by GC.**
- **Determination of alcohol by GC.**
- **Determination of benzoic acid in beverages by GC.**
- **Determination of drugs in pharmaceuticals using HPLC.**

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-		36		60
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week. 2 h

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize the separation methods in analytical chemistry, classifications , and solvent extraction technique	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Identify the principles of chromatographic methods and its classification		
1.3	Know the principles of column chromatography		
1.4	Describe liquid-liquid chromatography and Solid-liquid chromatography		
1.5	Familiar with plane chromatography		
1.6	Select the proper method of preparation of an organic molecule		
1.7	Name the different conformations of alkanes and cycloalkanes		
1.8	Determine principles and devices of previous analysis methods		
1.9	Recognize thin layer chromatography (TLC), paper chromatography (PC) and electrophoresis method		
1.10	Memorize the thermal analysis methods		
1.11	Outline calometric analysis		
1.12	Definethermal titrations		

2.0	**Cognitive Skills**		
2.1	Apply separation methods in analytical chemistry	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Compare calometric analysis and thermal titrations		
2.3	Explain the principles of chromatographic methods and its classification		
2.4	Analyze liquid-liquid chromatography and Solid-liquid chromatography		
2.5	Summarize the principles and devices of GC and HPLC		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Illustrate the principles of chromatographic methods and its classification	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Analyze thin layer chromatography (TLC), paper chromatography (PC) and electrophoresis method		
4.0	**Communication, Information Technology, Numerical**		
4.1	Appraise the separation methods in analytical chemistry	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate ion exchanger chromatography, ionic chromatography and HPLC		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-Term Exam (One Hour Exam)	8	20%
2	Assignments	---	10%
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

• **We have faculty members to provide counseling and advice.** • **Office hours: During the working hours weekly.** • **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks • Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, ***Analytical Chemistry***, 7th edition, Springer (2014)
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Handouts available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, ***Analytical Chemistry***, 7th edition, WILEY (2014)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **Noother requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Dr. Mohammed Kassem**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Selected Topics in Analytical Chemistry

402413-2

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Selected Topics in Analytical Chemistry / 402413-2**	
2. Credit hours: **2**	
3. Program(s) in which the course is offered. **Chemistry program**	
4. Name of faculty member responsible for the course: **Dr. Mohammed Kassem**	
5. Level/year at which this course is offered: **8th level/4th year**	
6. Pre-requisites for this course (if any):**Separation methods and thermal analysis course / 402317**	
7. Co-requisites for this course (if any)---	
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ■	What percentage? **80%**
b. **Blended (traditional and online)** ■	What percentage? **20%**
c. e-learning ☐	What percentage? ☐
d. Correspondence ☐	What percentage? ☐
f. Other ☐	What percentage? ☐
Comments:	

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be:** **1- Able to apply different analytical methods on samples in artificial chemistry,** **2- Familiar with Quality control and environmental pollutions** **3- Able to using of statistical analysis in analytical chemistry and tests of significance**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
ww. Quality control and data handling in analytical chemistry techniques and how to select the optimum samples	1	2
xx. The methods and ways of analytical chemistry – environmental analytical chemistry – industrial pollutions	1	2
yy. The analytical chemistry in manufactures – the measurements and primary standard materials and standard methods in analytical chemistry	1	2
zz. The standard parameters in the world and in Saudi Arabia	1	2
aaa. The advanced analytical techniques	1	2
bbb. Using of statistical analysis in analytical chemistry and tests of significance	1	2
ccc. The optimal parameters to select the best analytical methods	1	2
ddd. The analytical problems during the solubility process and preparation of sample	1	2
eee. Selective industrial applications	1	2
fff. Forensic science and analytical chemistry in criminal and toxics examinations	1	2
ggg. Biological applications on hair, natural and artificial fibers, pesticides and environmental pollutions	1	2
hhh. Analytical applications on alloys, metals, raw material, rocks and sand	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-	-	-	-	24
Credit	2	-	-	-	-	2

3. Additional private study/learning hours expected for students per week. 2 h

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize quality control and data handling in analytical chemistry techniques and how to select the optimum samples	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays
1.2	Know the methods and ways of analytical chemistry – environmental analytical chemistry – industrial pollutions		
1.3	Describe analytical chemistry in manufactures – the measurements and primary standard materials and standard methods in analytical chemistry		
1.4	Familiar with the standard parameters in the world and in Saudi Arabia		
1.5	Select the optimal parameters to select the best analytical methods		
1.6	Identify the analytical problems during the solubility process and preparation of sample		
1.7	Write selective industrial applications		
1.8	Recognize forensic science and analytical chemistry in criminal and toxics examinations		
1.9	Outline biological applications on hair, natural and artificial fibers, pesticides and environmental pollutions		
2.0	**Cognitive Skills**		
2.1	Apply the optimal parameters to select the best analytical methods	• Lectures • Scientific discussion • Library visits	• Exams • web-based student performance systems • portfolios
2.2	Compare between quality control and data handling in analytical chemistry techniques and how to select the optimum samples		

2.3	Explain the methods and ways of analytical chemistry – environmental analytical chemistry – industrial pollutions	• Web-based study	• posters • demonstrations
2.4	Analyze the standard parameters in the world and in Saudi Arabia		
2.5	Summarize the selective industrial applications		
2.6	Account for analytical applications on alloys, metals, raw material, rocks and sand		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Modify the methods and ways of analytical chemistry	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Analyze The optimal parameters to select the best analytical methods		
4.0	**Communication, Information Technology, Numerical**		
4.1	Illustrate the using of statistical analysis in analytical chemistry and tests of significance	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Evaluate the optimal parameters to select the best analytical methods		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	--	10%
2	First Periodic Exam (One Hour Exam)	--	20
3	Second Periodic Exam (One Hour Exam)	--	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks • R. Kellner, J. M. Mermet, M. Otto, M. Valcarcel and H. M. Widmer, *Analytical Chemistry*, 2nd edition, WILEY (2014) • K. Danzer, *Analytical Chemistry, Theoretical and Metrological Fundamentals*, Springer(2014)
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Handouts available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, *Analytical Chemistry*, 7th edition, WILEY (2014) • Douglas A. Skoog, Donald M. West, James F. Holler and Stanley R. Crouch, *Analytical Chemistry*, 7th edition, Springer (2014)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **Noother requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.**

- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Dr. Mohammed A. Kassem**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

B- Physical Chemistry Courses

2017

Course Specifications

General Chemistry 1
402101-2

Institution **Umm Al-Qura University**	Date of Report: **2018**
College/Department **Applied Science /Chemistry Department**	

2017

A. Course Identification and General Information

1. Course title and code: **General Chemistry (402101-5)**
2. Credit hours : **5h**
3. Program(s) in which the course is offered. **Chemistry** (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course **Prof. Mohamed Ismail Awad**
5. Level/year at which this course is offered **first level**/first year
6. Pre-requisites for this course (if any) **No**
7. Co-requisites for this course (if any):
8. Location if not on main campus **both on El-Abedyah, and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	■	What percentage?	70 %
b. Blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other	■	What percentage?	30 %

Comments:

B Objectives

1. What is the main purpose for this course?

By the end of this course student will be able to:

- Explore the role of measurements in understanding and quantifying principles of chemistry.
- Comprehend quantitative relationships in chemical equations.
- Identify types of chemical reactions.
- Answer qualitative questions about foundational chemistry topics, such as the electronic structure of atoms and molecules, properties of elements and compounds, and chemical bonding;
- Solve quantitative problems involving chemistry topics, such as stoichiometry, thermochemistry, and properties of gases;
- Use chemical terminology and units of measures correctly
- Run elementary chemistry experiments.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- **Use a lot of Web sites that contain videos and animated illustrations that clarify the scientific idea faster and better.**
- **An attempt to link the scientific theories and concepts to life as much as possible with examples and applications in our daily lives.**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Solution, concentration expressions and types of solutions and their properties.	**2**	**8**
Thermodynamics and thermochemistry: first law of thermodynamics, Hess's law and applications on Hess's law.	**2**	**8**
Exam	**1**	**4**
Chemical equilibrium- law of mass action – Le Chatelier principle.	**2**	**8**

Electrochemistry: Galvanic cells- Electrochemical series- Cell potential- Nernst equation- Electrolytic cells- Faraday's law of electrolysis.	**2**	**8**
Gaseous state: ideal gas equation- Van der Waals equation – gas liquefaction	**2**	**8**
Liquid state: Evaporation- vapor pressure-boiling-boiling point-surface tension-viscosity.	**2**	**8**
Exam	**1**	**4**
Solid state: melting point-crystalline systems- X-ray and crystal structure	**2**	**8**

Experiment	No. of weeks	Contact hours
Introduction and Safety in laboratory	**1**	**3**
Density and viscosity of liquids	**1**	**3**
Types of chemical compounds (polar-non-polar-ionic-covalent)	**1**	**3**
Chemical reaction	**1**	**3**
Exam	**1**	**3**
Acids and Bases- calculation of pH	**1**	**3**
Vinegar titration	**1**	**3**
Oxidation-reduction reactions	**1**	**3**
Molecular weight of acid	**1**	**3**
Qualitative analysis (acid and basic radicals)	**1**	**3**
Determination of molecular weight of chemical compounds	**1**	**3**
Enthalpy determination	**1**	**3**
Determination of **critical temperature of phenol-water system**	**1**	**3**
Exam	**1**	**3**

Revision	**1**	**3**
Final exam	**1**	**3**

Practical part:

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**64**			**48**		
Credit	**4**			**1**		

3. Additional private study/learning hours expected for students per week. **Requires 4 hours per week between revision and solve the exercises and websites on the subject.**

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0			
1.1	**List the different expression methods of the concentration of solutions.**	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • portfolios • long and short essays posters lab manuals
1.2	**Familiar with the laws that describe the behavior of ideal gases.**		
1.3	**Identify characteristics of liquids.**		
1.4	**Describe types of soilds.**		
1.5	**Identify types of thermochemical reactions.**		
1.6	**Mention the first law of thermodynamics.**		

1.7	**Identify types of electrochemical cells and differences between them.**		
1.8	**List the factors affecting equilibrium position and equilibrium concentration.**		
2.0	**Cognitive Skills**		
2.1	**Summarizes gases laws**	• Lectures • Scientific discussion • homework assignment containing problem thinking activities	1. Midterm exam 2.quizzes 3.Final exam
2.2	**Compare between ideal and real gases**		
2.3	**Apply Hess's law for the calculation of heat of reaction.**		
2.4	**Apply Faraday's laws for calculating the amount deposited at electrodes**		
2.5	**Predict the spontaneity of chemical reaction.**		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	Team work groups General discussion with students for solving a problrm.	Assessment of the solution of problems submitted by the students.
3.2	Use university library andweb search engines for collecting information and search about different topics .		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	Write a Report Use libraries	Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Homework and other assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks
   1. **P. Atkins and J. de Paula, Physical Chemistry, 10th ed., 2006, New York.**
   2. **General Chemistry – d/Al Owais — Dar Al-kheraigi**
   3. **Simplify General Chemistry – d/Abdullah Al beed**

2. List Essential References Materials (Journals, Reports, etc.)

Steven S. Zumdahl, Susan A. Zumdahl, 9th ed., 2009, New York.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

Chemistry, R. Chang, 10th Edition, McGraw-Hill Higher Education, 2011.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **http://www.chemweb.com**
- **http://www.sciencedirect.com**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.**

- **Providing new tools for learning.**
- **The application of e-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Prof. Mohamed Ismail Awad _____

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Thermodynamics
402241-3

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

2017

A. Course Identification and General Information

1. Course title and code: **Thermodynamics /402241-3**			
2. Credit hours: **3(2+1)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Professor Alaa El-Shafei**			
5. Level/year at which this course is offered: **3th level/2nd year**			
6. Pre-requisites for this course (if any): Volumetric Analytical Chemistry (402112)& Calculus (404101			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom		What percentage?	
b**. Blend (traditional and online)**	■	What percentage?	**100%**
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	
Comments:			

B Objectives

1. What is the main purpose for this course? **By the end of this course the students will be able to:** **1. Describe the fundamental principles of thermodynamics.** **2. State the fundamental application of thermodynamic laws in various fields** **3. Develop physical intuition, mathematical reasoning, and problem solving skills.** **4. Analyse the thermodynamic data and predict the processes spontaneity**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Theoretical part		
iii. General introduction	1	2
jjj. Thermodynamic terms: Heat, energy and work (the mechanical equivalent of heat). Different types of systems	1	2
kkk. Thermodynamics variables and characteristics of intensive, extensive and thermodynamics processes.	1	2
lll. Zero and first laws of thermodynamics and their applications	1	2
mmm. The relationship between enthalpy change and internal energy change, heat capacity	1	2
nnn. The Jules-Thompson's effect, Adiabatic and isothermal expansions, Determination of Joule's coefficient from heat capacity measurements.	1	2
ooo. Thermochemistry. Exothermic and endothermic reactions. Kirchhoff's law, Hess's law and its applications.	1	2
ppp. The second law of thermodynamics and its applications. Spontaneous and non spontaneous processes. Heat machines and thermal efficiency	1	2
qqq. Heat transfer to work. Carnot cycle (efficiency and compression ratio) Otto cycle.	1	2

rrr. Entropy. Gibbs free energy, work function, Gibbs and Gibbs – Helmholtz Equations.	1	2
sss. Van't Hoff Equations, Chemical Equilibrium and spontaneity.	1	2
ttt. Third law of thermodynamics and its applications.	1	2
uuu. General revision	1	2
Practical Part		
• Instructions on rules and methods of safety at work and an introduction to the objectives of thermodynamics and various types of thermo-chemical reactions.	1	3
• Determination of the heat capacity and specific heat of the calorimeter using distilled water.	1	3
• Determination of the heat capacity of the calorimeter using solutions.	1	3
• Determination of the heat capacity for different concentration of sodium chloride solutions.	1	3
• Determination of the heat of neutralization between acid and alkaline.	1	3
• Determination of the heat of salvation of ammonium chloride as an endothermic reaction at infinite dilution.	1	3
• Determination of the heat of salvation of sodium hydroxide as an exothermic reaction at infinite dilution.	1	3
• Hess's Law.	1	3
• Determination of the critical temperature for water-phenol system.	1	3
• Determination of the lower critical temperature in two component system.	1	3
• Three component systems.	1	3
• General revision	1	3

2017

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	26	-		39		65
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize the intensive and extensive properties	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Know the classifications of thermodynamic systems		
1.3	Describe Joul and Joul-Thompson effects		
1.4	Familiar with systems and various dynamic processes.		
1.5	Identify the different thermodynamics functions		
1.6	Write thermal equations for various thermodynamic processes.		
1.7	Determine the relationship between chemical equilibrium and spontaneity.		
1.8	Memorize different laws of thermodynamics		
1.9	Outline the different uses of thermodynamics functions		
1.10	Defineexothermic and exothermic reactions		
2.0	**Cognitive Skills**		
2.1	Apply the thermodynamic laws	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Compare between various thermodynamic systems		
2.3	Explain the conversion of heat to work		
2.4	Analyse the thermodynamic data		
2.5	Predict the spontaneity of the reactions		
2.6	Evaluate the efficiency of various heat engine		

3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	• Team work groups for cooperative work making. • Presenting the case study for each group to the other groups in class. • Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	• Writing group scientific report for a case study. • Assessment of the solution of problems submitted by the students.
3.2	Use university library and web search engines for collecting information and search about different topics.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	• Write a Report • Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	• Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks. • Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information**.**		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Homework and other assignments	----	10

3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counselling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counselling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks

- الكيمياء الفيزيائية: J. Berro ترجمة أحمد محمد عزام واخرون – مكتبة الانجلو المصرية 1982م .
- 2. B. S. Bahl, Advanced Physical Chemistry, S. Chand & Co., 1993, New Delhi, India.
- 3. R. A. Alberty and R. J. Silbey, Physical Chemistry, 1992, John Wiley & Sons.
- 4. J. P. Bromberg, Physical Chemistry, 1980, Allyn and Bacon.
- 5. P. Atkins and J. de Paula, Physical Chemistry, 7 th ed., Oxford University press, New York, 2014.

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- Thermodynamics: an engineering approach, Yunus A. Cengel and Michael A. Boles, 7 th. SI ed., McGraw- Hill, London, 2011.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **http://www.chemweb.com**
- **http://www.sciencedirect.com**
- **http://www.rsc.org**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Independent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application o fe-learning.** • **Exchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.**

- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Professor Alaa El-Shafei**

Signature:  **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Quantum Chemistry

402253-2

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ Department of chemistry**	

2017

A. Course Identification and General Information

1. Course title and code: **Quantum Chemistry**/402253-2			
2. Credit hours: **2 hours**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Dr Ahmed El Defrawy**			
5. Level/year at which this course is offered: **4rd level/2st year**			
6. Pre-requisites for this course (if any): **402121**			
7. Co-requisites for this course (if any) -			
8. Location if not on main campus: **both in El-Abdyah(boys side) and El-Zaher (girls side)**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	■	What percentage?	80%
b. Blended (traditional and online)		What percentage?	
c. e-learning	■	What percentage?	20%
d. Correspondence		What percentage?	
f. Other		What percentage?	
Comments:			

B Objectives

1. What is the main purpose for this course? By the end of this course the students will be able to: 1. describe the fundamental principles of quantum chemistry. 2. State the fundamental postulates of quantum mechanics. 3. develop physical intuition, mathematical reasoning, and problem solving skills. 4. write the solution of Schrodinger equation for some simple systems. 5. be further prepared for the necessarily rigorous sequence in chemistry courses needed the quantum chemistry
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) 1. Computer labs to be used in teaching the student the basics of the application of the quantum chemistry soft ware used in the simulation, molecular modeling and quantum chemical calculations. 2. encourage students to make reports in the recent trends in the field of quantum chemistry, either from the library or by using the Internet.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Basics of Quantum Theory – Introduction to Quantum Mechanics And Its Origin – Properties of Wave Function.	2	2
Solution of Schrödinger Equation – Applications of Schrödinger Equation - A Particle Moving in A Box With Different, One – Two – Three, Dimensions - Predict the Wave Function Equation and the Energy in Each Case.	2	4
Operators and its Importance in Quantum Chemistry - Eigen Functions and Eigen Values	1	2
Schrödinger Equation Of Hydrogen Atom- Wave Function Equation and Energy	1	2
Different Quantum Numbers and their Uses in Describing the Orbitals and the Energy Levels.	1	2
Quantum Theory and Molecular Structure – Born-Oppenheimer Approximation.	1	2
revision	1	2
Molecular Orbital Theory and Molecular Structure-	1	2
Linear Combination of Atomic Orbitals (LCAO).	1	2
Application of Molecular Orbital Theory on Homonuclear Molecules.	1	2

Application of Molecular Orbital Theory on Heteronuclear Molecules	1	2
Overlap Matrix- Correlation Diagrams.	1	2
Practical Applications on Computational Software - Analysis and Discussion of the Results.	2	4
Revision	1	2

2017

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	32	-	-	-	-	32
Credit	2	-	-	-	-	2

3. Additional private study/learning hours expected for students per week. -

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	List the historical development of the Origins of quantum theory	1.Lectures using white board and data show 2. Problem classes 3. discussion groups	1.Midterm exam 2.quizzes 3.Group discussion 4.Final exam
1.2	Illustrate, qualitatively and quantitatively, the role of photons in understanding phenomena like the photoelectric effect and Compton scattering.		
1.3	describe the experiments displaying wave like behavior of matter, and how this motivates the need to replace classical mechanics by a wave equation of motion for matter (the Schrödinger equation).		
1.4	mention the basic concepts and principles of quantum mechanics: The Schrödinger equation, the wave function and its physical interpretation, Eigen values and Eigen functions, expectation values and uncertainty.		
1.5	define the concepts of spin and angular momentum, as well as their quantization- and addition rules.		

1.6	Explain physical properties of atoms and molecules based on quantum Chemical formulations.		
1.7	describe a Qualitative treatment of the LCAO-MO for homonuclear and heteronuclear diatomic molecules as a well as Simple Hückel Molecular Orbital theory.		
2.0	**Cognitive Skills**		
2.1	Give concise physical interpretations and discussions of quantum mechanics postulations in molecular orbitals treatment.	1. group discussions 2. case study. 3. home work assignment containing problem thinking activities	1.Midterm exam 2.quizzes 3.Group discussion 4.Final exam
2.2	solve the Schrödinger equation for simple one-dimensional systems and conclude the probabilities, Eigen and expectation values for these systems.		
2.3	compare between the different energies of the rigid rotors and harmonic oscillator models based on the solution of their Schrödinger equation.		
2.4	Solve the Schrödinger equation for the hydrogen like elements.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessment of the solution of problems submitted by the students.
3.2	Use university library andweb search engines for collecting information and search about different topics .		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	1.Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1.Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information**.**		

			each other in different tasks. 2.Evaluation of the report presented
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	problem sets and case study	**weekly**	**3%**
2	Quizzes	**To be assigned**	**3%**
3	class test 1 (One Hour Exam)	**7**	**20%**
4	class test 2 (One Hour Exam)	**13**	**20%**
5	project	**14**	**4%**
6	Final exam (Two Hours Exam)	**16**	**50%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- We have faculty members to provide counseling and academic advice.
- 2 hours per week as office hours are available for discussion with the students.

E. Learning Resources

1. List Required Textbooks

1- Ajit J Thakkar, Quantum Chemistry, Morgan & Claypool Publishers, 2014.

2- Donald A. McQuarrie, Quantum Chemistry, University Science Books, 2008.

2. List Essential References Materials (Journals, Reports, etc.)

journal of Molecular Structure (Elsevier)

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

1- Peter Atkins and Ronald Friedman, Molecular Quantum Mechanics, Oxford University Press, 2005.

2- David O. Hayward, Quantum Mechanics for Chemists, Royal Society of Chemistry, 2002.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http//:en.wikipedia.org/wiki/ • http//:www.chemweb.com/ • Websites on the internet relevant to the topics of the course
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Hyperchem or Spartan software will be helpful beside some free software.

2017

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Appropriate teaching class including white board and data show with at least 25 seats.

2. Computing resources (AV, data show, Smart Board, software, etc.) Computer Halls access for the students will be helpful in doing their tasks during the course.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Computational software will be helpful such as Spartan or hyperchem program packages.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Student discussion with the instructor allow for continuous feedback through the course progress. • Student Evaluation Questionnaires.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Discussions within the group of faculty teaching the course. • Peer consultation on teaching strategies and its effectiveness.
3 Processes for Improvement of Teaching • Workshops given by experts on new teaching and learning methodologies will be attended. • Improving of the teaching strategies by monitoring the evaluation of the students progress through the semester
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) Not effective yet.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- The course will be evaluated periodically after each semester based on the results of the students and the report presented by the teaching stuff that will be discussed with the course coordinator so as to improve the course.

Faculty or Teaching Staff: **Ahmed Mohamed El Defrawy**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

2017

Course Specifications

Colloid Chemistry and Phase Rule
402243-2

Institution **Umm Al-Qura University**	Date of Report **2018**
College/Department **Faculty of Applied Science / Department of Chemistry**	

2017

A. Course Identification and General Information

1. Course title and code: **Colloid Chemistry and Phase Rule- 402243-2**
2. Credit hours: **2h**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr Ahmed Fawzy Saad**
5. Level/year at which this course is offered: **5th level/third Year**
6. Pre-requisites for this course (if any) **General Chemistry(2)**
7. Co-requisites for this course (if any): **none**
8. Location if not on main campus: **El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. Blended (traditional and online)	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of the study of this course have students familiar with** • **the basic concepts of colloid chemistry** • **types of colloids and there preparation methods** • **properties of colloids and their applications** • **basics of phase rule and its important** • **examples of phase rule to mono, di and tri component systems**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **Use smart teaching halls for lectures.** *** Encourage students to link colloid chemistry course and what studied numerous applications in various domains such as Chemistry and medicine and Pharmacy and the food industry, water purification and industry and succession through work reports both from the library or using the Internet (self-teaching) and through discussion with Standing**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
1-Definition of colloids with examples	**1**	**2**
2- Classification of colloids	**1**	**2**
3- Theory of colloid stabilization	**1**	**2**
4- Methods of colloids preparations	**1**	**2**
5- Colloid technology	**1**	**2**
6- Colloid properties	**1**	**2**
7- Importance of colloids and its importance	**1**	**2**
8- Definition of phase rule	**1**	**2**
9- Physical changes dynamics	**1**	**2**
10- Cielus Calpyron Equation	**1**	**2**
11- Studying phase rule low	**1**	**2**
12- Phase rule of one component system	**1**	**2**
13- Phase rule of two component system	**1**	**2**
14- Phase rule of three component system	**1**	**2**
15- General Revision and Exam	**1**	**2**

2017

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**30**	-	-	-		**30**
Credit	**2**	-	-	-		**2**

3. Additional private study/learning hours expected for students per week. **1 hour/week**

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Mention the main differences between colloids and suspension and true solution.	1.Lectures using white board and data show 2. Problem classes 3. discussion groups	1.Midterm exam 2.quizzes 3.Group discussion 4.Final exam
1.2	List the preparation and purifying of colloidal solutions.		
1.3	Describe characteristics of colloidal solutions.		
1.4	Describethe most important applications of colloidal solutions.		
1.5	Describethe phase rule and its classifications.		
1.6	Mention equilibrium curves for different systems.		
2.0	**Cognitive Skills**		
2.1	Compare between colloids and suspension and true solution.	• Scientific discussion • Library visits • Web-based study	• web-based student performance systems • portfolios • posters • demonstrations
2.2	Give concise about the characteristics of colloidal solutions		
2.3	Analyze the relations between different phases of material.		
2.4	Apply equilibrium curves for different systems		

3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessment of the solution of problems submitted by the students.
	Use university library andweb search engines for collecting information and search about different topics .		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	1.Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1.Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks. 2.Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information**.**		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • **We have faculty members to provide counseling and advice.** • **Office hours: During the working hours weekly.** • **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks *** Handbook of Applied Surface and Colloid Chemistry, Vol. 1-2, Holmberg, Krister, John Wiley & Sons, New York, 2002.** *** PHYSICAL CHEMISTRY IN BRIEF, Josef P. Novak, Stanislav Labık, Ivona Malijevska, Institute of Chemical Technology, Prague, 2005.**
2. List Essential References Materials (Journals, Reports, etc.) *** Lecture Hand outs available on the coordinator website .**
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) *** Emulsions, Foams, and Suspensions: Fundamentals and Applications, Laurier L. Schramm, WILEY-VCH Verlag GmbH & Co, 2005.** *** Colloidal Chemistry, A. Goel, Discovery Publishing House, 1st ed., New Delhi, 2006.**
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Independent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **Application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic Review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

2017

Faculty or Teaching Staff: Dr Ahmed Fawzy Saad

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

ATTACHMENT 2 (e)

Course Specifications

2017

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications

Kinetic Chemistry and Catalysis

402242-3

Institution: **Umm Al-Qura University** Date of Report: **2018**

College/Department : **Faculty of Applied Science / Department of Chemistry**

2017

A. Course Identification and General Information

1. Course title and code: **Kinetic Chemistry and Catalysis / 402242-3**				
2. Credit hours: **3 (2+1)**				
3. Program(s) in which the course is offered. **Chemistry program**				
4. Name of faculty member responsible for the course: **Dr. Tahani Bawazeer**				
5. Level/year at which this course is offered: **4rd level/2nd year**				
6. Pre-requisites for this course (if any): **Thermodynamics / 402241**				
7. Co-requisites for this course (if any)---				
8. Location if not on main campus: **both in El-Abdyah(boys side) and El-Zaher (girls side)**				
9. Mode of Instruction (mark all that apply)				
a. Traditional classroom		What percentage?		
b. **Blended (traditional and online)**	■	What percentage?	**100%**	
c. e-learning		What percentage?		
d. Correspondence		What percentage?		
f. Other		What percentage?		
Comments:				

B Objectives

1. What is the main purpose for this course?

By the end of this course the students will be able to:

1. Describe the principles of kinetic chemistry.
2. Follow a reaction by different techniques.
3. Determine the rate law from the experimental data.
4. Analyze the experimental data of a given reaction.
5. Write the sequence of the elementary steps "mechanism" of a reaction.
6. Describe the fundamentals of catalysis and influence of the catalysts on the reaction rate.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

1. Encourage students to make reports in the field of kinetic chemistry from the library or using the Internet.
2. Use the websites to follow up and update the new topics of the subject of the course.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
General concepts in chemical kinetic – reaction rate – rate laws – reaction order – half-life time.	**1**	**2**
Factors affecting the rate of reaction.	**1**	**2**
Conventional techniques of following a reaction: chemical methods - physical methods.	**2**	**4**
Integration of simple rate laws: zero, first, second and third order reactions and examples.	**1**	**2**
Pseudo-first order reactions - fractional order reactions – higher order reactions and examples.	**1**	**2**
General revision and Mid-Term Exam.	**1**	**2**
Determining the rate law from experimental data: Isolation method - Differential methods - Integral methods – Method of Half lives.	**1**	**2**
Dependence of rate on temperature - The Arrhenius equation and activation energy.	**1**	**2**
Theories of chemical reactions - collision theory, transition-state theory.	**1**	**2**
Catalysis: types and examples.	**1**	**2**
Homogeneous catalysis - kinetics and mechanism of homogeneous catalysis	**1**	**2**
Theories of catalysis.	**1**	**2**
Catalysis by acids and bases and its applications.	**2**	**4**
General revision and Final Exam.	**1**	**2**

Practical Part:

1. Catalytic decomposition of hydrogen peroxide as a first order reaction.
2. Hydrolysis of ester as pseudo-first order reaction.
3. Saponification of ester as a second order reaction.
4. Persulfate-iodide reaction.
5. Oxidation of hydrogen peroxide to determine the order and the thermodynamic parameters.
6. Halogenation of acetone in solution as a zero order reaction.
7. Autocatalytic reaction between potassium permanganate and oxalic acid.

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**32**	-	-	**36**	-	**68**
Credit	**2**	-	-	**1**	-	**3**

3. Additional private study/learning hours expected for students per week.	

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	List the conventional techniques of following a reaction and select the appropriate one to the given reaction.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Mention the different reaction orders and their rate laws.		
1.3	Define the reaction rate constant of various reaction orders.		
1.4	List the factors affecting the reaction rate.		
1.5	Describe the types of catalysis - homogeneous catalysis.		
1.6	Explain the mechanism of catalysis by acids and bases.		
1.7	Describe the different theories of catalysis.		
2.0	**Cognitive Skills**		

2.1	Compare between the different experimental techniques of following a reaction.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Solve the rate-law expressions for different reaction orders.		
2.3	Solve the kinetic problems for all orders.		
2.4	Give a concise interpretation of the mechanism of catalysis by acids and bases.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Use the library and internet for collecting information and search about different topics.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Communicate effectively with his lecturer and colleagues		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Homework and other assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • We have faculty members to provide counselling and academic advice. • 2 hours per week as office hours are available for discussion with the students.

E. Learning Resources

1. List Required Textbooks *** An Introduction to Chemical Kinetics, Margaret Robson Wright, New York, John Wiley & Sons, 2004.** *** Kinetics of Chemical Reactions, Guy Marin, Gregory S. Yablonsky, John Wiley, 2011.** * **Catalytic Kinetics, Dmitry Yu Murzin and Tapio Salmi, 2nd Ed., Elsevier, 2016.**
2. List Essential References Materials (Journals, Reports, etc.) *** Lecture Hand outs available on the coordinator website.**
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) *** Concepts of Modern Catalysis and Kinetics, Chorkendorff, J. W. Niemantsverdriet, 2nd ed., WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, 2007.** *** Physical Chemistry, Peter Atkins & Julio de Paula, 10th ed., W. H. Freeman *and* Company, 2014.** *** Principles of Chemical Kinetics, Second Edition, James E. House, 2nd ed., Academic Press, 2007.**
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http//:en.wikipedia.org/wiki/** • **http//:www.chemweb.com/** • **Websites on the internet relevant to the topics of the course**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) * Appropriate teaching class including white board and data show with at least 25 seats. * Chemistry laboratories.

2. Computing resources (AV, data show, Smart Board, software, etc.) * Computer Halls access for the students will be helpful in doing their tasks during the course.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) * Noother requirements.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Student discussion with the instructor allow for continuous feed back through the course progress. • Student Evaluation Questionnaires.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Discussions within the group of faculty teaching the course. • Peer consultation on teaching strategies and its effectiveness.
3 Processes for Improvement of Teaching • Workshops given by experts on new teaching and learning methodologies will be attended. • Improving of the teaching strategies by monitoring the evaluation of the students progress through the semester
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) * Not effective yet.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • The course will be evaluated periodically after each semester based on the results of the students and the report presented by the teaching stuff that will be discussed with the course coordinator so as to improve the course.

Faculty or Teaching Staff: Dr. Tahani Bawazeer

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

COURSE SPECIFICATION

Electrochemistry

402245-3

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A Course Identification and General Information

1. Course title and code: **Electrochemistry 402245-3**
2. Credit hours **3 (2 theoretical + 1 Experimental)**
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) **Chemistry**
4. Name of faculty member responsible for the course **Professor Alaa El-Shafei**
5. Level/year at which this course is offered**:** **4th Level/2nd year**
6. Pre-requisites for this course (if any) **Physical Chemistry(2)**
7. Co-requisites for this course (if any)
8. Location if not on main campus

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

- **List types of electrodes and types of electrochemical cells.**
- **Types of standard electrodes and compare them.**
- **Write Nernst equation and solve related problems.**
- **List Faraday's laws and solve relevant problems.**

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- **Obsolete some topics will be dropped and more recent topics will be introduced.**
- **Number of lecture contact hours will be increased to 4 to allow a chance to introduce new subjects as electrode kinetics and cyclic voltammetry.**

C.Course Description(Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1 Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to electrochemistry.	**2**	**4**
Standard redox potentials	**1**	**2**
Types of galvanic and electrolytic cell.	**1**	**2**
Electrode potential and Nernst equation.	**2**	**4**
Reversible and irreversible electrochemical cells	**1**	**2**
Cell reaction and electromotive force.	**1**	**2**
Electromotive force and electrochemical reactions in the cell Standard electrodes	**1**	**2**
Major Exam I	**1**	**2**
Thermodynamic and electrode potentials	**1**	**2**

Major Exam II	**1**	**2**
Applications on Nernst Equation	**2**	**4**
Cell designation and cell potential	**1**	**2**

Practical Part

Experiment	No. of weeks	Contact hours
Daniel Cell	1	3
Concentration cells	1	3
Electrode position at electrodes	1	3
Measurements of cell potential	1	3
Determination of solubility of sparingly soluble salt	1	3
Electroplating	1	3
Measurements of some electrochemical parameters from Tafel Plots	1	3
Determination of the corrosion inhibition efficiency of some inhibitors using Tafel plots	1	3
Determination of corrosion rates using weight loss method	1	3
Determination of the corrosion inhibition efficiency of some inhibitors using weight loss method	1	3
Determination of corrosion rates using thermometric method	1	3
Determination of the corrosion inhibition efficiency of some inhibitors using thermometric method	1	3
Revision	1	3
Final exam	1	3

2 Course components (total contact hours per semester):				
Lecture: 32	Tutorial: -	Laboratory 48	Practical/Field work/Internship	Other:

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)

3 hours/week **(homework, take home exams and other assignments)**

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods	
1.0	**Knowledge**			
1.1	To know terminology of electrochemistry	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays posters lab manuals	
1.2	Write Nernst equation for determination of cell potential			
1.3	List the applications of galvanic cells			
1.4	List types of electrodes			
2.0	**Cognitive Skills**			
2.1	**Compare types of electrochemical cells and the reaction at the half cells**	• Lectures • Scientific discussion	• web-based student performance systems • portfolios • posters	

2.2	**Solve Problems on Nernst equation**	• Library visits • Web-based study	demonstrations
2.3	**Solve problems on Faraday's laws**		
2.4	**Apply Faraday's laws for calculating the amount deposited at electrodes**		
2.5	**Predict an assembly of galvanic cell**		
3.0	**Interpersonal Skills & Responsibility**		
3.1	**The ability for teamwork and the distribution of tasks.**	• Lectures • Scientific discussion Web-based study	• Exams web-based student performance systems
3.2	**The ability for fruitful interaction and communication with the surrounding environment.**		
4.0	**Communication, Information Technology, Numerical**		
4.1	**The ability to debate and dialogue with clear scientific method.** -	• Lectures • Scientific discussion • Library visits Web-based study	• web-based student performance systems individual and group presentations
4.2	**The ability to throw or explain scientific topic.**		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Homework and other assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • **Office hours (6 hours per week + appointments)** • **Help session (problem solving): 1 hour per week**

E Learning Resources

1. Required Text(s)
2. Essential References • **Electrochemistry Principles, Methods and Applications, Christopher M. A. Brett, Maria Oliveira Brett,Oxford University Press, 2005**
3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List) • **Electrochemical Methods , Fundamental and Applications,A.J.Bard ,L.R.Faulkner,JohnWiley&Sons,2010.** • **Handbook of Electrochemistry, Cynthia Zosk, Elsevier, 2011.** • **Handbook of Corrosion Engineering (Chinese), Pierre R. Roberge, McGraw-Hill, 2005.** • **Corrosion Basics: An Introduction, Pierre R. Roberge, NACE International, 2006.**
4-.Electronic Materials, Web Sites etc **Web sites dedicated to Electrochemistry available on the internet**
5- Other learning material such as computer-based programs/CD, professional standards/regulations **Power point presentations and other handouts posted on the WebCT for the students enrolled in the course.**

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.) • **A classroom containing at least 50 seats** • **A chemical laboratory of at least 20 places**
2. Computing resources • **Computer lab containing at least 20 computer sets.** • **Scientific calculator**
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) **Availability of chemicals, reagents, glassware, analytical balances, equipment relevant to the experiments assigned for the whole course and safety setups.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • **Course evaluation by students** • **Faculty – students general gathering**
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • **Peer consultation on teaching** • **Departmental council discussions** • **Discussions with the group of faculty teaching both the lab and lecture portions of the course.**
3 Processes for Improvement of Teaching • **Conducting workshops presented by experts on the teaching methodologies** • **Periodical departmental revisions on its methods of teaching** • **Monitoring of teaching activities by senior faculty members**
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • **Providing samples of all kind of assessment in the departmental course portfolio of the course**

- **Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy**
- **Conducting standard exams such as the American Chemical Society exams or others.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **The course material and learning outcome are periodically reviewed and the changes to be taken are in the departmental and higher councils.**
- **The chairman of the department and faculty members take the responsibility**

Faculty or Teaching Staff: **Professor Alaa El-Shafei**

Signature:  **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

2017

Course Specifications

General Spectra Chemistry
432254-2

Institution **Umm Al-qura University**	Date of Report **2018**
College/Department **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **General Spectra Chemistry- 432254-2**		
2. Credit hours: 2h		
3. Program(s) in which the course is offered. **Chemistry program**		
4. Name of faculty member responsible for the course: **Dr Ahmed El Defrawy**		
5. Level/year at which this course is offered: **4th level/Second Year**		
6. Pre-requisites for this course (if any) **Quantum Chemistry**		
7. Co-requisites for this course (if any): **none**		
8. Location if not on main campus: **El-Zaher**		
9. Mode of Instruction (mark all that apply)		
a. Traditional classroom	■ What percentage?	80%
b. Blended (traditional and online)	☐ What percentage?	☐
c. e-learning	■ What percentage?	20%
d. Correspondence	☐ What percentage?	☐
f. Other	☐ What percentage?	☐
Comments:		

B Objectives

1. What is the main purpose for this course?

By the end of this course student will :

1. describe the fundamental principles of molecular spectroscopy.
2. apply quantitative reasoning and problem-solving skills with quantum chemistry as a context to explain the different types of molecular spectra.
3. develop physical intuition, mathematical reasoning, and problem solving skills.
4. present written and mathematical arguments to support a response
5. formulate arguments based on evidence to support claims.
6. be further prepared for the necessarily rigorous sequence in chemistry courses needed the molecular spectroscopy.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1- Historical introduction – the nature of electromagnetic waves	**1**	**2**
2- Bohr Theory + quantum view	**2**	**4**
3- Electronic configurations	**1**	**2**
4- Spectra series+ absorption &emission mechanism	**2**	**2**
5- IR spectroscopy	**2**	**4**
6- Visible/UV spectroscopy	**2**	**4**
7- NMR	**2**	**4**
8- Molecular symmetry and spectroscopy	**3**	**6**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**15**	-	-	-		**30**
Credit	**2**	-	-	-		**2**

3. Additional private study/learning hours expected for students per week. **1 hour/week**

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize the meaning of Electromagnetic radiation	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • portfolios • long and short essays • quizes
1.2	Identify the laws of absorption and emission of radiation.		
1.3	identify the absorption spectra in the infrared region-		
1.4	Name the types of vibrational motions		
1.5	describe how quantum treatment is used to study the harmonic oscillator		
1.6	list the different electronic transition in organic compounds in the UV/Vis region using quantum theory.		
1.7	recognize the absorption spectra in the Radio wave region		
1.8	Recognize classical and qualitative description of the Nuclear magnetic resonance (NMR)		
1.9	Define the symmetry –symmetry elements and different symmetry operations – Point groups –		

	retaliation between the symmetry and spectroscopy and the molecular orbital theory		
2.0	**Cognitive Skills**		
2.1	apply the laws of absorption and emission of radiation for any kinds of radiation	• Scientific discussion • Library visits • Web-based study	• portfolios • final exam • group disscusio n
2.2	analyze the spectra of different region of electromagnetic radiation		
2.3	Compare between classical and qualitative description of the Nuclear magnetic resonance (NMR)		
2.4	Apply the symmetry elements and operation on different compounds		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessmen t of the solution of problems submitted by the students
3.2	Use university library andweb search engines for collecting information and search about different topics .		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	1.Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1. Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communicati on with each other in different tasks. 2.Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information**.**		

5.0	**Psychomotor**
5.1	NOT APPLICABLE

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks

- I.N. Levine, Molecular Spectroscopy, Wiley Interscience, New York, 1975.

2. List Essential References Materials (Journals, Reports, etc.)

- W. J. Moore, Physical Chemistry, 5th edition, Longman, 1972.

- K. Anderson, Fundamental of Molecular Spectroscopy, John Wiley& Sons, 3rd Edition, 1992.

- J. Michael Hollas, Modern Spectroscopy, 4th ed. John, Wiley & Sons New York, 2004.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

none

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **http://www.chemweb.com**

• **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.)
▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete thequestionnaireevaluation of the coursein particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **Application of e-learning.**

- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic Review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Dr Ahmed El Defrawy

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Surface Chemistry

402343-3

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Surface Chemistry/402343-3**
2. Credit hours: **3 (2+1)**
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) **Chemistry**
4. Name of faculty member responsible for the course: **Dr Abdel Rahman Salah Khder**
5. Level/year at which this course is offered: **5th level/3rd year**
6. Pre-requisites for this course (if any) **colloidal chemistry& phase rule**
7. Co-requisites for this course (if any) ----------
8. Location if not on main campus ----------
9. Mode of Instruction (mark all that apply)

a. **Traditional classroom**	■	**What percentage?**	**70 %**
b. Blended (traditional and online)	☐	What percentage?	☐
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. **Other Practical**	■	**What percentage?**	**30 %**

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be able to:** • **describe the fundamental principles of surface chemistry** • **describe the basic concepts of surface tension,** • **State the fundamental postulates of theories and equations gas adsorption theories.** • **Able to measure the surface tension of any liquid** • **Able to remove the pollutants from water by char coal.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Surface tension and free surface energy	**1**	**2**
Measurements of surface tension	**1**	**2**
Contactangleand work of adhesion and work of cohesion-Dupres equation	**1**	**2**
Equations of Kelvin, Laplace and Young	**1**	**2**
Adsorption, adsorption of gases by solids	**1**	**2**
Adsorption isotherms	**1**	**2**
Theories of adsorption isotherms (Frundlish, Langmuir, Langmuir-Hinshelwood,.....)	**1**	**2**
BET equation	**1**	**2**
Experimental methods of Gas adsorption for determining all parameters of surface properties including surface area	**1**	**2**
Adsorption and Heterogeneous catalysis	**1**	**2**
catalyst poisoning and types	**1**	**2**
Examples of heterogeneous catalysis mechanisms and kinetics	**1**	**2**

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24		36			60
Credit	2		1			3

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	**Recognize meaning of surface tension**	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	**Identifythedifferentmethodsof measurementofsurfacetension**		
1.3	**Know work of adhesion and work of cohesion**		
1.4	**Describe the Equations of Kelvin, Laplace and Young**		
1.5	**Identify the adsorption of gases by solids**		
1.6	**Recognize the Adsorption isotherms**		
1.7	**Identify the different Theories of adsorption**		
1.8	**Determine the experimental methods of Gas adsorption**		
1.9	**Recognize the Heterogeneous catalysis**		
1.10	**Know catalyst poisoning and types**		
1.11	**Know Examples of heterogeneous catalysis mechanisms**		
2.0	**Cognitive Skills**		
2.1	**Predict the origin surface tension of different liquids**	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	**Compare between tension of different liquids**		
2.3	**Compare between the different strategies for surface tension determination**		
2.4	**Analyze the Equations of Kelvin, Laplace and Young**		
2.5	**Compare betweenthe adsorption and adsorption isotherms of gases by solids**		
2.6	**Compare between the different methods for adsorption determination**		
2.7	**Give concise about heterogeneous catalysis and its poisoning**		

3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessment of the solution of problems submitted by the students.
3.2	Use university library andweb search engines for collecting information and search about different topics .		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	1.Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1.Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks. 2.Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information**.**		
4.4			
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%

2	Homework and other assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks
   1- **Handbook of Applied Surface and Colloid Chemistry, Vol. 1-2, Holmberg, Krister, John Wiley & Sons, 2002, New York**
   2- **Emulsions, Foams, and Suspensions: Fundamentals and Applications, Laurier L. Schramm, WILEY-VCH Verlag GmbH & Co, 2005, KGaA, Weinheim**
   3- Introduction to Applied Colloid and Surface Chemistry, Georgios M. Kontogeorgis & Soren Kiil, WILEY, 2016
   4- Surface and Colloid Chemistry, Principles and Applications, K. S. Birdi, CRC Press, Taylor and Francis Group, 2010

2. List Essential References Materials (Journals, Reports, etc.)
   - **Lecture Handouts available on the coordinator website**

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   1- Handbook of Applied Surface and Colloid Chemistry, Vol. 1-2, Holmberg, Krister, John Wiley & Sons, 2002, New York
   2- Emulsions, Foams, and Suspensions: Fundamentals and Applications, Laurier L. Schramm, WILEY-VCH Verlag GmbH & Co, 2005, K Ga A, Weinheim
   3- Introduction to Applied Colloid and Surface Chemistry, Georgios M. Kontogeorgis & Soren Kiil, WILEY, 2016
   4- Surface and Colloid Chemistry, Principles and Applications, K. S. Birdi, CRC Press, Taylor and Francis Group, 2010

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
   - **http://www.chemweb.com**
   - **http://www.sciencedirect.com**
   - **http://www.rsc.org**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Dr Abdel Rahman Salah Khder
Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Advanced Kinetic Chemistry
402445-2

Institution: **Umm Al-Qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ Department of Chemistry**	

A. Course Identification and General Information

1. Course title and code: **Advanced Kinetic Chemistry / 402445-2**				
2. Credit hours: **3 (2+1)**				
3. Program(s) in which the course is offered. **Chemistry program**				
4. Name of faculty member responsible for the course: **Dr. Ahmed Fawzy Saad**				
5. Level/year at which this course is offered: **7th level/4th year**				
6. Pre-requisites for this course (if any): **Surface Chemistry / 402343**				
7. Co-requisites for this course (if any)---				
8. Location if not on main campus: **both in El-Abdyah(boys side) and El-Zaher (girls side)**				
9. Mode of Instruction (mark all that apply)				
a. Traditional classroom		What percentage?		
b. **Blended (traditional and online)**	■	What percentage?	**100%**	
c. e-learning		What percentage?		
d. Correspondence		What percentage?		
f. Other		What percentage?		
Comments:				

B Objectives

1. What is the main purpose for this course? By the end of this course the students will be able to: 7. Describe the different types of complex reactions. 8. Develop the kinetics of different types of complex reactions. 9. Write the kinetics of catalysis by enzymes. 10. State the photochemical reactions. 11. Describe the fundamentals of reactions in solutions.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) 1. Encourage students to make reports in the field of kinetic chemistry from the library or using the Internet. 2. Use the websites to follow up and update the new topics of the subject of the course.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Classification of reactions - kinetics of complex reactions - reversible reactions and examples.	**1**	**2**
Kinetics of parallel reactions and consecutive reactions and examples.	**1**	**2**
Kinetics of chain reactions and examples.	**1**	**2**
Kinetics of heterogeneous catalytic reactions and their applications.	**1**	**2**
Adsorption and its types – its relation with the kinetics of heterogeneous catalytic reactions.	**1**	**2**
Surface reactions, types and examples.	**1**	**2**
Enzymes, mechanism of enzymatic reactions and factors affecting them.	**1**	**2**
General revision and First Periodical Exam.	**1**	**2**
Kinetics of catalysis by Enzymes.	**1**	**2**
Photochemical reactions and examples.	**1**	**2**
Kinetics and mechanism of photochemical reactions.	**1**	**2**
Reactions in solutions and factors affecting them.	**2**	**4**
Kinetics and mechanism of reactions in solutions.	**1**	**2**
General revision and Second Periodical Exam.	**1**	**2**
Final Exam.	**1**	**2**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	32	-	-	-	-	32
Credit	2	-	-	-	-	2

3. Additional private study/learning hours expected for students per week.	

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	List the various types of complex reactions.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Define the different complex reactions and their rate laws.		
1.3	Mention the two types of catalytic reactions and their applications.		
1.4	Explain the kinetics and mechanism of catalysis by enzymes.		
1.5	Explain the kinetics and mechanism of photochemical reactions.		
1.6	Describe the factors affecting the reactions in solutions and their kinetics.		
2.0	**Cognitive Skills**		
2.1	Compare between the different types of complex reactions.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Solve the rate-law expressions for different complex reactions.		
2.3	Compare between the two types of catalytic reactions.		
2.4	Give a concise interpretation of the mechanism of catalysis by enzymes - mechanism of photochemical reactions.		
2.5	Interpret the kinetics of reactions in solutions and the factors affecting it.		
3.0	**Interpersonal Skills & Responsibility**		

3.1	Manage resources, time and collaborate with members of the group.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems
3.2	Use the library andinternet for collecting information and search about different topics.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Work effectively both in a team, and independently on solving the kinetic chemistry problems.	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Communicate effectively with his lecturer and colleagues		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- We have faculty members to provide counselling and academic advice.
- 2 hours per week as office hours are available for discussion with the students.

E. Learning Resources

1. List Required Textbooks *** An Introduction to Chemical Kinetics, Margaret Robson Wright, New York, John Wiley & Sons, 2004.** *** Kinetics of Chemical Reactions, Guy Marin, Gregory S. Yablonsky, John Wiley, 2011.** *** Principles of Chemical Kinetics, Second Edition, James E. House, 2nd ed., Academic Press, 2007.**
2. List Essential References Materials (Journals, Reports, etc.) *** Lecture Hand outs available on the coordinator website.**
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) *** Physical Chemistry, Amazon logo Silbey, R. R. Alberty, M. Bawendi, 4th ed., John Wiley&Sons, 2004.** *** Physical Chemistry, Peter Atkins & Julio de Paula,10th ed., W. H. Freeman and Company, 2014.** *** Chemical Kinetics, Luis Arnaut, Sebastiao Formosinho, Hugh Burrows, 1st ed., Elsevier Science, 2006.**
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http//:en.wikipedia.org/wiki/ • http//:www.chemweb.com/ • Websites on the internet relevant to the topics of the course
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) * Appropriate teaching class including white board and data show with at least 25 seats.

2. Computing resources (AV, data show, Smart Board, software, etc.) * Computer Halls access for the students will be helpful in doing their tasks during the course.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) * No other requirements.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Student discussion with the instructor allow for continuous feed back through the course progress. • Student Evaluation Questionnaires.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Discussions within the group of faculty teaching the course. • Peer consultation on teaching strategies and its effectiveness.

3 Processes for Improvement of Teaching • Workshops given by experts on new teaching and learning methodologies will be attended. • Improving of the teaching strategies by monitoring the evaluation of the students progress through the semester
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Not effective yet.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • The course will be evaluated periodically after each semester based on the results of the students and the report presented by the teaching stuff that will be discussed with the course coordinator so as to improve the course.

Faculty or Teaching Staff: Dr. Ahmed Fawzy

Signature:  **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Advanced Electrochemistry

(402447-2)

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

2017

A. Course Identification and General Information

1. Course title and code: **Advanced Electrochemistry (402447-2)**	
2. Credit hours: **2**	
3. Program(s) in which the course is offered. **Chemistry program**	
4. Name of faculty member responsible for the course: **Professor MetwallyAbdallah**	
5. Level/year at which this course is offered: **4rd level/1st year**	
6. Pre-requisites for this course (if any): **-**	
7. Co-requisites for this course (if any)---	
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ☐	What percentage? ☐
b. **Blended (traditional and online)** ■	What percentage? **100%**
c. e-learning ☐	What percentage? ☐
d. Correspondence ☐	What percentage? ☐
f. Other ☐	What percentage? ☐

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar the basic concepts of electro chemistry and minerals corrosion explained to discourage these different physical concepts of corrosion and its relevance and its applications in different domains** 1. describe the fundamental principles of corrosion. 2. State the fundamental of different types of inhibitors 3. Develop the measurements of corrosion rates 4. known the **pitting corrosion and its inhibition** **5-Stydy the basic concepts of passivity**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material l, changes in content as a result of new research in the field) **1-The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course** 2-encourage students to make reports in the recent trends in the field of corrosion of metals and its inhibition either from the library or by using the Internet.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1- Introduction to corrosion study	1	2
2- Relation between corrosion and surface chemistry and chemical bonds.	1	2
3- **Mechanism of electrochemical corrosion** .	1	2
4 - **Electrochemical cells used in corrosion**	1	2
5- Types of metallic corrosion	1	2
6- pH –potential diagrams	1	2
6- **Electrochemical corrosion diagrams**	1	2
7- Effect of polarization on corrosion rate and corrosion rate calculation	1	2
8- Mid term exam Passivetion, definition, and its reasons.	1	2
9- Passivetion, definition, and its reasons	1	2
10- **Corrosion and theories and methods of forsaking measured and its prevention**	1	2
11- methods and ways of the corrosion protection of metals from corrosion	1	2

12- General revision and exams	1	2

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-				24
Credit	2	-				2

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	• List the historical development (thinking back) and to acquire student skill training to choose a methods of corrosion measurements	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	• **describe the student predicating skill of different types of inhibitors**		
1.3	• Illustrate **the values inhibition efficiency from different techniques**		
1.4	• **Mention appropriate methods of determination of corrosion rate.**		
1.5	• **Define different ways to determine pitting corrosion**		

1.6	• **Explain different ideas for student innovates the studying the protection against corrosion**		
1.7	**Describe the student plans of research program in the field of advanced electrochemistry chemistry according to organized steps.**		
2.0	**Cognitive Skills**		
2.1	• **Generate dialogue and debate within the classroom.**	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	• **Examples given in the lecture and exercise under the supervision of teaching workshops.**		
2.3	• **Give some practical issues and assigning students to create a strategic plan for the solution.**		
2.4	• **Encourage the transmission of learning using analysis tools in various applications and through discussion of potential applications in other areas.**		
2.5	**Commissioned student functions duties include open tasks designed to apply the predicating skills, analysis and problem solving.**		
3.0	**Interpersonal Skills & Responsibility**		
3.1	• **Division of students to collective teams to conduct some joint reports.**	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	**Development of student opinion of fellow accepts its participation to do effective presentation of the topic was linked to course, and evaluate results to discover the responsiveness of students to collective cooperation.**		
4.0	**Communication, Information Technology, Numerical**		

4.1	• **Use the computer in the compilation of research that helps in writing reports on topics relevant to the course.**	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	• **Use the computer and the Internet to identify sources of recent research relevant to the course**		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Homework and other assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks

1- ,E.E. Stansbury and R.A. Buchanan,Fundamentals of electrochemical corrosion ,ASM International,2000.
2- Arthur J. Allmand ,The Principles of Applied Electrochemistry,Amazon, 2007

3.E.McCafferty,Introduction to Corrosion Science, ,Springer, 2010

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

-

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **http://en.wikipedia.org/wiki/Petroleum1- http://www.chemhelper.com/**
- **http://www.chemweb.com/**
- **http://www.science.uwaterloo.ca/~cchieh/cact/**
- **http://www.sciencedirect.com/**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - **Classrooms capacity (30) students.**
   - **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.)
   - **Room equipped with computer and projector and TV.**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
   - **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Complete thequestionnaireevaluation of the coursein particular.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
   - **Observations and the assistance of colleagues.**

- **Independent evaluation for extent to achieve students the standards.**
- **Iindependent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Professor MetwallyAbdallah**

Signature:  **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Solution Chemistry and Kinetic Theory of gases
402446-2

2017

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Solution Chemistry and Kinetic Theory of gases 402446-2**			
2. Credit hours: **2**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Professor MetwallyAbdallah**			
5. Level/year at which this course is offered: **4rd level/1st year**			
6. Pre-requisites for this course (if any): -			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom		What percentage?	
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar** 1. describe the fundamental principles of solution chemistry. 2. State the fundamental of different types of solutions. 3. Develop the conductivity and ionic strength of solutions. 4. known the **Vant Hoff factor and Debye theory and movement** **5-Stydy the basic concepts of chemistry of electrolytic solutions , diffusion of gases**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material l, changes in content as a result of new research in the field) **1-The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course** 2-encourage students to make reports in the recent trends in the field of solutions chemistry, either from the library or by using the Internet.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1- electrolytic solutions and Faraddy Law and chemical equivalent	1	2
3- Equivalent and specific conductance and relation between them, degree of ionization	1	2
3-Electrical conductance applications and Kolwrawsh Law.	1	2
4 -Transport numbers and ionic migration and Oswald Law	1	2
13- Activity and ionic strength	1	2
14- Strong electrolyte theories	1	2
15- **Kinetic theory of gases and its applications**	1	2
16- Real gases- compressibility factor – Van der Walls Equation	1	2
17- Carbonyl compounds (nomenclature, preparation and chemical properties	1	2
18- **Joul –Thmoson effect – transition temperature**	1	2
19- **Law of different states**	1	2
20- **Collisions between gas molecules – and mean free path and collision diameter**	1	2

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-				24
Credit	2	-				2

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	• List the historical development (thinking back) and to acquire student skill training to choose appropriate methods of and gas liquefaction.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	• **describe the student predicating skill of equivalent conductance at infinite dilution for week electrolyte.**		
1.3	• Illustrate **the values of transport numbers , ionic strength and distribution of molecular velocities.**		
1.4	• **mentionappropriate methods of determination of ionization constant of week electrolyte.**		
1.5	• **Define different ways to determine Vant Hoff factor**		
1.6	• **Explain different ideas for student innovates the studying the deviation of gases**		

1.7	**Describe the student plans of research program in the field of solution chemistry according to organized steps.**		
2.0	**Cognitive Skills**		
2.1	• **Generate dialogue and debate within the classroom.**	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	• **Examples given in the lecture and exercise under the supervision of teaching workshops.**		
2.3	• **Give some practical issues and assigning students to create a strategic plan for the solution.**		
2.4	• **Encourage the transmission of learning using analysis tools in various applications and through discussion of potential applications in other areas.**		
2.5	**Commissioned student functions duties include open tasks designed to apply the predicating skills, analysis and problem solving.**		
3.0	**Interpersonal Skills & Responsibility**		
3.1	• **Division of students to collective teams to conduct some joint reports.**	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	**Development of student opinion of fellow accepts its participation to do effective presentation of the topic was linked to course, and evaluate results to discover the responsiveness of students to collective cooperation.**		
4.0	**Communication, Information Technology, Numerical**		
4.1	• **Use the computer in the compilation of research that helps in writing reports on topics relevant to the course.**	• Lectures • Scientific discussion • Library visits	• web-based student performance systems

4.2	• **Use the computer and the Internet to identify sources of recent research relevant to the course**	• Web-based study	• individual and group presentations
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hoursweekly.**
- **Academic Advisingforstudents.**

E. Learning Resources

1. List Required Textbooks

P. Atkins*,Physical Chemistry, *9 ed. (2014)Published by McGraw Hill Companies,Newyork

2-Raymond Chang, Chemistry ,10th.Edition(2010).
Publisher: ThomaD.Timp

3-.N. Murrell and A.D. Jenkins,Properties of liquids and solutions,2nd Edition 1994, John Willey& Sons.

4-Alberrty/Sibey, Physical chemistry,1992 , John Willey& Sons.

4- 5-Somasundaran, and Dianzuo Wang, (2006)Solution Chemistry,Mineral and Reagents,Elseiver
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Walter Kauzmann, Kinetic Theory of Gases,**(2012) Dover Publications**
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://en.wikipedia.org/wiki/Petroleum1- http://www.chemhelper.com/** • **http://www.chemweb.com/** • **http://www.science.uwaterloo.ca/~cchieh/cact/** • **http://www.sciencedirect.com/**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classroomscapacity(30) students.** • **Providinghallof teaching aids includingcomputers andprojector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete thequestionnaireevaluation of the coursein particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation forextent toachieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching

- **Workshopsforteaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application ofe-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Professor MetwallyAbdallah**

Signature:  **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

C. Inorganic Chemistry

Courses

2017

Course Specifications

General Chemistry 2

(402121-2)

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science / Chemistry Department**	

A. Course Identification and General Information

1. Course title and code: **General Chemistry 2 / 402121-2**
2. Credit hours: **2 (theoretical)**
3. Program(s) in which the course is offered: **Chemistry**
4. Name of faculty member responsible for the course: **Dr. Mona Alhasani**
5. Level/year at which this course is offered: 2nd **level/1st year**
6. Pre-requisites for this course (if any): **-** General Chemistry 1 (402101-5)
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom		What percentage?	
b. **Blended (traditional and online)**	■	What percentage?	100
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

2017

B. Objectives

1. What is the main purpose for this course? By finishing of this course, the students will be able to discuss and explain: a. The atomic shells, their shapes and Bohr theory of hydrogen atom. b. Electronic structure and Lewis structures of different chemical compounds c. The valence shell electron pairs repulsion theory, molecular orbital theory and valence bond theory. **d.** The principle quantum numbers, classification of elements and properties of ionic and covalent compounds.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Using different learning sources of the course, so that the students make use of more than one reference. • The use of smart teaching halls for lectures. • Encourage students to carry out reports in the field of general chemistry.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached):

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
• Electronic structure – atomic shells and their shapes.	**1**	**2**
• Bohr theory of hydrogen atom.	**1**	**2**
• Principle quantum numbers.	**1**	**2**
• Properties of elements and the periodic table – classification of elements into periods and groups.	**1**	**2**

• Comparison between some properties of the elements inside the period such as; ionization energy, electron affinity, electronegativity and atomic size.	**2**	**4**
• Chemical bonds; their types and theories – Lewis symbols and structures.	**1**	**2**
• Molecular orbital theory – octet rule.	**2**	**4**
• Valence shell electron pairs repulsion theory.	**1**	**2**
• Valence bond theory.	**1**	**2**
• Properties of ionic and covalent compounds.	**1**	**2**
• Hybridization and its types	**2**	**4**

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-		-		28
Credit	2	-		-		2

3. Additional private study/learning hours expected for students per week.

- Student spends 10 hrs in preparing reports related to general chemistry and their discussions.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Describe the atomic shells and their shapes.	• Lectures	

1.2	Write on classification of elements into periods and groups.	• Scientific discussion • Use the library to work duties and a small research on general chemistry. • Use of the Internet to carry out some reports on course subjects.	• Written mid-term and final exams • Long and short essays.
1.3	List the properties of the elements inside the period.		
1.4	Memorize the valence shell electron pairs repulsion theory.		
1.5	Describe Bohr theory of hydrogen atom.		
2.0	**Cognitive Skills**		
2.1	Predict the type of hybridization in a chemical compounds.	• Lectures • Scientific discussion • Library visits • Web-based study	• Periodic tests and assignments. • Measuring the response of the assignments.
2.2	Explain Lewis structures of different chemical compounds.		
2.3	Compare between molecular orbital theory and valence bond theory.		
2.4	Estimate the principle quantum numbers of different chemical compounds.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Demonstrate the properties of ionic and covalent compounds.	• Dividing students into groups to carry out collective scientific reports. • Periodic individual duties to develop the	• Evaluate the results of collective works and duties as well as knowing the contribution of each individual through dialogue and discussion.
3.2	Develop the student's ability in self-reliance and responsibility.		
3.3	Operate in team work and accept his college's opinions.		

		skill of taking responsibility and self-reliance	• Assessment of individual tasks and duties to determine the student's ability to self-reliance.
4.0	**Communication, Information Technology, Numerical**		
4.1	Use computers and the international information network (the Internet) to perform calculations and to identify recent research relevant to decision sources.	• Visiting research centers. • The use of computers in the training room for the department. • Using the internet for collecting data.	• Evaluation of the duties associated with the proper use of numerical and communication skills. • Web-based student performance systems • Individual and group presentations.
4.2	Perform mathematical calculations and data analysis.		
5.0	**Psychomotor**		
5.1	• Not applicable.		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • Office hours: During the working hours weekly. • Academic Advising for students. • Availability of Staff members to provide counseling and advice.

E. Learning Resources

1. List Required Textbooks - General Chemistry: The Essential Concepts 7th Edition by Raymond Chang Dr., Kenneth Goldsby Professor, 2013.
2. List Essential References Materials (Journals, Reports, etc.) - D. A. McQuarrie, J. D. Simon. Physical Chemistry: A Molecular Approach. University Science Books, 1997. - J. D. Lee, Concise Inorganic Chemistry, 5th ed., Wiley-Blackwell, 1998.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) - Inorganic Chemistry Catherine Housecroft and Alan G. Sharpe, 4th ed. Pearson, 2012. - H. B. Gray. Chemical Bonds: An Introduction to Atomic and Molecular Structure, University Science Books, 1994.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
• 5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. : **- Not required.**

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Equipped lecture halls.

2. Computing resources (AV, data show, Smart Board, software, etc.) • Room equipped with computer and data show and TV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • No other requirements.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Complete the questionnaire evaluation of the course each semester.
2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Preparation of a course report and study of the results of the students to give us indication about the planned outputs and the extent to which student's benefits.
3. Processes for Improvement of Teaching • Exchange of experiences internal and external. • Application of e-learning. • Review of strategies proposed. • Providing new tools for learning.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Check marking of a sample of exam papers, or student work. • Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Consult other staff of the course.
- Hosting a visiting staff to evaluate of the course.
- Workshops for teachers of the course.
- Periodic review of the contents of the syllabus and modify the negatives.

2017

Faculty or Teaching Staff: **Dr. Mona Alhasani**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

2017

Course Specifications

Chemistry of the Main Group Elements

(402221-2)

Course Specifications

Institution: **Umm Al-qura University** Date of Report: **2018**	2
College/Department : **Faculty of Applied Science/ Chemistry Department**	0
	1
	7

A. Course Identification and General Information

1. Course title and code: **Chemistry of the Main Group Elements** / 402221-2
2. Credit hours: **2**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr. Mona Al-Hasani**
5. Level/year at which this course is offered: **3rd level/2nd year**
6. Pre-requisites for this course (if any): General Chemistry 2 (402121-2)
7. Co-requisites for this course (if any):
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)
a. Traditional classroom ☐ What percentage? ☐
b. **Blended (traditional and online)** ■ What percentage? **100%**
c. e-learning ☐ What percentage? ☐
d. Correspondence ☐ What percentage? ☐
f. Other ☐ What percentage? ☐
Comments:

B Objectives

1. What is the main purpose for this course? By the end of this course, the student should fully aware of: a. The main group elements in the periodic table. b. The chemical properties of the main group elements through their reactions. c. The existence and most important compounds of the main group elements.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
a. General and periodic properties of main group (non-transition) elements; atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties.	2	4
b. Horizontal, perpendicular and diagonal relationships in periodic table	1	2
c. Hydrogen; position in periodic table, properties, isotopes and chemical properties.	1	2
d. s-bolck elements; electronic configuration, size, hardness, melting points – chemical properties; chemical reactivity with metals, nitrogen, acids, complexes formation – solubility and hydration – solubility in ammonia	4	8
e. Halides – some chemical properties of lithium and magnesium – diagonal relationship between lithium and magnesium.	1	2

f. Chemical properties of beryllium and differences between it and second group elements – diagonal relationship between beryllium and aluminum.	1	2
g. p-bolck elements; their electronic configuration properties and compounds – properties of the first element in each group in comparison with the last element – inert pair effect – changing of metallic and non-metallic properties in groups.	2	4
h. Study of the third, fourth, fifth, sixth, seventh and inert gases groups.	2	4

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-		-		28
Credit	2	-		-		2

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the general and periodic properties of main group (non-transition) elements including their atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios
1.2	Recognize the horizontal, perpendicular and diagonal relationships in periodic table		

1.3	Study hydrogen isotopes and chemical properties.		
1.4	Define s-bolck elements and recognize their properties.		
1.5	Describe halides and state some chemical properties of lithium and magnesium – Recognize the diagonal relationship between lithium and magnesium.		
1.6	Record the chemical properties of beryllium and recognize the differences between it and second group elements		
1.7	Define the p-bolck elements and recognize their properties.		
1.8	Know the third, fourth, fifth, sixth, seventh and inert gases groups.		
2.0	**Cognitive Skills**		
2.1	Summarize the general and periodic properties of main group (non-transition) elements including their atomic and ionic size, ionization potential, electron affinity, electro-negativity and physical properties.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios
2.2	Compare between the horizontal, perpendicular and diagonal relationships in periodic table		
2.3	Interpret the s-bolck elements and recognize their properties.		
2.4	Criticize the diagonal relationship between lithium and magnesium.		
2.5	Compare between beryllium and and second group elements		
2.6	Define the p-bolck elements and recognize their properties.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Illustrate the general and periodic properties of main group (non-transition) elements	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Show s-bolck and p-block elements and analyze their properties.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the general and periodic properties of the s and p-block elements.	• Lectures	• web-based student

4.2	Interpret the properties of the s and p-blocl elements	• Scientific discussion • Library visits • Web-based study	performance systems • individual and group presentations
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks

- A. G. Massey, Main Group Chemistry, 2nd Edition, Wiley, 2000.

2. List Essential References Materials (Journals, Reports, etc.)

- **Das**, Kumar V.G, Main Group Elements and their Compounds, Springer, 1996.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

F. A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry, A comprehensive text, 1988, John Wiley & Sons.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **Noother requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.**

- **Providing new tools for learning.**
- **The application of e-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Dr. Mona Al-Hasani

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Chemistry of Transition Metals

(402223-3)

2017

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ Chemistry Department**	

A. Course Identification and General Information

1. Course title and code: **Chemistry of Transition Metals** / 402223-3	
2. Credit hours: **3**	
3. Program(s) in which the course is offered. **Chemistry program**	
4. Name of faculty member responsible for the course: **Dr. Hoda El-Ghamry**	
5. Level/year at which this course is offered: **4th level/2nd year**	
6. Pre-requisites for this course (if any): Chemistry of the Main Group Elements (402221-2)	
7. Co-requisites for this course (if any):	
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ☐	What percentage? ☐
b. **Blended (traditional and online)** ■	What percentage? **100%**
c. e-learning ☐	What percentage? ☐
d. Correspondence ☐	What percentage? ☐
f. Other ☐	What percentage? ☐
Comments:	

B Objectives

1. What is the main purpose for this course? By the end of this course student will be familiar with: a. The properties of the main transition elements. b. The properties of the inner transition elements depending on the periodic properties in the periodic table in addition to a comparative studies of the elements in their groups. c. The spectroscopic and magnetic properties of the transition elements.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
a. Site of transition elements in the periodic table.	1	3
b. d-block elements: first transition series (3d), second transition series (4d) and third transition series (5d).	1	3
c. f-block elements: lanthanides (4f) and actinides (5fd).	1	3
d. Differences between d-block and f-block elements.	1	3
e. Comparisons between 4d and s, p block elements.	1	3
f. Characteristic properties of first transition series.	1	3
g. Magnetic properties from crystal field theory.	1	3
h. Electronic distribution of electrons in d orbitals on octahedral complexes.	1	3
i. Comparison between the properties of first transition series (3d) with the second transition series (4d) and third transition series (5d).	1	3

j. Comparative studies of transition elements in their groups; scandium group, titanium group, vanadium group, chromium group, manganese group, iron group, cobalt group, nickel group, copper group, and zinc group.	1	3
k. Studies of lanthanides and actinides (f-block elements) in comparison with scandium group (abundance, electronic configuration, oxidation states and lanthanides contraction).	2	6
l. Spectroscopic and magnetic properties – difference between 4f and 5f as well as its effect on chemical behavior	2	6

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	42	-		-		42
Credit	3	-				3

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Describe the site of transition elements in the periodic table.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios
1.2	Define d-block elements		
1.3	Define the f-block elements by its two series; lanthanides (4f) and actinides (5fd).		
1.4	Describe the characteristic properties of first transition series.		
1.5	Identify the magnetic properties from crystal field theory.		

1.6	Recognize the electronic distribution of electrons in d orbitals on octahedral complexes.		
1.7	List the transition elements in their groups; scandium group, titanium group, vanadium group, chromium group, manganese group, iron group, cobalt group, nickel group, copper group, and zinc group.		
1.8	Identify lanthanides and actinides (f-block elements) in comparison with scandium group (abundance, electronic configuration, oxidation states and lanthanides contraction).		
1.9	Recognize the spectroscopic and magnetic properties of the d- and f-block elements		
2.0	**Cognitive Skills**		
2.1	Reorganize the site of transition elements in the periodic table.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios
2.2	d. Compare between d-block and f-block elements.		
2.3	Differentiate between 4d and s, p block elements.		
2.4	Estimate the characteristic properties of first transition series.		
2.5	Compare between the properties of first transition series (3d) with the second transition series (4d) and third transition series (5d).		
2.6	Subdivide the f-block elements into lanthanides and actinides and compare them with scandium group (abundance, electronic configuration, oxidation states and lanthanides contraction)		
2.7	Predicte the spectroscopic and magnetic properties of the d- and f-block elements		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Show the position of transition elements in the periodic table.	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Evaluate the differences between d-block and f-block elements.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Illustrate the site of the transition elements in the periodic table.	• Lectures	• web-based student

4.2	Interpret comparatively the transition elements in their groups including scandium group, titanium group, vanadium group, chromium group, manganese group, iron group, cobalt group, nickel group, copper group, and zinc group.	• Scientific discussion • Library visits • Web-based study	performance systems • individual and group presentations
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks

- R. Gopalan "*Textbook of Inorganic Chemistry 1st Edition"***2011,** *CRC Press.*
- T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" **2013**, John Wiley & Sons.

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Hand outs available on the coordinator website.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Eleanor Crabb, Elaine Moore, Lesley Smart "*Concepts in Transition Metal Chemistry*" **2010**, Royal Society of Chemistry. • Kazuo Nakamoto "Infrared and Raman Spectra of Inorganic and Coordination Compounds" **2009,** John Wiley &Sons.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.**

- **Iindependent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Dr. Hoda El-Ghamry

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Coordination Chemistry

(402325-3)

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science / Chemistry Department**	

A. Course Identification and General Information

1. Course title and code: **Coordination Chemistry / 402325-3**
2. Credit hours: **3 (2+1)**
3. Program(s) in which the course is offered. **Chemistry**
4. Name of faculty member responsible for the course: **Prof. Abdalla Mohamed Khedr**
5. Level/year at which this course is offered: 6th**level/3rd year**
6. Pre-requisites for this course (if any): - Chemistry of Transition Metals (402223-3)
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom		What percentage?	
b. **Blended (traditional and online)**	■	What percentage?	70%
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other	■	What percentage?	30%

Comments:

2017

B. Objectives

1. What is the main purpose for this course? By ending this course, students should be familiar with: a. The nature, types, naming and importance of coordination compounds. b. The different theories explaining the bonding in metal complexes. c. The preparation methods of coordination compounds. d. The spectral, magnetic and biological properties of metal complexes.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Using different learning sources of the course, so that the students make use of more than one reference. • Encourage students to carry out reports in the field of coordination chemistry including preparation and study of some physical and chemical properties and link the practical side with the theoretical one in order to understand the nature of coordination compounds. • The use of smart teaching halls for lectures.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached):

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
• Introduction to the chemistry of coordination compounds - Werner theory of coordination compounds - Effective atomic number.	2	4
• Ligands – nomenclature of metal complexes – symmetry in metal complexes.	1	2
• Valence bond theory – coordination numbers and geometrical structures – inner and outer complexes.	2	4

• Stability of metal complexes; factors affecting the stability of metal complexes – ionic and ionization potential – geometrical arrangement of ligands around the central metal ion - metal chelates.	2	4
• Crystal field theory; ligand field in octahedral complexes – ligand field in tetrahedral complexes – ligand field in square planer complexes – Jahn-Teller effect (distortion from symmetrical arrangement) – crystal field stabilization energies.	2	4
• Preparation of coordination compounds (complexes); direct reactions – oxidation and reduction reactions – thermal decomposition reactions.	2	4
• Electronic spectrum of complexes - infrared spectra of the metal complexes.	1	2
• Metal complexes of significant biological activities.	1	2
• Acids and bases rigid and soft.	1	2
Practical Part:		
• Introduction about coordination chemistry and safety rules in labs.	**1**	**3**
• Preparation of $[Cu(en)_2](NO_3)_2$	**1**	**3**
• Preparation of $[Co(NH_3)_5Cl]Cl_2$	**1**	**3**
• Preparation of $K_3[Cr(C_2O_4)_3]$	**1**	**3**
• Preparation of $[Ni(en)_3]Cl_2.2H_2O$	**1**	**3**
• Preparation of [Fe(acac)3]	**1**	**3**
• Melting points of the metal complexes.	**1**	**3**
• Solubility of the metal complexes.	**1**	**3**
• Conductivity of the metal complexes.	**1**	**3**
• Final practical exam.	**1**	**3**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total

Contact Hours	28	-		30		58
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week.

- The student spends two hours a week to prepare reports, discuss and resolve questions.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Describe the nature, types and importance of coordination compounds.	• Lectures • Scientific discussion • Use the library to work duties and a small research on the nature and types of metallic complexes. • Use of the Internet to carry out some reports on course subjects.	• Written mid-term and final exams • Long and short essays.
1.2	Explain the preparation methods of coordination compounds.		
1.3	Name the complexes according to the IUPAC system.		
1.4	Determine the mode of bonding in metal complexes using bonding theories.		
1.5	Explain the spectral, magnetic and biological properties of metal complexes.		
2.0	**Cognitive Skills**		
2.1	Confirm the molecular formula of metal complexes.	• Lectures	

2.2	Estimate the type of metal complex.	• Scientific discussion • Library visits • Web-based study	• Periodic tests and assignments and practical experiments. • Measuring the response of the assignments.
2.3	Apply the analytical calculations to know the complex.		
2.4	Design scientific methods and think to solve problems concerning the course.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Operate in team work and accept his college's opinions.	• Dividing students into groups to carry out collective scientific reports. • Practical experiments which is carried out in groups. • Periodic individual duties to develop the skill of taking responsibility and self-reliance	• Evaluate the results of collective works and duties as well as knowing the contribution of each individual through dialogue and discussion. • Assessment of individual tasks and duties to determine the student's ability to self-reliance.
3.2	Choose the suitable method to solve problems.		
3.3	Develop the student's ability in self-reliance and responsibility		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the different methods of preparation of inorganic compounds	• The use of computers in the training room for the department.	• Web-based student performance systems
4.2	Use computers and the international information network (the Internet) to perform calculations and to identify		

	recent research relevant to decision sources.	• Visiting research centers. • Using the internet for collecting data.	• Individual and group presentations. • Evaluation of the duties associated with the proper use of numerical and communication skills
	Perform mathematical calculations and data analysis.		
5.0	**Psychomotor**		
5.1	Not applicable.		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	Midterm 1 Exam (One Hour Exam)	8	20
4	Practical Exam (Three Hours Exam)	15	30
5	Final Exam (Two Hours Exam)	16	40%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)
   - Availability of Staff members to provide counseling and advice.
   - Office hours: During the working hours weekly.
   - Academic advising for students.

E. Learning Resources

1. List Required Textbooks • P. L. Soni, Vandna Soni, Coordination Chemistry: Metal Complexes, CRC Press, 2013.
2. List Essential References Materials (Journals, Reports, etc.) • Geoffrey A. Lawrance, Introduction to Coordination Chemistry, John Wiley & Sons, 2009. • William L. Jolly, Modern Inorganic Chemistry; (2nd edition) McGraw-Hill, New York, 1991.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Kazuo Nakamoto, Infrared and Raman Spectra of Inorganic and Coordination Compounds, John Wiley &Sons, 2009. • James E. Huheey, Inorganic chemistry, Prentic Hall; (4th edition) , 1997.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. : **- Not required.**

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Equipped lecture halls and laboratories equipped specializing in inorganic chemistry.
2. Computing resources (AV, data show, Smart Board, software, etc.) • Room equipped with computer and data show and TV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

- **No other requirements.**

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
   - Complete the questionnaire evaluation of the course in particular.

2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor
   - Preparation of a course report and study of the results of the students to give us indication about the planned outputs and the extent to which student's benefits.

3. Processes for Improvement of Teaching
   - Training programs and workshops for Staff member.
   - Review of strategies proposed.
   - Providing new tools for learning.
   - The application of e-learning.
   - Eexchange of experiences internal and external.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)
   - Check marking of a sample of exam papers, or student work.
   - Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
   - Periodic review of the contents of the syllabus and modify the negatives.
   - Consult other staff of the course.
   - Hosting a visiting staff to evaluate of the course.
   - Workshops for teachers of the course.

Faculty or Teaching Staff: **Prof. Abdalla Mohamed Khedr**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

2017

2017

Course Specifications

Nuclear Chemistry

(402424-1)

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science / Chemistry Department**	

2017

A. Course Identification and General Information

1. Course title and code: **Nuclear Chemistry / 402424-1**
2. Credit hours: 1 **(theoretical)**
3. Program(s) in which the course is offered. **Chemistry**
4. Name of faculty member responsible for the course: **Dr. Aisha Yousif Eldawood**
5. Level/year at which this course is offered: 7th**level/4th year**
6. Pre-requisites for this course (if any): - Chemistry of Transition Metals (402223-3)
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom		What percentage?	
b. **Blended (traditional and online)**	■	What percentage?	100
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

B. Objectives

1. What is the main purpose for this course? The goal of this course is to familiarize students with: a. The different types of radiations, the importance of nuclear chemistry and its applications. b. The radiation dissociation laws, the radiation displacement laws and nuclear binding energy. c. The nuclear fission, nuclear fusion and the linear accelerator. **d.** The transuranic elements and the methods of radiation measurement.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Using different learning sources of the course, so that the students make use of more than one reference. • Encourage students to carry out reports in the field of nuclear chemistry. • The use of smart teaching halls for lectures.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached):

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
• Main differences between nuclear chemistry and nuclear physics.	1	1
• Importance of nuclear chemistry.	1	1
• Differences between chemical and nuclear reactions.	1	1
• Radiation displacement laws.	1	1
• Radiation dissociation and its types; types of radiations – α-rays, β-rays and γ-rays and their dissociations.	2	2
• Structure and stability of the nucleus – nuclear stability.	1	1

• Radiation dissociation laws and nuclear binding energy.	1	1
• Nuclear fission and nuclear fusion - the linear accelerator.	2	2
• Transuranic elements.	1	1
• Methods of radiation measurement.	1	1
• Applications of nuclear chemistry.	2	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	14	-		-		14
Credit	1	-		-		1

3. Additional private study/learning hours expected for students per week.

- Two hours a week to prepare reports, discuss and resolve questions related to nuclear chemistry.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Know the different types of radiations.	• Lectures • Scientific discussion • Use the library to work duties and a small research on	• Written mid-term and final exams • Long and short essays.
1.2	Write on the importance of nuclear chemistry and its applications.		
1.3	Recall the radiation dissociation laws and nuclear binding energy.		
1.4	Describe the nuclear fission, nuclear fusion and the linear accelerator		

1.5	List the transuranic elements.	nuclear chemistry. • Use of the Internet to carry out some reports on course subjects.	
2.0	**Cognitive Skills**		
2.1	Compare between chemical nuclear reactions.	• Lectures • Scientific discussion • Library visits • Web-based study	• Periodic tests and assignments. • Measuring the response of the assignments.
2.2	Estimate the methods of radiation measurement		
2.3	Summarize the radiation displacement laws.		
2.4	Analyze the structure and stability of the nucleus as well as nuclear stability		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Develop the student's ability in self-reliance and responsibility.	• Dividing students into groups to carry out collective scientific reports. • Periodic individual duties to develop the skill of taking responsibility and self-reliance	• Evaluate the results of collective works and duties as well as knowing the contribution of each individual through dialogue and discussion. • Assessment of individual tasks and duties to determine the student's ability to self-reliance.
3.2	Choose the suitable method to solve problems.		
3.3	Operate in team work and accept his college's opinions.		

4.0	**Communication, Information Technology, Numerical**		
4.1	Perform mathematical calculations and data analysis.	• The use of computers in the training room for the department. • Visiting research centers. • Using the internet for collecting data.	• Web-based student performance systems • Individual and group presentations. • Evaluation of the duties associated with the proper use of numerical and communication skills
4.2	Use computers and the international information network (the Internet) to perform calculations and to identify recent research relevant to decision sources.		
5.0	**Psychomotor**		
5.1	• Not applicable.		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

• Academic Advising for students. • Availability of Staff members to provide counseling and advice. • Office hours: During the working hours weekly.

E. Learning Resources

1. List Required Textbooks - Walter D. Loveland , David J. Morrissey and Glenn T. Seaborg "*Modern Nuclear Chemistry*", New York, John Wiley & Sons Inc. (2006).
2. List Essential References Materials (Journals, Reports, etc.) - David J. Morrissey, Walter D. Loveland and Glenn T. Seaborg "*Introductory Nuclear Chemistry*" New York, John Wiley & Sons Inc. (2001).
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) - J. Rydberg , J. O. Liljenzin and G. R. Choppin "*Radiochemistry and Nuclear Chemistry*" 3rd Edition, MA; Butterworth-Heinmann (2001) -A. Vértes, S. Nagy, Z. Klencsár, R.G. Lovas, F. Rösch"*Handbook of Nuclear Chemistry"* 2nd ed., springer (2011).
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
• 5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. : - Notrequired**.**

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Equipped lecture halls.

2. Computing resources (AV, data show, Smart Board, software, etc.)

• Room equipped with computer and data show and TV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • No other requirements.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Complete the questionnaire evaluation of the course.
2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Preparation of a course report and study of the results of the students to give us indication about the planned outputs and the extent to which student's benefits.
3. Processes for Improvement of Teaching • Review of strategies proposed. • Providing new tools for learning. • Eexchange of experiences internal and external. • Application of e-learning.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty. • Check marking of a sample of exam papers, or student work.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Workshops for teachers of the course. • Periodic review of the contents of the syllabus and modify the negatives. • Consult other staff of the course. • Hosting a visiting staff to evaluate of the course.

2017

Faculty or Teaching Staff: **Dr. Aisha Yousif Eldawood**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

2017

Course Specifications

Organometallic Chemistry

(402426-2)

Course Specifications

Institution: **Umm Al-qura University** Date of Report: **2018**	2
College/Department : **Faculty of Applied Science/ Chemistry Department**	0
	1
	7

A. Course Identification and General Information

1. Course title and code: **Organometallic Chemistry**/ 402426-2
2. Credit hours: **2**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr. Hoda El-Ghamry**
5. Level/year at which this course is offered: **7th level/4th year**
6. Pre-requisites for this course (if any): Coordination Chemistry (402325-3)
7. Co-requisites for this course (if any):
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom ☐ What percentage? ☐

b. **Blended (traditional and online)** ■ What percentage? **100%**

c. e-learning ☐ What percentage? ☐

d. Correspondence ☐ What percentage? ☐

f. Other ☐ What percentage? ☐

Comments:

B Objectives

1. What is the main purpose for this course?

   By the end of studying of this course the student should fully understand:

   a. The basic concepts of organometallic chemistry.

   b. The classifications and nomenclature of organometallic compounds

   c. The chemical and physical properties of organometallic compounds.

   d. The economic importance of organometallic compounds.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
a. Nomenclature of σ-bonded and π-bonded complexes.	1	2
b. Eighteen electron rule – oxidation number	1	2
c. Preparation of σ-bonded complexes: preparation of metal carbonyls and carbonyl anions	1	2
d. Direct reactions between metals and alkyl halides	1	2
e. Preparations involve organometallic compounds: reaction with organic halides, reaction with free metals and their compounds.	1	2
f. Substitution reactions: substitution of hydrogen with metal	1	2
g. Addition reactions: addition of metallic compounds to multiple bonds.	1	2
h. Preparations involve dizonium salts.	1	2
i. Extrwion reaction – preparation of carbenes.	1	2
j. Preparation and reactions of π-bonded organometallic compounds – complexes of alkynes and alkenes	1	2

k. Structure and bonding in organometallic compounds.	1	2
l. Application of organometallic compounds in organic preparations: organolithium compounds, organomagnesium compounds, organocopper compounds, organoaluminium compounds, organosilicon compounds, organoiron compounds	2	4
m. Organometallic complexes of transition metals – unsaturated hydrocarbons	1	2

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-	-	1		28
Credit	2	-	-	-		2

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the nomenclature of σ-bonded and π-bonded complexes.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems
1.2	Identify the eighteen electron rule and oxidation number		
1.3	Describe the preparation of σ-bonded complexes: preparation of metal carbonyls and carbonyl anions		

1.4	Describe the methods of synthesis of organometallic compounds.		
1.5	Define Extrwion reaction.		
1.6	List the preparation methods and reactions of π-bonded organometallic compounds		
1.7	State the structure and bonding in organometallic compounds.		
1.8	Memorize the application of organometallic compounds in organic preparations: organolithium compounds, organomagnesium compounds, organocopper compounds, organoaluminium compounds, organosilicon compounds, organoiron compounds		
2.0	**Cognitive Skills**		
2.1	Explain the nomenclature of σ-bonded and π-bonded organometallic compounds.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Apply the eighteen electron rule to the organometallic compounds.		
2.3	Preparation of σ-bonded complexes: preparation of metal carbonyls and carbonyl anions		
2.4	Direct reactions between metals and alkyl halides		
2.5	Summarize the preparation methods of the organometallic compounds.		
2.6	Explain the structure and bonding in organometallic compounds.		
2.7	Interpret examples of organometallic compounds such as organolithium, organomagnesium, organocopper, organoaluminium, organosilicon, organoiron.		
3.0	**Interpersonal Skills & Responsibility**		

3.1	Use the IUPAC rules for nomenclature of organometallic compounds	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Show the different synthesis methods and reactions of organometallic compounds		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the different methods of preparation of organometallic compounds	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Illustrate synthetic methods and reactions of different organometallic compounds.		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks • James E. Huheey, Inorganic Chemistry: Principles of Structure and Reactivity, 4th Edition, **2006**, Pearson Education India.
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website. • B.D. Gupta, Anil J. Elias "Basic Organometallic Chemistry: Concepts, Syntheses and Applications" **2013**, Universities Press.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • R.H. Crabtree "**The Organometallic Chemistry of the Transition Metals**" 6th ed. 2014, Wiley publisher. • Leah Renold**,** ***Applied Organometallic Chemistry and Catalysis,*** 2005, Oxford University Press.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **Noother requirements.**

G Course Evaluation and Improvement Processes

2017

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Complete the questionnaire evaluation of the course in particular.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Dr. Hoda El-Ghamry**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

2017

Course Specifications

Mechanism of Reactions and Spectroscopy

(402427-2)

2017

Course Specifications

Institution: Umm Al-Qura University	Date of Report: **2018**
College/Department : Faculty of Applied Science / Chemistry Department	

A. Course Identification and General Information

1. Course title and code: Mechanism of Reactions and Spectroscopy / 402427-2
2. Credit hours: 2 (theoretical)
3. Program(s) in which the course is offered. Chemistry program
   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: **Prof. Nashwa Mahmoud El-Metwaly**
5. Level/year at which this course is offered: seventh/fourth
6. Pre-requisites for this course (if any): Coordination Chemistry (402325-3)
7. Co-requisites for this course (if any): Nothing
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. Blended (traditional and online)	■	What percentage?	100
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? By the end of the study of this course students, will be aware fully with: a. The basic concepts of mechanism of metal-ligand substitution reactions. b. The basic concepts of mechanism of oxidation-reduction reactions in metal complexes. c. The electronic spectra of the transition metal complexes, which includes the charge transfer and ligand-field spectra. d. Electronic energy levels of free ions and their complexes.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) - Problem solving skills, relating to qualitative and quantitative information - E-Learning System is being introduced. - Students can download course material which can be helpful for the students learning. - For the research, use internet such as Wikipedia, Google ....etc. - Interpersonal skills, relating to the ability to interact with other people and to engage in team- working through group discussion.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
• Introduction to reaction mechanism and spectroscopy and their importance	1	2
• Rate of Reaction and the rate law	1	2
• Labile and inert complexes	1	2
• kinetics and reaction mechanism of ionic complexes	1	2
• Some possible reaction mechanisms of ligand substitution	1	2

• Study the ratio in isomerism (Cis / Trans) in the reaction products	1	2
• Study substitution reactions $[Co(CN)_5X]^{-n}$ complexes type	1	2
• Reactions include the substitution of coordinating water	1	2
• Methods studying complexes reactions - Octahedral & square-planar	1	2
• Study the substitution reactions in square - planar complexes	1	2
• Oxidation- Reduction reactions	1	2
• The electronic spectra of transition metal complexes	1	2
• Electronic energy levels of free ions and their complexes	1	2
• Energy level diagrams & electronic spectra of complexes	1	2
• Electronic spectra of selective metal ion complexes	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	30	4	0	0	0	34
Credit	2	0	0	0	0	2

3. Additional private study/learning hours expected for students per week. 10

- Assignments 4 Hrs
- Tutorials 4 Hrs
- e-learning 2 Hrs

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

- Brief summary of the knowledge or skill to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;

-The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Learn the main concepts of inorganic mechanisms with some significant principles.	- Class room lectures - Assignments - Individual handwritten assignments require use of library reference material and web sites to identify information required to complete tasks. - E-learning through university website	- Written tests - assess the effective participation of students during a lecture presentation - the duties given to e-learning site.
1.2	Know some history and aims about inorganic reaction mechanisms.		
1.3	Understand the process of chemical bonding and predict what type of bonds will form between different substances.		
1.4	know the scientific data in English and solving problems related to qualitative and quantitative information		
2.0	**Cognitive Skills**		
2.1	Must able to use the Internet for more information specially you tube	-Making connections between different concepts across the domains. - Assigning research questions that can be answered through collecting and analyzing data. - Summarizing the findings of the online research - Using the instructor's webpage learning activities.	- Assignments, Midterm Exams and Final examination at the end of semester. - Solving general chemistry problems related to qualitative and quantitative information at the end of each topic.
2.2	Have English language skills and symbolic thinking skills		
2.3	Participate with solving topic problems		
2.4	Deducts different important notice		
2.5	Interpret and Analyze data		
2.6	Compare between different issues		
2.7	Analyze the main issues in the topics		
2.8	Demonstrate good understanding and retention of basic and advanced chemical principles		

			- Individual assignments or oral exam for developing/solving a task
3.0	**Interpersonal Skills & Responsibility**		
3.1	Learn the ethics of communication with each others	-Using Power Point (it's easy to cover more material quickly). - Group discussion - Online workshops	Assessment of group assignment includes component for individual contribution. - Providing feedback. - Encouraging self-assessment during the learning process
3.2	Encourage students to use online resources		
3.3	Using the Internet to collect statistical data		
3.4	Deal with Microsoft Office (e.g. Excel, Microsoft Access, front page) to analyze data and prepare statistical reports		
4.0	**Communication, Information Technology, Numerical**		
4.1	Communicate with each others	- Debates - Group working. - Mini seminars prepared by the students to present their team projects.	- Instructor's feedback - Final and midterms exams include different problems need numerical and technical skills
4.2	Responsible for class discussions		
4.3	Develop personal conjugation in teamwork		
4.4	Collaborate to finish team assignments		
4.5	Learn how to present reports or researches		
4.6	Use computational skills to learn by himself		
5.0	**Psychomotor:** Not Applicable		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%

2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- The faculty member has 2 hours per week for these cases

E. Learning Resources

1. List Required Textbooks

- **Robert B. Jordan, Reaction Mechanisms of inorganic and organometallic systems, 3rd , Oxford University press, 2007**
- **Smiljko Asperger, Chemical Kinetics and inorganic reaction mechanisms, 2ed, Kluwer Academic / Plenum Publisher 2003**
- **Kazuo Nakamoto , Infrared and Raman Spectra of Inorganic and Coordination Compounds, John Wiley & Sons , 2009**

2. List Electronic Materials (eg. Web Sites, Social Media, etc.)

1- "Kinetics and Mechanisms of Reaction of Transition Metal Complexes," Ralph G. Wilkins, 2nd Thoroughly Revised Edition, VCH Publishers, 1992, ISBN 9783527282531 (Online book access at http://onlinelibrary.wiley.com/book/10.1002/3527600825)

2- "Ligand Substitution Processes," C.H. Langford and H.B. Gray, W.A. Benjamin, Inc., 1966 (Online book access at http://caltechbook.library.caltech.edu/100/1/Langford_Lsp.pdf)

3- Lecture Synopsis at http://www.chem.ox.ac.uk/icl/dermot/mechanism1/

5. Other

.3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- **Robert B. Jordan, Reaction Mechanisms of inorganic and organometallic systems, 3rd , Oxford University press, 2007**
- **Smiljko Asperger, Chemical Kinetics and inorganic reaction mechanisms, 2ed, Kluwer Academic / Plenum Publisher 2003**
- **Kazuo Nakamoto , Infrared and Raman Spectra of Inorganic and Coordination Compounds, John Wiley & Sons , 2009**

4. List Electronic Materials (eg. Web Sites, Social Media, etc.)

1- "Kinetics and Mechanisms of Reaction of Transition Metal Complexes," Ralph G. Wilkins, 2nd Thoroughly Revised Edition, VCH Publishers, 1992, ISBN 9783527282531 (Online book access at http://onlinelibrary.wiley.com/book/10.1002/3527600825)

2- "Ligand Substitution Processes," C.H. Langford and H.B. Gray, W.A. Benjamin, Inc., 1966 (Online book access at http://caltechbook.library.caltech.edu/100/1/Langford_Lsp.pdf)

3- Lecture Synopsis at http://www.chem.ox.ac.uk/icl/dermot/mechanism1/

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- Isisdraw and Chemdraw and Chemoffice

-MS-Office Software

http://scholle.oc.uni-kiel.de/herges/modeling/gliederung.html

http://phycomp.technion.ac.il/~ira/types.html

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

- A classroom containing at least 45 seats and equipped with projector and Internet access (scheduled for 2 hours once a week).
- A help session classroom containing at least 45 seats and equipped with projector and Internet access (scheduled for 1 hours every week).

2. Computing resources (AV, data show, Smart Board, software, etc.)

- Common computer lab containing at least 25 computer sets. - High speed internet access
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) - Chemdraw and Chem office - Computer for individual students - Internet access - Networked laboratory systems

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching - Confidential completion of standard course evaluation questionnaire. - Focus group discussion with small groups of students.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor - Observations and assistance from colleagues, independent assessment of standards achieved by students, - Independent advice on assignment tasks, etc.
3 Processes for Improvement of Teaching - Developing the lectures periodically - Workshops on teaching methods. - Review of recommended teaching strategies.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) - Meetings are conducting with teachers for checking the grading of the exams - Check marking by an independent member teaching staff of a sample of student work. - Periodic exchange and remarking of tests or a sample of assignments with staff at another institution.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. - Perform the necessary changes based on the feedback from the statistical analysis of the student grades.

Periodic revision of the course from concerned parties in the department and college, and improving it according to what is known in distinguished universities worldwide. - Perform the necessary changes based on the feedback from the workshops, conferences, and seminars recommendations. - Perform the necessary changes based on the feedback from the experts in the field and faculty members.

2017

Faculty or Teaching Staff: Prof. Nashwa Mahmoud El-Metwaly

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Chemistry of Solid State

(402428-2)

2017

Course Specifications

Institution: Umm Al-Qura University	Date of Report: **2018**
College/Department : Faculty of Applied Science / Chemistry Department	

A. Course Identification and General Information

1. Course title and code: Chemistry of Solid State (402428-2)
2. Credit hours: 3 (theoretical)
3. Program(s) in which the course is offered. Chemistry program
   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: **Prof. Nashwa Mahmoud El-Metwaly**
5. Level/year at which this course is offered: seventh/fourth
6. Pre-requisites for this course (if any): Coordination Chemistry (402325-3)
7. Co-requisites for this course (if any): Nothing
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. Blended (traditional and online)	■	What percentage?	60
c. e-learning	■	What percentage?	40
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course?
   - Study crystallography and their kinds.
   - Study the effect of X-ray on different crystals and its importance.
   - Study the crystallographic shapes and semiconductors.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)
   - Diversify teaching methods, such as using models for the different crystal system
   - Showing animation for explaining difficult concepts such as Band theory, conduction in metallic solids.
   - Continuous development to keep the contents of this course updated with the results of modern scientific research.
   - Activation of more e-learning with this course by the University's website.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction to Solid State Chemistry	1	3
How to study compounds by X-ray	1	3
Study of X-ray diffraction - rating case-quantitative analysis - the exac dimensions of the cell dimensions	1	3
Crystal definition - crystal Lattice - Types crystals- crystal Lattice of NaCl- crystal Lattice of CsCl- crystal Lattice of ZnS_2 - crystal Lattice of nickel arsenate	2	6
Study compounds of MX_2 formula - structural formula of $CaCl_2$ and CdI_2 and bonds comparison in-between.	2	6
Structural formula of ReO_3 and Peroviskite's ($CaTiO_3$) (ABO_3)	1	3
Crystal lattice levels, axes and Vin formula	1	3

Solid defects - Crystal imperfections and its types	1	3
Preparation of non-standard compounds - structural formula of ferrous oxide- immeasurability - Titanium oxide and immeasurability	1	3
Thermal Analysis TMA, DTA, TGA and its applications	2	6
Crystal structure of solids: Solid crystallography- covalent crystals - ionic crystals- cubic centered face- cubic centered body- Miller parameters- X-Ray crystallography (interference phenomenon and diffraction method) - X-ray diffraction in the crystal structure - absorption X-ray absorption- X-Ray spectrum - experimental crystal study (Lewis method - Rotatable crystal- powder diffraction)	2	6

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	45	4	0	0	0	49
Credit	3	0	0	0	0	3

3. Additional private study/learning hours expected for students per week. 2

1 hour for private study in solving problems.

1 hour for homework assignment on black board.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
-The methods of assessment to be used in the course to evaluate learning outcomes in the domain concerned.

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**

1.0	**Knowledge**		
1.1	Understand the concepts of basic principles structures of solid state.	-Lectures. - Dialogue and discussion -Video shows -Models for Bravais lattices and lattice types	- Written tests - assess the effective participation of students during a lecture presentation - the duties given to e-learning site.
1.2	Know crystal system and their properties and how different between polymorphism and isomorphism		
1.3	Learn how to deal with Miller Indices of directions and planes		
1.4	Learn how to know the crystal defects, types of defects (point, line, surface) and how to calculate the concentrations of the defects according to types of defects.		
1.5	Understand how the metallic alloys formed from solid solutions		
1.6	Study everything about the cement industry		
2.0	**Cognitive Skills**		
2.1	Calculate the concentrations of the defects according to types of defects	-Display the problems for students in the framework of scheduled and directing them to solve it. -Taking relevant and search for topics and treatment	- By discussion and interactive note realize the extent of the student scientific material that displays - Written tests
2.2	Calculate Miller Indices at different directions and planes		
2.3	Identify crystal system and their properties such as no of molecules , coordination numbers for the different cubic systems		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Guide student about ethics of dealing with his colleagues and with the instructors and supervisor	- The duties for individual students on the e-learning site where each student depends on himself -Action teams among the	-Assessment of assignments includes
3.2	Encourage students towards responsibility for themselves and toward others.		

3.3	Encourage the work in group to make the students aware with responsibility	students to bring out the lectures in line with what abstracted from the lecture and the present on the e-learning site	portion of grade for effectiveness of investigation processes. - Personal performance in classroom.
3.4	Install self-learning character in the student		
4.0	**Communication, Information Technology, Numerical**		
4.1	Able to communicate with his colleagues across all available tools	-Applying the smart teaching - assignments by using the e-learning tools. - Given 5 min at the end of each lecture to selected one of students to re-mentioned again the main topics introduced in lecture	- Final and midterms exams include different problems need numerical and technical skills - Develop degrees on the active participation of students in taking out en masse to some lectures
4.2	Enrich the knowledge in information technology that will enable them to gather, interpret, and communicate information and ideas		
4.3	Must have sufficient information about how to thinking to solve problems that will enable them to apply in interpreting and proposing solutions		
4.4	Communicate via the available electronic tools		
4.5	Use of search engines across the Web		
5.0	**Psychomotor** Not applicable		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment

1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

-Office Hours: 5 hours

Total 5 hrs. of office hours for individual student consultations and academic advice per week in e-learning as mentioned before.

E. Learning Resources

1. List Required Textbooks

Lesley E. Smart, Elaine A. Moore, Solid State Chemistry: An Introduction, 4th , CRC press (Taylor & Frances) 2012

- Lesley E. Smart , Elaine A. Moore , Solid State Chemistry ; An Introduction, 3rd, Taylor & Francis Group, 2005 LLC

2. List Essential References Materials (Journals, Reports, etc.)

Lesley E. Smart, Elaine A. Moore, Solid State Chemistry: An Introduction, 4th , CRC press (Taylor & Frances) 2012

- Lesley E. Smart , Elaine A. Moore , Solid State Chemistry ; An Introduction, 3rd, Taylor & Francis Group, 2005 LLC

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

Lesley E. Smart, Elaine A. Moore, Solid State Chemistry: An Introduction, 4th , CRC press (Taylor & Frances) 2012

Lesley E.Smart , Elaine A.Moore , Solid State Chemistry ; An Introduction, 3rd, Taylor & Francis Group, 2005 LLC

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4. List Electronic Materials (eg. Web Sites, Social Media, etc.)

http://www.mx.iucr.org/iucr-top/comm/cteach/pamphlets/13/node5.html

http://img.chem.ucl.ac.uk/sgp/mainmenu.htm

www.shef.ac.uk/.../solid-state-chemistry-applications-msc

www.simplybooks.in/solid-state-chemistry-its-anthony-r-book..

www.infibeam.com/.../solid-state-chemistry-its-applications/9...

http://www.seas.upenn.edu/~chem101/sschem/solidstatechem.html

http://www.webqc.org/symmetry.php

http://en.wikipedia.org/wiki/Molecular_geometry

http://en.wikipedia.org/wiki/Molecular_graphics

http://butane.chem.uiuc.edu/cyerkes/Chem102AEFa07/Lecture_Notes_102/newL102.htm-ecture%2014

/Science/Chemistry/Lewis_Structures_VSEPRhttp://www.wyzant.com/Help

http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro3.htm

drills.com/VSEPR.php-.chemistryhttp://www

http://cat.middlebury.edu/~chem/chemistry/class/general/ch103/chapter9/Test.html

kiel.de/herges/modeling/gliederung.html-http://scholle.oc.uni

faculty.ucsd.edu/trogler/GroupTheory224/Grouptheory.html-http://chem

http://www.seas.upenn.edu/~chem101/sschem/solidstatechem.html

http://phycomp.technion.ac.il/~ira/types.html http://en.wikipedia.org/wiki/Solid-state_chemistry

www.shef.ac.uk/.../**solid-state-chemistry-applications**-msc

www.simplybooks.in/**solid-state-chemistry-its**-anthony-r-book..

www.infibeam.com/.../**solid-state-chemistry-its-applications**/9...

http://books.google.com.sa/books?id=-EKCm5UQaqEC&hl=ar&redir_esc=y

5. Other

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- Isisdraw and Chemdraw and Chemoffice

-MS-Office Software

http://scholle.oc.uni-kiel.de/herges/modeling/gliederung.html

http://chem-faculty.ucsd.edu/trogler/GroupTheory224/Grouptheory.html

http://phycomp.technion.ac.il/~ira/types.html

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - A classroom containing at least 45 seats and equipped with projector and Internet access (scheduled for 2 hours once a week). - A help session classroom containing at least 45 seats and equipped with projector and Internet access (scheduled for 1 hours every week).

2. Computing resources (AV, data show, Smart Board, software, etc.) - Common computer lab containing at least 25 computer sets. - High speed internet access.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) - Isisdraw and Chemdraw and Chemoffice - Computer for individual students - Internet access - Networked laboratory systems

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching - Confidential completion of standard course evaluation questionnaire. - Focused group discussion with small groups of students. - Review with the department chairman.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor - Observations and assistance from colleagues. - Independent assessment of standards achieved by students. - Independent advice on assignment tasks
3 Processes for Improvement of Teaching - Workshops on teaching methods. - Review of recommended teaching strategies. - Periodical department revisions on its methods of teaching by experts on the teaching.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking by an independent member teaching staff of a sample of student work.
- Periodic exchange and remarking of tests or a sample of assignments with staff at another institution.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Periodic revision of the course from concerned parties in the department and college, and improving it according to what is known in distinguished universities worldwide.
- Perform the necessary changes based on the feedback from the statistical analysis of the student grades.
- Perform the necessary changes based on the feedback from the workshops, conferences, and seminars recommendations.
- Perform the necessary changes based on the feedback from the experts in the field and faculty members.

Faculty or Teaching Staff: Professor Nashwa Mahmoud El-Metwaly

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

Course Specifications

Selected Topics in Inorganic Chemistry

(402429-2)

Institution: Umm Al-Qura University	Date of Report: **2018**
College/Department : Faculty of Applied Science / Chemistry Department	

2017

A. Course Identification and General Information

1. Course title and code: Selected Topics in Inorganic Chemistry (402429-2)	
2. Credit hours: 2 (theoretical)	
3. Program(s) in which the course is offered. Chemistry program (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course: **Dr. Khadega Mostafa**	
5. Level/year at which this course is offered: seventh/fourth	
6. Pre-requisites for this course (if any): Mechanism of Reactions and spectroscopy (402327-2)	
7. Co-requisites for this course (if any): Nothing	
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom	☐ What percentage? ☐
b. Blended (traditional and online)	■ What percentage? 100
c. e-learning	☐ What percentage? ☐
d. Correspondence	☐ What percentage? ☐
f. Other	☐ What percentage? ☐
Comments:	

B Objectives

1. What is the main purpose for this course? - Study the basic concepts of the chemistry of oxygen anions poly-nuclear for some transition and non-transition elements and their different uses. - Study the magnetic properties of the transition metal and their complexes. - Study the nomenclature of poly-homogeneous anions and poly-heterogeneous anions. - Study an introduction to structural inorganic chemistry and the different geometries.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) - E-Learning System is being introduced. - Students can download course material which can be helpful for the students learning. - For the research, use internet such as Wikipedia, Google ....etc. - Interpersonal skills, relating to the ability to interact with other people and to engage in team-working through group discussion. - Problem solving skills, relating to qualitative and quantitative information.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Anionic poly-central ooxygen 's: silicates , borates and condensing or crystalline -Phosphates	0.5	1
Poly-nuclear of transitional elements	1	2
Poly-Tungstate - Poly-Vanadidate	1	2
Poly-hetero acids	1	2
Structural configuration of homo poly- anionic and hetero poly-anionic	0.5	1

Nomenclature of poly-homogeneous anions and poly-heterogeneous anions	1	2
Condensation of inorganic compounds in solution	1	2
Mass elements: SP	1	2
Magnetic properties of transition elements and their complexes: para-, dia- and ferromagnetic as well as, the methods of the magnetic moment measurements for various complexes	1	2
Metal-Metal bonds and the cluster and cage geometry of transition metal complexes and prove the structural formula	2	4
Gold(III)complexes and its organometallic compounds; preparation and structural characterization processes	1	2
Transition metal ion complexes with phosphorus (III) ligands; preparation methods and their economic importance	1	2
Phosphorus complexes, arsenic and antimony as donor atoms	2	4
Introduction to structural inorganic chemistry and the different geometries	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	30	4	0	0	0	34
Credit	2	0	0	0	0	2

3. Additional private study/learning hours expected for students per week. 8

- Assignments 4 Hrs
- Tutorials 4 Hrs

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

- Brief summary of the knowledge or skill to develop;

- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
-The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Learn students the structural building of different unusual compounds such as : poly anionic or poly nuclear compounds	- Class room lectures - Assignments - Individual handwritten assignments require use of library reference material and web sites to identify information required to complete tasks. - E-learning through university website	- Written tests - assess the effective participation of students during a lecture presentation - the duties given to e-learning site.
1.2	Take a clear impact about some SP compounds		
1.3	know the magnetic properties of different compounds		
1.4	learn about luster and cage geometry of transition metal complexes		
1.5	learn elaborately some important gold compounds		
2.0	**Cognitive Skills**		
2.1	Able to understand the basic concepts and principles of transition metals chemistry and the behavior of luster and cage geometry	Making connections between different concepts across the domains. - Assigning research questions that can be answered through collecting and analyzing data. - Summarizing the findings of the online research - Using the instructor's webpage learning activities.	- Assignments, Midterm Exams and Final examination at the end of semester. - Solving general chemistry problems related to qualitative and quantitative information at the end of each topic.
2.2	able to deduce the geometry and molecular structure of different inorganic compounds		
2.3	Deduct, Memory, Self-regulation, and Motor executive functions		
2.4	Interpret, and analyze mystery issues related to topics		
2.5	compare between knowledge		
2.6	Demonstrate good understanding of basics and advanced chemical principles		

			- Individual assignments or oral exam for developing/solving a task
3.0	**Interpersonal Skills & Responsibility**		
3.1	Able to self learn	-Using PowerPoint (it's easy to cover more material quickly). - Group discussion - Online workshops	-Assessment of group assignment includes component for individual contribution. - Providing feedback. - Encouraging self-assessment during the learning process
3.2	Encourage students to use online resources		
3.3	Use the internet to collect statistical data		
3.4	UseMicrosoft Office (e.g. Excel, Microsoft Access, front page) to analyze data and prepare statistical reports		
4.0	**Communication, Information Technology, Numerical**		
4.1	Deal with computers skills	- Debates - Group working. - Student assignments for writing and presenting skills for general chemistry concepts	- Instructor's feedback - Final and midterms exams include different problems need numerical and technical skills - Assessments of student's assignments
4.2	Communicate through teamwork		
4.3	Collaborate to finish team assignments		
4.4	Present reports on their reading		
4.5	Make relationships between the knowledge		
5.0	**Psychomotor:** Not Applicable		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%

2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) - The faculty member has 2 hours per week for these cases

E. Learning Resources

1. List Required Textbooks -James E. House, Inorganic Chemistry, Elsevier Inc., 1st edition, 2008, printed in Canada -U. Muller, “Inorganic Structural Chemistry”, 2nd, John Wiley & Sons, New York, 2006
2. List Essential References Materials (Journals, Reports, etc.) - James E. House, Inorganic Chemistry, Elsevier Inc., 1st edition, 2008, printed in Canada -U. Muller, “Inorganic Structural Chemistry”, 2nd, John Wiley & Sons, New York, 2006
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) - James E. House, Inorganic Chemistry, Elsevier Inc., 1st edition, 2008, printed in Canada -U. Muller, “Inorganic Structural Chemistry”, 2nd, John Wiley & Sons, New York, 2006
4. List Electronic Materials (eg. Web Sites, Social Media, etc.) 1- http://scholle.oc.uni-kiel.de/herges/modeling/gliederung.html 2- http://chem-faculty.ucsd.edu/trogler/GroupTheory224/Grouptheory.html 3- " http://onlinelibrary.wiley.com/book/10.1002/3527600825) 4- http://caltechbook.library.caltech.edu/100/1/Langford_Lsp.pdf) 5- http://www.chem.ox.ac.uk/icl/dermot/mechanism1/ **5. Other**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- Isisdraw and Chemdraw and Chemoffice -MS-Office Software http://scholle.oc.uni-kiel.de/herges/modeling/gliederung.html http://phycomp.technion.ac.il/~ira/types.html

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Number of seats in each class room 40 -Accessories – Overhead projector and data show

2. Computing resources (AV, data show, Smart Board, software, etc.) - MS-Office Software and Internet connection
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Data show Computer for individual students Internet access Isisdraw and Chemdraw and Chemoffice

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching - Confidential completion of standard course evaluation questionnaire. - Focus group discussion with small groups of students.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor - Observations and assistance from colleagues, independent assessment of standards achieved by students, - Independent advice on assignment tasks, etc.
3 Processes for Improvement of Teaching - Developing the lectures periodically - Workshops on teaching methods. - Review of recommended teaching strategies.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Meetings are conducting with teachers for checking the grading of the exams.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

-Periodic revision of the course from concerned parties in the department and college, and improving it according to what is known in distinguished universities worldwide.

- Perform the necessary changes based on the feedback from the workshops, conferences, and seminars recommendations.

- Perform the necessary changes based on the feedback from the experts in the field and faculty members.

Faculty or Teaching Staff: Dr. Khadega Mostafa

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

2017

D. Organic Chemistry Courses

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Chemistry of Aliphatic Compounds
402131-4

Course Specifications
(CS)

2017

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Chemistry of Aliphatic Compounds**/ 402131-4			
2. Credit hours: **4 (3+1)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Professor Mohamed Rabie**			
5. Level/year at which this course is offered: **2rd level/1st year**			
6. Pre-requisites for this course (if any): -			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐
Comments:			

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with nomenclature, chemical properties and synthesis of aliphatic compounds**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Nomenclature of Hydrocarbons	1	3
Alkanes (Preparation, physical properties, chemical reactions cycloalkanes, conformations in cycloalkanes)	1	3
Alkenes (Preparation, physical properties, chemical reactions conjugated dienes, free radical addition, Diels alder reaction, and 1,4 cycloadditions in dienes	1	3
Alkynes (Preparation, Acidity of terminal alkynes, chemical reactions, induserial uses of alkynes)	1	3
Alkyl halides and dihalides (nomenclature, preparations and reactions)	1	3
Alcohols anddihydric and trihydric alcohols (nomenclature, chemical properties) and thioalcohols	1	3
Ethers (nomenclature, preparations and chemical properties) and thioethers	1	3
Organometallic compounds and Grignard reagents	1	3
Carbonyl compounds (nomenclature, preparation and chemical properties	1	3
Carboxylic acids and their derivatives (nomenclature, preparation and chemical properties)	1	3
Amines(nomenclature, preparation and chemical properties)	1	3
Inductive effect, resonance effect and stereochemistry	1	3

Practical Part:

I-Identification and investigation tests of the following

a. Alcohols
b. Aldehydes and ketones
c. Carboxylic acids
d. Salts of carboxylic acids

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	36	-		36		72
Credit	3	-		1		4

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the general IUPAC rules for nomenclature of different organic classes	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Name different organic classes and organomettalic compounds using common and IUPAC system		
1.3	Know the classifications in different organic families		
1.4	Describe the different methods of preparations of organic compounds		
1.5	Familiar with the physical properties of different organic molecules and their relation with the structure		
1.6	Select the proper method of preparation of an organic molecule		
1.7	Identify the different conformations of alkanes and cycloalkanes		
1.8	Write a mechanism for a chemical organic transformation		
1.9	Determine the type of mechanism and intermediates in different organic reactions		
1.10	Recognize the industrial use of most famous organic molecules		
1.11	Memorize different name reactions in organic chemistry		
1.12	Outline the different uses of organometallic compounds		
1.13	Defineinductive and resonance effect		
2.0	**Cognitive Skills**		
2.1	Apply the IUPAC rules for all organic families	• Lectures • Scientific discussion	• Exams • web-based student performance systems
2.2	Compare between IUPAC nomenclature and common nomenclature for organic compounds		
2.3	Explain the different strategies for preparation of organic compounds		

2.4	Analyze the reasons for the unique physical properties in some organic compounds	• Library visits • Web-based study	• portfolios • posters • demonstrations
2.5	Predict the most stable conformation of alkanes and cycloalkanes		
2.6	Summarize the different reactions of organic compounds		
2.7	Account for the acidity and basicity of different organic compounds		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Use the IUPAC rules for all organic families	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Choose the suitable mechanism for a given reaction		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the different methods of preparation of organic compounds	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate a synthetic pathways for synthesis of organic molecules		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

• **We have faculty members to provide counseling and advice.** • **Office hours: During the working hours weekly.** • **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks • T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" **2013**, John Wiley & Sons. • John McMurry's "*Organic Chemistry, 8th edition, International Edition*" **2011**, Brooks/Cole •
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • AmitArora "*Introductory Organic Chemistry*" **2006**, Discovery Publishing House New Delhi • M. Casey, J. Leonard, B. Lygo, G. Procter"*Advanced Practical Organic Chemistry*" 1990, Springer US
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and project or and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Professor Mohamed R. Shaaban**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

2017

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Chemistry of Aromatic compounds (402234-3)

Course Specifications
(CS)

Course Specifications

Institution: **Umm Al-Qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Aromatic organic chemistry** / 402234
2. Credit hours: **3 (2 theoretical +1 practical)**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr. Heba Abd Elhady Mohamed**
5. Level/year at which this course is offered: **3rd level / 2st year**
6. Pre-requisites for this course (if any): **-Aliphatic organic chemistry**
7. Co-requisites for this course (if any)---
8. Location if not on main campus:**in campus location.**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with basic concepts in aromatic chemistry including dividing, naming, preparation, physical and chemical properties.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • simulating evolution in the science of chemistry by trying to add new items on some points of the course • diversify of learning sources for the course to benefitfrom more than one reference • comparison of contents with that introduced in deferent local and international departments • use of smart classes for lectures • Encouragement of students to make reports in aromatic chemistry from libraries or by using internet (Self-study)

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
vvv. Definition and properties of aromatic compounds- chemical structure of benzene	1	2
www. Chemical properties of benzene	1	2
xxx. Effect of substituted groups on directing and reactivity of benzene ring	1	2
yyy. Electrophilic aromatic substitution reactions	1	2
zzz. Benzene alkyl derivatives and directing in di substituted benzene derivatives	1	2
aaaa. Aromatic amines and their reactions	1	2
bbbb. Sulfonic acids and their derivatives	1	2
cccc. Phenols and their derivatives	1	2
dddd. Aromatic aldehydes and ketones	2	4
eeee. Aromatic carboxylic acids (mono- di) carboxylic	1	2
ffff. Poly nuclear aromatic hydrocarbons	1	2
gggg. Condensed aromatic hydrocarbons	2	4

Practical Part:

I-Identification and investigation tests of the following

e. Aromatic hydrocarbons
f. Aromatic aldehydes and ketones
g. Aromatic carboxylic acids
h. Phenols
i. Aromatic amines
j. Sulfonic acids

II-General scheme for identification of organic aromatic unknown

2017

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-		42		70
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week.
Two hours for preparing and discussion of reports and solving home works in addition to the main time of lectures

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Define aromatic compounds and aromaticity	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • long and short essays • providing various posters
1.2	Name different organic classes using common and IUPAC system		
1.3	Classify different organic families		
1.4	Describe the different methods of preparations of organic compounds		
1.5	Familiar with the physical properties of different aromatic compounds and their relation with the structure		
1.6	Select the proper method of conversions among different aromatic compounds		
1.7	Write a mechanism of electrophilic aromatic substitution reactions.		
1.8	Recognize the industrial use of most famous organic molecules		
2.0	**Cognitive Skills**		
2.1	Train to choose the suitable method for the preparation of aromatic compounds		
2.2	Choose the suitable mechanism for reactions	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • posters • demonstrations
2.3	Compare between IUPAC nomenclature and common nomenclature for aromatic compounds		
2.4	Explain the different strategies for preparation of aromatic compounds		
2.5	Analyse the reasons for the unique physical properties in some organic compounds		
2.6	Predict the expected product in different aromatic reactionsaccording to the functional group		

2.7	Summarize the different reactions of aromatic compounds		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Have the following skills • Ability to work in a team to perform a specific experimental tasks. • Ability to work independently to handle chemicals • Ability to communicate results of work to classmateand participation in class or laboratory discussions	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performanc e systems
4.0	**Communication, Information Technology, Numerical**		
4.1	Research using computer to collect the data used in writing reports	• Using computers lab • Research centers visit • Library visits • Web-based study	• web-based student performanc e systems • individual and group presentatio ns
4.2	Illustrate sources of new researches which are related to the course by researching in the internet		
4.3	Able to calculate and discuss the facts and logical propose methods to solve the difficulties		
4.4	Ability to work in a team to perform a specific task		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
	Laboratory practice including **1**.Locate Materials Safety Data Sheets, chemicals carcinogens list, and hazardous chemicals list. **2.** Handle chemicals safely with a proper PPE **3.**Dilute solutions, repeat analysis and calculate true result for all procedures performed as required. 4.Dispose the hazardous solution in right way	Practical session should include both demonstration and experiments	1. Repetition of the experiments , to reproduce the results 2.Written report of chart and procedures. 3.The students should be able to correlate their results with experimental conditions

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%

5	Total		100%

D. Student Academic Counselling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counselling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks
   - T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "Organic Chemistry, 11th Edition, International Student Version" **2013**, John Wiley & Sons.
   - John McMurry's "Organic Chemistry, 8th edition, International Edition" **2011**, Brooks/Cole

2. List Essential References Materials (Journals, Reports, etc.)

1. Organic chemistry, by Graham Solomons TW, Craig B Fryhle, 8th ed., **2007**.
2. Organic Chemistry, by J. McMurvy, 6th ed., Brooks/Cole Publishing Company(2003).
3. Introductory Organic Chemistry ,AmitArora, Discovery Publishing House, (**2006**).

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   - AmitArora "Introductory Organic Chemistry" **2006**, Discovery Publishing House New Delhi
   - M. Casey, J. Leonard, B. Lygo, G. Procter"Advanced Practical Organic Chemistry" **1990**, Springer US

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
   - **http://www.chemweb.com**
   - **http://www.sciencedirect.com**
   - **http://www.rsc.org**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

- **Classrooms capacity (30) students.**
- **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.)

- **Room equipped with computer and projector and TV.**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

- **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Complete the questionnaire evaluation of the course in particular.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**

- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Dr. Heba Abd Elhady Mohamed**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Physical Organic and Stereochemistry (402235-3)

Course Specifications
(CS)

Course Specifications

Institution: **Umm Al-Qura University**	Date of Report: **2018**
College/Department: **Faculty of Applied Science/ Department of Chemistry**	

A. Course Identification and General Information

1. Course title and code: **Physical Organic and Stereochemistry (402235-3)**
2. Credit hours**: 3 (3+0)**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Prof. Dr. Thoraya A. Farghaly**
5. Level/year at which this course is offered**: 4th level/2 year (1st term)**
6. Pre-requisites for this course (if any) **Chemistry of aromatic compounds(402234-3)**
7. Co-requisites for this course (if any): Nothing
8. Location if not on main campus: In main campus
9. Mode of Instruction (mark all that apply)

a. Traditional classroom		What percentage?	
b. Blended (traditional and online)	■	What percentage?	100%
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with Studying theorganic mechanismsand types of electronic effects of groups in molecules andstudying thereplacement, additions and elimination reactions.Stereochemistryandconformational isomerism.**·
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1. General Introduction - Knowledge of the basic rules in organic chemistry including: Electronegativity - Covalent bonds - Hydrogen bonds - Energy bonds - Dipole Moment.	2	4
2. Types of electronic effects of groups in molecules: Inductive Effect- Mesomeric Effect.	1	2
3. Complement of the effects of electronic for groups: 4. Electromeric Effect - Steric Effect – Hyper Conjugation – Inductomeric Effect.	1	2
5. Definition of organic reactions – Aliphatic Nucleophilic Substitution Reactions - S_N1 and S_N2 Mechanisms.	1	2
6. Factors affecting on S_N1 and S_N2 Mechanisms.	1	2
7. Aromatic Nucleophilic Substitution Reactions and mechanisms. 8. Aromatic Electrophilic Substitution Reactions and mechanisms.	1	2
9. Elimination reactions and mechanisms.	1	2
10. Introduction to stereochemistry - Isomerism - Configuration - shape and types of isomerism: structural and conformational.	1	2
11. Complement of conformational isomerism (Geometric – Shape for cyclic and open compounds)	1	2

12. Complement of Molecular Chirality - Optical isomerism - Enantiomers and their Opticalactivity-Fischer projection- Absolute configuration.	1	2
13. Compoundsthatcontainmore than onechiralcarbon atom - Diastercomersandtheir properties.	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	4	0	0	0	28
Credit	3	0	0	0	0	3

3. Additional private study/learning hours expected for students per week. 10

- Assignments 4 Hrs
- Tutorials 4 Hrs
- e-learning 2 Hrs

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

- Brief summary of the knowledge or skill to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
-The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Memorize of the basic rules in organic chemistry.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays posters lab manuals
1.2	Understand of the division oftypes of electronic effects of groups in molecules.		
1.3	Knowledgeand understanding of themechanismof differenttypesoforganic reactions.		
1.4	Understand SN1 and SN2 Mechanisms.		
1.5	Knowledge of types of isomerism.		
1.6	Drawashapeofopenandcycliccompounds.		
1.7	Understand of theabsoluteconfiguration.		
1.8	Knowledge of Diastercomersandtheir properties and Molecular Chirality.		
2.0	**Cognitive Skills**		

2.1	The ability to use the Internet for more information specially you tube	• Lectures • Scientific discussion • Library visits • Web-based study	• -Discussing and evaluating the topics that students learn from their textbooks and other sources. • Assignments, Midterm Exams and Final examination at the end of semester. • Solving problems related to course. • Individual assignments or oral exam for developing/solving a task
2.2	Attention, Memory, Self-regulation, and Motor executive functions		
2.3	The studen't acquiring of the skill of how to predict the mechanism of the different reactions		
2.4	The students use the internet to prepare an essay about a recent advances related to the course of physicalorganic chemistryandstereochemistry.		
2.5	Developingskills ofdrawingshape of the stereochemistry oforganic compounds.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	The division of students collectively for teams to make some common reports	• Lectures • Scientific discussion Web-based study	• Exams web-based student performance systems
3.2	Self-reliance and take individual responsibility and the ability to work within the group		
3.3	Encouraging students to use online resources.		
4.0	**Communication, Information Technology, Numerical**		
4.1	The ability to conduct a successful style of dealing with data analysis, describing his strategy in the image and draw conclusions from them	• Lectures • Scientific discussion • Library visits Web-based study	• web-based student performan ce systems individual and group presentation s
4.2	Introductory lecture at the beginning of the semester to use the computer and the internet to search for sources of new researches and collect the researches which help in writing reports on topics related to syllabus.		
4.3	Evaluating the performance of the students through examination, duties and the discussion in the lecture which constitute 30 % of the total evaluation.		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework and other assignments	--	10%
2	First Periodic Exam (One Hour Exam)	7	20
3	Second Periodic Exam (One Hour Exam)	14	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. **<u>List Required Textbooks</u>**

- John McMurry's "*Organic Chemistry, 8th edition, International Edition*" 2011, Brooks/Cole.
- T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" 2013, John Wiley & Sons.

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- Amit Arora "*Introductory Organic Chemistry*" 2006, Discovery Publishing House New Delhi.
- Michael J. T. Robinson "*Organic Stereochemistry*" 2000, OUP Oxford.
- R. K. Sharma "*Stereochemistry, Volume 4*" 2008, Discovery Publishing House.

• Howard Maskill "*Structure and Reactivity in Organic Chemistry*, Volume 81 of Oxford Chemistry Primers" 1999, OUP Oxford.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **Noother requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.**

- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Professor Dr. Thoraya A. Farghaly

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

ATTACHMENT 2 (e)

Course Specifications

2017

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Heterocyclic Chemistry (402333-3)

Course Specifications
(CS)

Course Specifications

Institution: **Umm Al-Qura University**	Date of Report: **2018**
College/Department: **Faculty of Applied Science/ Department of Chemistry**	

A. Course Identification and General Information

1. Course title and code: **Heterocyclic Chemistry (402333-3)**
2. Credit hours: **3 hrs (2 theoretical +1 practical)**
3. Program(s) in which the course is offered: **Chemistry program**
4. Name of faculty member responsible for the course: **Dr. Rasha El-Demerdashi El-Mekawi**
5. Level/year at which this course is offered: **5th level/3 year (1st term)**
6. Pre-requisites for this course (if any): **Chemistry of aromatic compounds(402234-3)**
7. Co-requisites for this course (if any): **Petroleum Chemistry and Petrochemicals(402385-3)** and **Chemistry of natural products (402335-2)**
8. Location if not on main campus: **both on El-Abdyah and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	rcentage?**90 %**	
c. e-learning	■	What percentage?**10 %**	
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? ☒ **By the end of this course student will be familiar with Studying trivial and systematic nomenclature, chemical properties and synthesis of different heterocyclic compounds**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) ☒ **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
a- Classification of heterocyclic compounds	1	2
b- Nomenclature of monocyclic heterocyclic compounds as well as fused systems	2	4
c- Bonding, Structure and geometry in heterocycliccompounds: three, four, five and six membered heterocycles- Aromaticity – Basicity	2	4
d- Structure and reactivity of different heterocyclesfive and six-membered rings with one or more different heteroatoms (same or different heteroatoms).	2	4
e- Chemical reactions of different heterocyclic compoundsfive and six-membered rings with one or more different heteroatoms (same or different heteroatoms).	2	4
f- Cycloaddition reactions (Diels-Alder [2+4]) of different heterocyclic compounds five and six-membered rings with one or more different heteroatoms (same or different heteroatoms).	1	2
g- Synthetic Routes to five membered rings with one or more different heteroatoms (same or different heteroatoms).	1	2

h- Synthetic Routes to six membered rings and fused heterocyles with one heteroatom.	1	2
i- Synthetic Routes to six membered rings with two heteroatoms (Diazines) (pyrimidine and pyrazine)	1	2

Practical Part:

1- Identifing the protocol of security and safety in lab. and developing of the environmental awareness
2- Synthesis of phthalimide
3- Synthesis of phthalylglycine
4- Synthesis of benzimidazole
5- Synthesis of benzotriazole
6- Synthesis of 1, 2, 3, 4-tetrahydrocarbazole
7- Synthesis of 3-methyl-1-phenyl-5-pyrazolone
8- Synthesis of 7-hydroxy-4-methyl coumarin
9- Synthesis of 3, 4-dihydro-1-hydroxy-4-oxo phthalazine
10- Synthesis of 4-benzylidene-2-methyloxyazol-5-one
11- Synthesis of 5, 5-diphenyl hydantoin
12- Synthesis of 2, 4, 5-triphenyl oxazole

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	26	-		36		62
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week. ☐

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Studying the molecular structures of different heterocyclic compounds	• Lectures	• Exams

1.2	Describing the classification of heterocyclic compounds according to their different types	• Scientific discussion • Library visits • Web-based study • E-learning	• web-based student performance systems • portfolios • long and short essays • posters lab manuals • Homework • Periodic Short exams
1.3	Knowledge of different methods for nomenclature of heterocyclic compounds		
1.4	Showing the multiple methods of preparation of heterocyclic compounds		
1.5	Recognizing the chemical properties of heterocyclic compounds		
1.6	Identifying the chemical reactions of different heterocyclic compounds		
2.0	**Cognitive Skills**		
2.1	Development of reverse thinking skill (back thinking) and the student's acquiring the training skill to choose the suitable method for heterocyclic compounds preparation	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Making the student acquire the skill of naming heterocyclic compounds		
2.3	The studen't acquiring of the skill of how to predict the outcomes of interactions of heterocyclic compounds		
2.4	The student can pick the appropriate methods for the preparation of heterocyclic compounds		
2.5	Design of different ways to nomenclature the heterocyclic compounds		
2.6	Student invents different ideas for the construction of many of the heterocyclic compounds		
2.7	The student is planning to make a research programme in the field of chemistry of heterocyclic compounds and their effectiveness		
3.0	**Interpersonal Skills & Responsibility**		
3.1	The division of students collectively for teams to make some common reports	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Self-reliance and take individual responsibility and the ability to work within the group		
4.0	**Communication, Information Technology, Numerical**		

4.1	The ability to conduct a successful style of dealing with data analysis, describing his strategy in the image and draw conclusions from them	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Introductory lecture at the beginning of the semester to use the computer and the internet to search for sources of new researches and collect the researches which help in writing reports on topics related to syllabus.		
4.3	Evaluating the performance of the students through examination, duties and the discussion in the lecture which constitute 30 % of the total evaluation.		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**

- **Office hours: During the working hoursweekly.**
- **Academic Advisingforstudents.**

E. Learning Resources

1. List Required Textbooks

- Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 1st June, Vol. 126, 2018.**Hardcover ISBN:** 9780128152096, **Imprint:** Academic Press.Elsevier
- Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 3rd February, Vol. 125, 2018.**ardcover ISBN:** 9780128152102, **Imprint:** Academic Press.Elsevier.
- Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 4th January, Vol. 124, 2018. **E-Book ISBN:** 9780128137611, **Hardcover ISBN:** 9780128137604, **Imprint:** Academic Press, Elsevier
- Gordon Gribble, John Joule "Progress in heterocyclic Chemistry" 1st Ed., Published: 5th September, Vol. 29, 2018.**E-Book ISBN:** 9780081023112, **Hardcover ISBN:** 9780081023105, **Imprint:** Elsevier
- Alan R. Katritzky, Christopher A. Ramsden, John A. Joule " Advances in heterocyclic Chemistry" 1st Ed., Published 7 Novmber, Vol. 113, 2014.**ISBN**10 0080958435, **ISBN**13 9780080958439, I**mprint**: Elsevier / The Lancet

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 4th April, Vol. 123, 2018. **E-Book ISBN:** 9780128121955, **Hardcover ISBN:** 9780128120927, **Imprint:** Academic Press, Elsevier.
- Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed, published: 25th March, Vol. 122, 2018. **E-Book ISBN:** 9780128119938, **Hardcover ISBN:** 9780128119730, **Imprint:** Academic Press Elsevier.
- Eric Scriven, Christopher A. Ramsden " Heterocyclic Chemistry in the 21st century: A Tribute to Alan R. Katritzky" 1st Ed., Published: 4th January Vol. 121,

2018. **E-Book ISBN:** 9780128120705, **Hardcover ISBN:** 9780128111741, **Imprint:** Academic Press • Gordon Gribble, John Joule "Progress in heterocyclic Chemistry" 1st Ed., Published: 3rd September, Vol. 28, 2016. **E-Book ISBN:** 9780080994093, **Hardcover ISBN:** 9780080994062, **Imprint:** Elsevier
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation forextent toachieve students the standards.**

• **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous trainingof member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Exchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hostinga visiting staffto evaluate of thecourse.** • **Workshopsfor teachers ofthe course.**

Faculty or Teaching Staff: **Dr/ Rasha El-Mekawy**

Signature:  **Date Report Completed: 2018**

Received by: Dr Ismail I. Althagafi **Department Head**

Signature: _____ Date: _____

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Organic Reactions and Preparations 402336-3

Course Specifications
(CS)

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Organic Reactions and Preparations / 402336-3**
2. Credit hours: **3 (2+1)**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr. Essam M. Hussein**
5. Level/year at which this course is offered: **6st level / 3rd year**
6. Pre-requisites for this course (if any): -
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **both on El-Abedyah, El-Azizya, and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with theoretical and practical study of the different reactions to synthesis of different classes of organic compounds**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
hhhh. Chemistry of functional groups	**2**	**4**
iiii. Named reactions: Bucherer reaction- Cannizzaro reaction - Chichibabin reaction - Chugaev elimination - Clemmensen reaction – Claisen condensation – Claisen rearrangement - Cope elimination	**1**	**2**
jjjj. Cope rearrangement - Curtius rearrangement – Dieckmann condensation - Doebner reaction - Edman degradation - Eschweiler–Clarke reaction - Friedel–Crafts acylation	**1**	**2**
kkkk. Fischer reaction - Friedländer synthesis - Skraup reaction - Skraup reaction - Fries rearrangement - Gabriel synthesis - Gattermann reaction - Gattermann Koch reaction - Gomberg–Bachmann reaction	**1**	**2**
llll. Grignard reaction – Hantzsch reaction - Kiliani–Fischer synthesis - Knoevenagel condensation - Leuckart reaction – Michael reaction - Perkin reaction - Reformatskii reaction - Reimer–Tiemann reaction	**2**	**4**
mmmm. Robinson reaction - Robinson annulation - Ruff degradation - Sandmeyer reaction - Schmidt reaction - Schotten–Baumann reaction - Stephen aldehyde synthesis	**1**	**2**
nnnn. Wittig reaction - Ullmann reaction - Kolbe–Schmitt reaction - Strecker amino acid synthesis – Williamson reaction	**1**	**2**
oooo. Redox reactions: Aldehydes – Ketones – Carboxylic acids – esters – Aromatic hydrocarbons	**1**	**2**
pppp. Introduction to Organic Synthesis	**2**	**4**
qqqq. Retrosynthetic approach	**2**	**4**

Practical Part:

I- Purification of organic compounds
II- Synthesis of benzoin
III- Synthesis of benzil
IV- Synthesis of Benzilic acid
V- Synthesis of Diazoamino Benzene
VI- Synthesis of Acetyl salicylic acid (Aspirin)
VII- Synthesis of Acetanilide

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**28**	---	---	**39**	---	**67**
Credit	**3**	---	---	**1**	---	**4**

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Know the different methods used in the preparation of various organic compounds	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Name		
1.3	Recognize the different methods used in the preparation of various organic compounds		
1.4	Identify the different classes of organic compounds depending on the functional groups		
1.5	Write the products of chemical reaction correctly		
1.6	Determine the type of mechanism and intermediates in different organic reactions		
1.7	Identify different synthetic pathways		
1.8	Familiar with different techniques of purification of organic compounds		
1.9			
1.10			
2.0	**Cognitive Skills**		
2.1	Explain the outputs of organic chemical reactions	• Lectures	• Exams

2.2	Compare between different methods to synthesis different organic compounds	• Scientific discussion • Library visits • Web-based study	• web-based student performance systems • portfolios • posters • demonstrations
2.3	Explain the reaction mechanisms for different organic reactions		
2.4	Predict the products of different organic reactions		
2.5	Summarize the different methods of organic synthesis		
2.6	Apply the different laboratory techniques to purify the organic molecules		
2.7			
3.0	**Interpersonal Skills & Responsibility**		
3.1	Use the retrosynthetic approach to synthesis of different organic molecules	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Choose the suitable mechanism for a given reaction		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the different methods of preparation of organic compounds	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate a synthetic pathways for synthesis of organic compounds		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • **We have faculty members to provide counseling and advice.** • **Office hours: During the working hours weekly.** • **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks • T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" 2013, John Wiley & Sons. • John McMurry's "*Organic Chemistry, 8th edition, International Edition*" 2011, Brooks/Cole
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Stuart Warren, Paul Wyatt "*Organic Synthesis: The Disconnection Approach, 2nd Edition*" 2008, Wiley-Blackwell. • P.G.M. Wuts "*Green's Protective Groups in Organic Synthsis"*, 2007, Wiley. • P. Wyatt and S. Warren "*Organic Synthesis: Strategy & Control*", 2007, Wiley.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

2017

Faculty or Teaching Staff: **Dr. Essam M. Hussein**

Signature: 

Date Report Completed: 2018

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Organic Spectroscopy
402332-3

Course Specifications
(CS)

2017

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Organic Spectroscopy / 402332-3**			
2. Credit hours: **3 (2+1)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Dr. Hossa fahad alshareef**			
5. Level/year at which this course is offered: **5th level/3rd year**			
6. Pre-requisites for this course (if any): **Physical Organic Chemistry and Stereochemistry**			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abdyah and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐
Comments:			

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with compounds analysis by (UV-Spectroscopy , Infra-Red Spectroscopy ,NMR-Spectroscopy,Mass Spectroscopy)**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be training to using data base services, and/or websites to improving interpretation of compounds with spectroscopy**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
1- Principals of spectroscopy and index of hydrogen deficiency.	**1**	**2**
2- UV Spectroscopy: ground and excited states, molar absorptivity, an calculation of A max to the possible structure.	**1**	**2**
3- Applications and solving problems.	**1**	**2**
4- Factors affecting absorption frequency, experimental aspects of IR spectroscopy.	**1**	**2**
5- Interpretation of IR charts.	**1**	**2**
6- The nature of NMR absorption instrumentation; chemical shifts in 1H NMR spectroscopy.	**1**	**2**
7- Shielding and de shielding effect magnetic anisotropy, spin-spin coupling in 1H NMR spectroscopy.	**1**	**2**
8- ^{13}C NMR spectroscopy (chemical shift);more complex spin-spin splitting patterns.	**1**	**2**
9- Mass Spectrometry (MS): ionization process and instrumentation.	**1**	**2**
10- Examples of common types of fragmentation processes.	**1**	**2**
11- Applications and solving problems.	**1**	**2**
12- Apply all Spectra.	**1**	**2**

Practical Part:

1- interpretation and confirmation of compounds of the following

a. interpretation of IR charts

b. interpretation of ^{1}H NMR chart

c. interpretation of ^{13}C NMR chart
d. interpretation of Mass(MS) chart

2- applications and solving problems contain all spectra.

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**28**	**42**	----	----	----	**70**
Credit	**2**	**1**	----	----	----	**3**

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the general Principals of different spectroscopy.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters • lab manuals
1.2	Know position the functional groups in infra red		
1.3	Describe the compounds with spectroscopy		
1.4	Familiar with the factors affecting absorption frequency		
1.5	Determine the type and numbers of signals for NMR spectra in the different compounds		
1.6	Identify the examples of common types of fragmentation processes		
2.0	**Cognitive Skills**		
2.1	Apply the spectroscopy steps for all compounds .	• Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters
2.2	Predict the structure of compounds with study spectroscopy		
2.3	Compare between methods spectroscopy .		
2.4	Explain the different Benefits for study organic spectroscopy		
2.5	Summarize the spectroscopy of organic compounds		

2.6	development Reverse thinking skill (back thinking)		• individual and group presentations • video analsis • lap manuals
3.0	**Interpersonal Skills & Responsibility**		
3.1	Use the spectroscopy for Discovers the structure of compound .	• Library visits • Scientific discussion • Web-based study	• web-based student performance systems • individual and group presentations
3.2	justify the structure of compound according to spectroscopy		
4.0	**Communication, Information Technology, Numerical**		
4.1	Demonstrate structure for organic compounds with spectroscopy	• Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2			
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks
   - Pavia, D.; Lampman, G.M.; Kriz, G.S.; Vyvyan, J.R. Introduction to Spectroscopy, 4 th edition, 2009, Belmont : Brooks/Cole, Cengage Learning.
   - Silverstein, R.M.; Webster, F.X.; Kiemle, D.J. Spectrometric Identification of Organic Compounds. 7th edition, 2005, N.Y. : John Wiley & Sons, Inc.
   - Prof.Dr.AbdullahM.Asiri,MahaM.Al-Otaibi"*Spectroscopic Methods in Organic Chemistry, 1st Edition*, 2012.

2. List Essential References Materials (Journals, Reports, etc.)
   Prof.Dr.AbdullahM.Asiri,Dr.AboodBahajaj " *Principles ofSpectroscopic Analysis of Organic Compounds*"

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   - R.T.Morrison ,R.N.Boyd,S.K.Bhattacharjee " *Organic Chemistry*" 7th edition, 2011,

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
   - **http://www.chemweb.com**
   - **http://www.sciencedirect.com**
   - **http://www.rsc.org**
   - http://stream.hebust.edu.

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - **Classrooms capacity (30) students.**
   - **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.)
   - **Room equipped with computer and projector and TV.**

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify then egatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Dr. Hossa fahad alshareef**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Chemistry of Natural Products
402335-2

Course Specifications
(CS)

2017

Course Specifications

Institution: **Umm Al-Qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Chemistry of Natural Products/ 402335**
2. Credit hours: **2 (2+0)**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr/ Nizar El Guesmi**
5. Level/year at which this course is offered: **6th level / 3rd year**
6. Pre-requisites for this course (if any): **Chemistry of Heterocyclic Compounds/ 402333**
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with nomenclature, structure elucidation, general properties and methods of preparation of natural products**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
rrrr. Definition, classification, nomenclature and Identification of natural products: Terpenoids – Steroids – Alkaloids – Carotenoids – Anthocyanins – Vitamins.	**2**	**4**
ssss. Terpenoids : Introduction and isolation from plants – general structure and nomenclature – classification – general methods of determination of the structure and preparations.	**3**	**6**
tttt. Steroids : Introduction and their natural abundance – the difference between steroid compounds – nomenclature – structure elucidation of steroids (sterols – cholesterol – Ergosterol – *bile acids* – Oestrogens – androges – Testesterone – and *Progesterone*) – methods of preparation of steroids.	**2**	**4**
uuuu. Alkaloids : Introduction and methods of extractions – general properties – classification of alkaloids (adrenaline – Ephedrine – papaverine – morphine – heroin – tropane – atropine – cocaine) – structure elucidation of alkaloids and methods of preparation.	**2**	**4**
vvvv. Carotenoids : Introduction and types – methods of isolation and preparation.	**1**	**2**
wwww. Anthocyanins : general properties – methods of isolation and preparation.	**1**	**2**
xxxx. Vitamins : Introduction and importance – classification – Examples of some vitamins and their structures and its methods of preparation.	**1**	**2**

Practical Part:

NOT APPLICABLE

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**24**	-	-	-	-	**24**
Credit	**2**	-	-	-	-	**2**

3. Additional private study/learning hours expected for students per week. **~ 4 Hours**

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the natural abundance of natural products	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Name different natural products classes		
1.3	Know the methods of isolation from plants of natural products		
1.4	Describe the different methods of extraction of the natural products		
1.5	Familiar with the general properties of different natural products and their relation with the structure		
1.6	Select the proper method of elucidation of structure of an natural products		
1.7	Identify the natural products		
1.8	Write a mechanism for a natural product transformation		
1.9	Recognize the importance of natural products and their impact on the human body		
1.10	Memorize different name natural products with general structure		
1.11	Outline the different uses of natural products		
2.0	**Cognitive Skills**		
2.1	Compare each class of natural products through its structure	• Lectures • Scientific discussion	• Exams • web-based student
2.2	Explain the different strategies for preparation of natural products		
2.3	Analyze the reasons for the unique properties in some natural products		

2.4	Predict the benefits and harms of various natural products	• Library visits • Web-based study	performance systems • portfolios • posters • demonstrations
2.5	Summarize the different methods for the preparation of various natural products		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Use the adequate method of isolation from plants of natural products	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Choose the natural product class for a given structure		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the different methods of preparation of natural products	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate a synthetic pathways for synthesis of natural products		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	--	10%
2	First Periodic Exam (One Hour Exam)	--	20
3	Second Periodic Exam (One Hour Exam)	--	20
4	Final Exam (Two Hours Exam)	16	50%
	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks
   - Raymond Cooper, George Nicola" *Natural Products Chemistry : Sources, Separations and Structures, 1st Edition*" 2014, CRC Press.
   - Rensheng Xu, Yang Ye, Weimin Zhao" *Introduction to Natural Products Chemistry, 1st Edition*" 2011, CRC Press
   - Sujata V. Bhat, B.A. Nagasampagi, Meenakshi Sivakumar "*Chemistry of natural products , 1st Edition*" 2005, Springer.

2. List Essential References Materials (Journals, Reports, etc.)

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   - P.M. Dewick "*Medicinal Natural Products: A Biosynthetic Approach*", 2nd Edition, Wiley & Sons, 2002 and 3rd Edition, Wiley & Sons, 2009.
   - J. R. Hans Editor E. W. Abel "*Natural Products : The Secondary Metabolites*" Copyright: 2003.Print ISBN: 978-0-85404-490-0

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
   - **http://www.chemweb.com**
   - **http://www.sciencedirect.com**
   - **http://www.rsc.org**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - **Classrooms capacity (30) students.**
   - **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

2017

Faculty or Teaching Staff: **Dr/ Nizar El Guesmi**

Signature: 

Date Report Completed: 2018

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

ATTACHMENT 2 (e)

Course Specifications

2017

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Chemistry of Petroleum and Petrochemicals

342385-3

Course Specifications
(CS)

2017

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Chemistry of Petroleum and Petrochemicals 342385-3**	
2. Credit hours: **3 (2+1)**	
3. Program(s) in which the course is offered: **Chemistry program**	
4. Name of faculty member responsible for the course: **Dr. Refaat Alsayed**	
5. Level/year at which this course is offered: **6th / 2nd semester (1436-1437)**	
6. Pre-requisites for this course: **Heterocyclic aromatic compounds 432333**	
7. Co-requisites for this course (if any)-	
8. Location if not on main campus **El-Abedyah**	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom ☐ What percentage? ☐	
b. Blended (traditional and online) ■ What percentage? **100%**	
c. e-learning ☐ What percentage? ☐	
d. Correspondence ☐ What percentage? ☐	
f. Other ☐ What percentage? ☐	
Comments:	

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with the theories of petroleum formation and measurement of classifications and quality. In addition, the fractional distillation of petroleum and its products, the chemical processes to get the fuel finished products. Also he will be familiar with the petrochemical industries processes and their importance and uses.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report as a self-education from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course, for example, on the natural gas and it use, Methane hydrate and alternative fuels**.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction of petroleum, Origin (biotc and abiotic theory) and Petroleum traps.	**1**	**3**
Crude oil recovery, Chemical Composition, and Classification of crude oil.	**1**	**3**
Oil Refining: Pre-treatment and Field separation of crude oil, desalting, dewatering (emulsion breaking) and degassing.	**2**	**6**
Petroleum refineries atmospheric and vacuum distillation of crude oil.	**1**	**3**
Distillation products: petroleum gas, light distillate, middle distillate, and heavy distillate	**2**	**6**
Petroleum conversion processes: Cracking processes (Thermal and catalysing cracking, FCC, hydrocracking, steam cracking, coking). Combining processes (Polymerization and Alkylation) Rearrangement processes (Catalytic reforming, Isomerization and Hydrogen production) Purification treatment.	**3**	**9**
Gasoline and diesel improvement (octane and cetane number).	**1**	**3**
Petrochemicals definition – History of Petrochemicals industry.	**1**	**3**
Production of petrochemicals and industrial uses.	**2**	**6**

Practical Part:

1. **Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products ASTM D 287-92.**

2. **Standard Test for Refractive index of hydrocarbon liquids ASTM D1218-92 (re-approved 1998).**

3. **Standard test method for distillation of petroleum products at atmospheric pressure (ASTM D 86-99a / IP 123/99).**

4. **Standard test method for distillation of petroleum products at reduced pressure (ASTM D 1160-99).**

5. **Standard test method for Calculating Viscosity Index from Kinematic Viscosity at 40 and 100 ºC ASTM D 2270-93 / IP 226/91 (95).**

6. **Standard Test Method for Smoke Point of Kerosene and Aviation Turbine Fuel ASTM 1322-97 / BS 2000: Part 57 1995/ IP 57/95.**

7. **Standard Test for Pour point of Petroleum Products ASTM D 5853-95 / IP 441/99 (95).**

8. **Standard Test Method for Aniline point of Petroleum Products and hydrocarbon solvents ASTM D 611-82.**

9. **Standard Test Method for Flash Point by Pensky-Martens Closed Cup Tester (ASTM D 93-99c / IP 34/99).**

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**42**	**-**		**27**		**69**
Credit	**2**	**-**		**1**		**3**

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the petroleum origin and the types of Petroleum traps	•Lectures •Scientific discussion •Library visits •Web-based study	•Exams •web-based student performance systems •portfolios •long and short essays •posters lab manuals
1.2	Describe the method of crude oil recovery		
1.3	Determine chemical composition of crude oil		
1.4	Know the classifications of Petroleum		
1.5	Know how oil is pretreated and refining in the field separation: desalting, dewatering (emulsion breaking) and degassing.		
1.6	Knowledge of the different ways fractional distillation of crude oil and distillate in each stage and identify the distillation products (natural gas, gasoline, kerosene etc.)		
1.7	Recognize of manufacturing processes such as chemical process of coking and thermal cracking, catalytic cracking and Hydrogen cracking. Thermal reforming, catalysts reforming etc.		
1.8	Outline of the petrochemical industries initial and final.		
1.9	Know how to improve Gasoline and diesel (octane and cetane number).		

1.10	Realize the history of petrochemicals industry.		
1.11	Learn how to get the final petrochemicals such as polymers, textiles, paints, detergents, etc.		
2.0	**Cognitive Skills**		
2.1	The student acquires the skill of thinking in trying to find the best theory for oil formation because of its economic effects on the oil wealth	•Lectures •Scientific discussion •Library visits •Web-based study	•Exams •web-based student performance systems •portfolios •posters •demonstrations
2.2	The student acquires knowledge of chemical structures and predict its presence in petroleum distillates.		
2.3	The student acquires the skill of petroleum distillation according to the boiling point.		
2.4	Acquire the skill of the possibility of chemical conversion of chemical substance to another theoretically.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Take the personality and responsibility for their own learning	•Lectures •Scientific discussion •Web-based study	•Exams •web-based student performance systems
3.2	Working effectively in groups and exercise leadership when appropriate		
3.3	Act ethically and consistently with high molar standards in personal and public forms.		
3.4	Community linked thinking		
3.5	Choose the suitable mechanism to get the finished fuel products		
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate different crude oil	• Lectures • Scientific discussion • Library visits Web-based study	• web-based student performance systems • individual and group presentations
4.2	Separate the petroleum products from crude oil		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- Presence of faculty members to provide counseling and means.
- Office Hours: weekly during working hours, and to create appropriate means
- Academic Advising for students to those who need it.

E. Learning Resources

1. List Required Textbooks

Lecture Hand outs of petroleum and petrochemical course available on the coordinator website

2. List Essential References Materials (Journals, Reports, etc.)

• J. G. Speight, The Chemistry and Technology of Petroleum, 5th ed. CRC Press, 2014, P. 953, ISBN: 9781439873892.
• R. Curley, Fossil Fuels. Britannica, 2012, P. 160, ISBN 9781615305407.
• M. A. Fahim, T. A. Alsahhaf, A. Elkilani, Fundamentals of Petroleum Refining, Elsevier, 2010, P. 496, ISBN 9780444527851.
• D. S. J. Jones, Peter R. Pujadó, Handbook of petroleum processing, Springer Dordrecht Netherlans, 2006.
• S. Matar, L. F. Hatch, Chemistry of Petrochemical Processes, 2nd ed. 2001, P. 392, ISBN 9780884153153.
- Uttam Ray Chaudhuri. Fundamentals of Petroleum and Petrochemical Engineering. December 13, 2010 by CRC Press.

- James G. Speight The Chemistry and Technology of Petroleum 4th. 2007 by Taylor and Francis Group, LLC

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) **International petroleum encyclopedia, Tulsa, Oklahoma: Pennwell, Corporation, 2007.**
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) **•http://en.wikipedia.org/wiki/Petroleum1-** **•http://www.chemhelper.com/** **•http://www.chemweb.com/** **•http://www.science.uwaterloo.ca/~cchieh/cact/** **•http://www.sciencedirect.com/**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. **•Microsoft Power Point, Microsoft Word.** **•Video show on thermodynamics.** **•Learning CD on thermodynamics.**

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) **-Classroom capacity (30) students.** **-Processing of the classroom with appropriate educational means, including computers**

2. Computing resources (AV, data show, Smart Board, software, etc.) **Classroom is equipped with a computer, Data Show and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching **Complete the questionnaire evaluation of the course in particular.**
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor **•Observations and the assistance of colleagues.** **•Independent evaluation for extent to achieve students the standards.** **•Independent advice of the duties and tasks.**
3 Processes for Improvement of Teaching **•Workshops for teaching methods.** **•Continuous training of member staff.**

•Review of strategies proposed. **•Providing new tools for learning.** **•The application of e-learning.** **•Exchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) **- Check marking of a sample of exam papers, or student work.** **- Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic Review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

Faculty or Teaching Staff: Dr. Refaat Alsayed

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Selected Topics in Organic Chemistry: 402433-3

Course Specifications
(CS)

Course Specifications

Institution: **Umm Al-Qura University** Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**

A. Course Identification and General Information

1. Course title and code: **Selected Topics in Organic Chemistry** / 402433-3
2. Credit hours: **3**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Prof. Dr. Thoraya A. Farghaly**
5. Level/year at which this course is offered: **8th level /4th year**
6. Pre-requisites for this course (if any): **Organic Reactions and Preparations**
7. Co-requisites for this course (if any)---
8. Location if not on main campus: **both on El-Abedyah, and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B Objectives

1. What is the main purpose for this course? **The course is designed to introduce and develop the fundamental concepts of biomolecules and the utility of α,β-unsaturated carbonyl compounds in organic synthesis.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Out of class review sessions, reading assignments and homework that require using university online library will be considered to enrich the scope of the course. • The course material will be posted online so that it could be accessed by the students enrolled in the course. • Will utilize various internet resources that offer informative details and illustrative pictures, schemes, and videos to support the lecture course material.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
yyyy. Reactions of α,β- unsaturated carbonyl compounds	2	3
zzzz. Carbohydrates chemistry: classification, stereochemistry of mono- and disaccharides, synthesis of ascorbic acids, reactions – chain shortening and chain lengthening of mono- and disaccharides	3	3
aaaaa. Nucleic acids: nucleosides, nucleotides, RNA and DNA.	2	3
bbbbb. Amino acids: group protection, chemical properties, synthesis and reactions.	2	3
ccccc. Peptides and proteins: physical and chemical properties, synthesis and reactions, structure identifications	2	3
ddddd. Lipids: physical and chemical properties, synthesis and reactions.	2	3

II-General scheme for identification of organic aliphatic unknown

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	42	-				42
Credit	3	-				3

3. Additional private study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize the reactions of α,β- unsaturated carbonyl compounds	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Name different organic classes and bioactive molecules such as carbohydrate, nucleic acid, lipids and proteins		
1.3	Describe the different methods of preparations of organic bioactive molecules such as carbohydrate, lipids and proteins.		
1.4	Familiar with the physical and chemical properties of different organic bioactive molecules such as carbohydrate, lipids and proteins		
1.5	Recognize the importance of chemistry in life		
2.0	**Cognitive Skills**		
2.2	Compare between the different reactions of α,β- unsaturated carbonyl compounds		
2.3	Explain the different strategies for preparation of bioactive organic compounds		
2.4	Analyze the reasons for the unique physical properties in some bioactive organic compounds		
2.6	Summarize the difference in the chemical compositions of nucleic acids (RNA and DNA)		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Use the advanced chemical reactions to prepare different classes of organic molecules	• Lectures	• Exams

3.2	Choose the suitable mechanism for a given reaction	• Scientific discussion • Web-based study	• web-based student performance systems
4.0	**Communication, Information Technology, Numerical**		
4.1	Evaluate the different methods of preparation of organic compounds	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Demonstrate a synthetic pathways for synthesis of organic molecules		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counselling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks • T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" **2013**, John Wiley & Sons. • P. Finch, ***Carbohydrates: Structures, Syntheses and Dynamics***, Springer Science & Business Media, 2013. • Ian Fleming, ***Pericyclic Reactions*** (Oxford Chemistry Primers) 1st Edition, 1999. • Axel Griesbeck, Michael Oelgemöller, Francesco Ghetti, ***CRC Handbook of Organic Photochemistry and Photobiology***, Third Edition, 2012.
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • P. M. Collins, P. J. Ferrier, ***Monosacharides: Their Chemistry and Their Role in NaturalProducts,*** 1995, John Wiley & Sons • John McMurry's "*Organic Chemistry, 8th edition, International Edition*" 2011, Brooks/Cole.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.

2017

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Iindependent advice of the duties and tasks.**

3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Eexchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- **Check marking of a sample of exam papers, or student work.**
- **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Prof. Dr. Thoraya A. Farghaly**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: _____**

ATTACHMENT 2 (e)

Course Specifications

2017

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Advanced Organic Chemistry (402435-3)

Course Specifications
(CS)

Course Specifications

Institution: **Umm Al-Qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ Department of Chemistry**	

A. Course Identification and General Information

1. Course title and code: **Advanced Organic Chemistry (402435-3)**		
2. Credit hours: **3 (2+1)**		
3. Program(s) in which the course is offered: **Chemistry program**		
4. Name of faculty member responsible for the course: **Prof. Dr. Thoraya A. Farghaly**		
5. Level/year at which this course is offered: **8th level/4 year (2nd term)**		
6. Pre-requisites for this course (if any): **Organic reactions and preparations (402336-3)**		
7. Co-requisites for this course (if any): ----------		
8. Location if not on main campus: ----------		
9. Mode of Instruction (mark all that apply)		
a. Traditional classroom	☐	What percentage? ☐
b. **Blended (traditional and online)**	■	What percentage? **100%**
c. e-learning	☐	What percentage? ☐
d. Correspondence	☐	What percentage? ☐
f. Other	☐	What percentage? ☐
Comments:		

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with Studying of Photochemistry of carbenes and nitrenes, dyes and definition of chemotherapy**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
j- Pericyclic reactions	2	4
k- Photochemistry and carbenes and nitrenes : Photooxidation – reduction – photochemical elimination Reactions – photochemical rearrangement – photochemical annulation – photochemical addition.	3	6
l- Chemotherapy : Introduction – Sulfa drugs (Preparations and their uses) – Antibiotics (Penicillin – *Cephalosporin* – Streptomycin – *Chloramphenicol* – *Polypeptide* Antibiotics – PolyacetylenesAntibiotics).	3	6
m- Chemistry of Dyes : Introductionand Classification–Typesof Dyes (Nitro – Nitroso – Azo – Diarylmethane – Triarylmenthane – Xanthine – *Acridine* – Quinoline – Anthraquinone) – methods of preparations of dyes – Uses dyes (Dyeing cellulosic fiber – Dyeing of Jute – Dyeing of Wool).	4	8

Practical Part:

13- Identifing the protocol of security and safety in lab. and developing of the environmental awareness
14- Synthesis of sudan dye {Phenyl azo*β*-naphthol}
15- Synthesis of methyl Orange
16- Synthesis of orange (II)
17- Synthesis of parared{1-((4-nitrophenyl)diazenyl)naphthalen-2-ol}
18- Synthesis of 4-(phenyldiazenyl)benzene-1,3-diol
19- Coupling of aromatic amines with active methylene derivatives (ethyl acetoacetate)
20- Desizing, Scouring and Bleaching of raw cotton fabric
21- Synthesis of asprin(O-acetylsalicylic acid)
22- Synthesis of *p*-cetamol{*N*-(4-hydroxyphenyl)acetamide**}**
23- Synthesis of hexamethylenetetramine

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24	-		33		57
Credit	2	-		1		3

3. Additional private study/learning hours expected for students per week. ☐

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Studying the definition and properties of pericyclic reactions	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays
1.2	Describing the classification of ofpericyclic reactions according to their different types **(***Electrocyclicreactions*,*Cycloadditionreaction*s.and*Sigmatropic rearrangement*)		
1.3	Knowledge of different reactions by photochemistry		
1.4	Showing the multiple methods of preparation of sulphadrugs and antibiotics,		

1.5	Recognizing the chemical properties and uses of sulphadrugs and antibiotics		• posters lab manuals
1.6	Identifying the chemical properties, types and synthesis of different dyes and how do dyestuff in lab.		
2.0	**Cognitive Skills**		
2.1	Development of reverse thinking skill (back thinking) and the student's acquiring the training skill to choose the suitable method for organic compounds preparation	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Making the student acquire the skill of naming azo dyes		
2.3	The student's acquiring of the skill of how to predict the outcomes of interactions of organic compounds by light		
2.4	The student can pick the appropriate methods for the preparation of different drugs		
2.5	Design of different ways to synthesize several types of dyes		
2.6	Student invents different ideas for the construction of many of the different organic compounds with interested effect		
2.7	The student is planning to make a research programm in the field of advanced organic chemistry and their effectiveness		
3.0	**Interpersonal Skills & Responsibility**		
3.1	The division of students collectively for teams to make some common reports	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Self-reliance and take individual responsibility and the ability to work within the group		
4.0	**Communication, Information Technology, Numerical**		
4.1	The ability to conduct a successful style of dealing with data analysis, describing his strategy in the image and draw conclusions from them	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Introductory lecture at the beginning of the semester to use the computer and the internet to search for sources of new researches and collect		

	the researches which help in writing reports on topics related to syllabus.		
4.3	Evaluating the performance of the students through examination, duties and the discussion in the lecture which constitute 30 % of the total evaluation.		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10
3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counselling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic advising for students.**

E. Learning Resources

1. List Required Textbooks

• Axel Griesbeck, Michael Oelgemöller, Francesco Ghetti"CRC Handbook of Organic Photochemistry and Photobiology, 3rd Edition - Two Volume Set", CRC Press(2012) • PetrKlán, JakobWirz "Photochemistry of Organic Compounds: From Concepts to Practice", Wiley-Blackwell (2009)
2. List Essential References Materials (Journals, Reports, etc.) • Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • J. March, Advanced Organic Chemistry, John Wiley & Sons, 2009. • Paula Y. Bruice, Organic Chemistry (7th Edition) 2013, Prentice Hall • J. McMurry, Organic Chemistry, 8th Edition 2012, Brooks/Cole, Cengage Learning.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Periodic review of the contents of the syllabus and modify the negatives.** • **Consult other staff of the course.** • **Hosting a visiting staff to evaluate of the course.** • **Workshops for teachers of the course.**

Faculty or Teaching Staff: **Prof. Dr. Thoraya A. Farghaly**

Signature: **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Polymer Chemistry

402487-3
Course Specifications
(CS)

2017

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2018**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Polymer Chemistry 4024487-3**			
2. Credit hours: **3 (2+1)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Dr. Essam M. Hussein**			
5. Level/year at which this course is offered: **7st level / 4th year**			
6. Pre-requisites for this course (if any): Organic reactions and preparations			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both on El-Abedyah, El-Azizya, and El-Zaher**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	■	What percentage? **100%**	
b**. Blended (traditional and online)**		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course? **This course aimed to study the preparation of polymers as well as understanding their physical and mechanical properties, applications, and its economic importance.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

2017

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
eeeee. Introduction and definitions	1	2
fffff. Basic principles of polymer classification – Polymer architecture – Types of polymers	1	2
ggggg. Molecular weight of polymers	1	2
hhhhh. Condensation polymers - addition polymer	2	4
iiiii. Mechanisms of polymerization reactions - copolymerization	1	2
jjjjj. Physical properties of polymers	2	4
kkkkk. Thermal transitions of polymers: glass transition state Tg – factors affecting on Tg	2	4
lllll. Polymer uses and future applications	2	4
mmmmm. Mechanical properties of polymers	1	2
nnnnn. Industrial synthesis of polymers and technology	1	2

Laboratory Part:

VIII- Synthesis of different polymeric copmpounds

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-	42			70
Credit	2	-	1			3

3. Additional private study/learning hours expected for students per week. 2hr

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Identify the basic principles of polymer classification	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	identify different methods to determine the molecular weight of polymers		
1.3	Recognize the different methods used in the preparation of polymers		
1.4	Write the products of polymerization reaction correctly		
1.5	Recognize the different types of polymers		
1.6	Determine the type of mechanism of polymerization reactions		
1.7	Familiar with the basic knowledge about the thermal transitions of polymers		
1.8	Familiar with the basic knowledge about the importance and applications of polymers in industry		
1.9	Familiar with the mechanical properties of different polymers		
1.10			
2.0	**Cognitive Skills**		
2.1	Explain the physical properties of polymers	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Compare between the different methods of polymerization		
2.3	Explain the reaction mechanisms for different polymerization reactions		
2.4	Summarize the different methods used to synthesis of different types of polymers		
2.5	Explain the factors affecting glass transition state (Tg) of polymers		
2.6	Apply the different laboratory techniques to synthesis of polymer molecules		
2.7	Predict the future applications of polymers		
3.0	**Interpersonal Skills & Responsibility**		
• Ability to work in a team to perform a specific experimental tasks. • Ability to work independently to handle chemicals • Ability to communicate results of work to classmate and participation in class or laboratory discussions		• Class discussions • Research activities	• Performance on in-practical exams. • Work on research activity. • Overall student performance in

			Lab. discussions • Cross questions after finishing laboratory work
4.0	**Communication, Information Technology, Numerical**		
	• Evaluate the different methods to synthesis of types of polymers • Enhancing the ability of students to use computers and internet. • Interpret chemical data • Present chemical data orally. • Know how to write a report. • Demonstrate a synthetic pathways for synthesis of polymer molecules • Demonstrate the different applications of polymers in industry	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
5.0	**Psychomotor**		
5.1 5.2	Laboratory practice . including 1.Locate Materials Safety Data Sheets, chemicals carcinogens list, and hazardous chemicals list. 2. Handle chemicals safely with a proper PPE 3.Dilute solutions, repeat analysis and calculate true result for all procedures performed as required. 4.Pipette accurately at all times 5. Titrate and weight efficiently in right way 6.Dispose the hazardous solution in right way	Practical session should include both demonstration and experiments .	1.Repetition of the experiments , to reproduce the results 2.Written report of chart and procedures. 3.The students should be able to correlate their results with experimental conditions

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term Exam (One Hour Exam)	5-14	20%
2	Assignments	----	10

3	Practical Exam (Three Hours Exam)	15	30%
4	Final Exam (Two Hours Exam)	16	40%
5	Total		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks

- L. H. Sperling, *Introduction to Physical Polymer Science*, 4th Edition, Wiley, **2006**.
- I. M. Ward and J. Sweeney, *An Introduction to The Mechanical Properties of Solid Polymers*, 2nd Edition, Wiley, **2004**. (TA455.P58 W36 2004).
- Stanley R. Sandler, *Polymer Synthesis*, Vol. III, Academic Press, **1980.**
- Stanley R. Sandler, *Polymer Synthesis*, Vol. I, Academic Press, **1974.**

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Hand outs available on the coordinator website

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

1. John McMurry's "*Organic Chemistry, 8th edition, International Edition*" **2011**, Brooks/Cole.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **http://www.chemweb.com**
- **http://www.sciencedirect.com**
- **http://www.rsc.org**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • **Classrooms capacity (30) students.** • **Providing hall of teaching aids including computers and projector.**
2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • **No other requirements.**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent advice of the duties and tasks.**
3 Processes for Improvement of Teaching • **Workshops for teaching methods.** • **Continuous training of member staff.** • **Review of strategies proposed.** • **Providing new tools for learning.** • **The application of e-learning.** • **Eexchange of experiences internal and external.**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) ▪ **Check marking of a sample of exam papers, or student work.** ▪ **Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic Review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

2017

Faculty or Teaching Staff: **Dr. Essam M. Hussein**

Signature:  **Date Report Completed: 2018**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date:** _____

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title General Biology

Course code: 4011101-4

Revised September 2015

Course Specification

For Guidance on the completion of this template, please refer to of Handbook 2 Internal Quality Assurance Arrangements

Institution: UM AL – QURA UNIVERSITY
College/Department : Faculty of Applied Science – Department of Biology

A Course Identification and General Information

1. **Course title General Biology** 2. **Course code: 4011101-4**
2. Credit hours: 4hrs
3. Program(s) in which the course is offered. : BSc Microbiology
3. **Name of faculty member responsible for the course:** **Botany academic staff members / Zoology academic staff members**
5. Level/year at which this course is offered: 1st Year / Level 2
6. Pre-requisites for this course (if any): ---
7. Co-requisites for this course (if any): ---
8. Location if not on main campus: Main campus

B Objectives

After completing this course student should be able to:

1. Define the principles and concepts of the living cells.
2. Differentiate between animal and plant cells
3. Aware of the protoplasmic and non-protoplasmic cell contents and its structure and function.
4. Study the different types of animal and plants tissues (structure and function).
5. Understand the biological activities of the living cells.

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached):

The course will cover the principle of eukaryotic cell structure and function. This course will provide a conceptual and experimental background in biology sufficient to enable students to take courses that are more advanced in related fields.

1 Topics to be Covered

Topic	No of Weeks	Contact hours
❖ **Introduction:** - The living cells. - Basis of cytology and histology. -Major differences between Eukaryotic and Prokaryotic cells. -Major differences between plant and animal cells	**1**	**3**
❖ **Plant cell morphology and structure I** - Cell wall, middle lamella, types of pits. - Structure and function. - Cytoplasmic ultra structure and function: Endoplasmic reticulum; mitochondria; Golgi apparatus, ribosomes	**1**	**3**

❖ **Plant cell morphology and structure II** - Plastids, chloroplasts, chromoplast, leucoplast types, morphology, ultra structure and function, distribution. -Non protoplasmic contents of plant cell (cell vacuole – carbohydrates – proteins – fats and oils – crystals glycosides – latex – alkaloids – tannins – organic acids) .	**1**	**3**
❖ **Animal cell morphology and structure I** **-Fine structure of the Cell membrane and Cell junctions** **-Functions of cell membrane (cell transport)** **-Mitochondria, Peroxisomes,** **Lysosomes (phagocytosis, autocytosis and pinocytosis** **Centrioles, cytoskeleton, microtubules and microfilaments,**	**1**	**3**
❖ **Animal / Plant cell morphology and structure: The Nucleus** **-Nucleus, nuclear envelope, nucleopores, nucleoplasm, chromatin and nucleolus. Mitochondria, Golgi apparatus and functions of each organell.** -	**1**	**3**
❖ **Plant morphology and anatomy** **-Meristematic tissues in plants – classification of meristematic tissues – Apical and lateral meristems- Permanent tissues. Dermal system, ground system and vascular system. Ground system; parenchyma cell, collenchyma cell and sclerenchyma cell.** **Seed germination, conditions necessary for seed germination, dicotyledonous seeds and seedling 1) broad bean (*Vicia faba*), kidney bean (*Phaseolus vulgaris*), monocotyledonous seeds and seedling 1) maize (*Zea mays*)**	**1**	**3**
Plant morphology **Morphology of the root – functions of the root, zones of the root, types of the roots, Adventitious roots**	**1**	**3**
Plant morphology **Morphology of the stem- functions of the stem- origin, functions and types of the buds- Stem branching- habit of the stem- Metamorphosis of the stem.**	**1**	**3**
❖ **Plant morphology** **Morphology of the leaf- functions of the leaf- parts of the leaf- Arrangement of the leaf- types of the leaf- leaf venation- leaf metamorphosis**		

❖ **Animal Histology I** -Introduction to Animal tissues difference and distribution of the animal tissues in the human body -Epithelial tissues, simple and stratified epithelia, glandular epithelia	**1**	**3**
❖ **Animal Histology II** -Connective tissues : Types of Cartilages Types of Bones Blood components	**1**	**3**
❖ **Animal Histology III** -Muscular tissues: -Smooth – skeletal – cardiac muscles. -Nervous tissues: -Neuron and its types - Nerve fibres - Neuroglial cells.	**1**	**3**
	14 weeks	**42hrs**

2 Course components (total contact hours per semester):

Lecture : 42	**Tutorial:**	**Practical: 42**	**Other:**

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week): 12h (reports & essay)

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge : Description of the knowledge to be acquired

Upon successful completion of this course The student will be able to:

- **Student will be familiar with the general characters of plant cells.**
- **Student will be aware with the differences between plant and animal cells.**
- **Student will be familiar with protoplasmic and non protoplasmic contents of plant cell.**
- **Student will be familiar with the different types of plant tissues, their functions and distribution within plant body.**

1- Define the difference between prokaryotic and eukaryotic cells.
2- Describe the fine structure and functions of all living organelles.
3- Explain biological activities of the animal cells.
4- Detect the difference between animal tissues.
5- Explain the function of animal tissues.
6- Discuss the distribution of all animal tissues in the body organs.

(ii) Teaching strategies to be used to develop that knowledge

- The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions.
- At the end of the programme, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course.
- All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions.
- Using images and movies
- Encouraging students to collect the new information about what the new in Microbiology
- Enable the reference books and scientific sites concerning General biology in internet.

(iii) Methods of assessment of knowledge acquired:

- Periodical exam and reports 10%
- Mid- term theoretical exam 20%
- Mid-term practical exam 5%
- Final practical exam 15%
- Final exam 50%

b. Cognitive Skills

(i) Cognitive skills to be developed

Having successfully completed the course students should be able to:

Explain the structure and function of the plant and animal cells.

- **Understand the ultrastructure and function of living organelles.**
- **Follow some of the biological activities of the cell.**
- **List types of plant and animal tissues.**
- **Differentiate between plant and animal tissues.**
- **Explain specific characters of each tissues.**
- **Classify the plants and animal tissues**
- **The student will be able to detect the plant and animal tissues in the selected organs examined under the microscopic.**

(ii) Teaching strategies to be used to develop these cognitive skills:

- Lectures
-Brain storming
-Discussion

(iii) Methods of assessment of students cognitive skills

- Exam must contain questions that can measure these skills.
- Quiz and exams
- Discussions after the lecture

c. Interpersonal Skills and Responsibility

At the end of the course, the student will be able to:

Describe the structure of the cell

- **Explain most of the biological activities of the cell**
- **Make short presentation about the cell and the animal tissues.**

- **Defined the desirable sections.**

(i) Teaching strategies to be used to develop these skills and abilities

- Lab work
- Case Study
- Active learning
- Small group discussion

(iii) Methods for assessment of the students interpersonal skills and capacity to carry responsibility

- Evaluate the efforts of each student in preparing the report.
- Evaluate the scientific values of reports.
- Evaluate the work in team
- Evaluation of the role of each student in lab group assignment
- Evaluation of students presentations

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain. At the end of the course, the student will be able to:

1. Enhancing the ability of students to use computers and internet.
2. Interpret biological data
3. Present biological data orally.
4. Know how to write a report.

5. Teaching strategies to be used to develop these skills

1. Homework (preparing a report on some topics related to the course depending on web sites).
2. Seminars presentation
3. Field visits to factories

(iii) Methods of assessment of students numerical and communication skills

1. Evaluation of presentations
2. Evaluation of reports
3. Practical exam

e. Psychomotor Skills (if applicable)

At the end of the course, the student will be able to:

- **Practice the basic Lab. Skills.**
- **Use light microscope in accuracy.**
- **Prepare microscopic slides.**

(ii) Teaching strategies to be used to develop these skills

- Follow up students the students in lab and during carryout all microbiological techniques

4. **Methods of assessment of students psychomotor skills**

- Giving additional marks for preparing correct media, bacterial slides , good seminar presentation
- Practical exam.

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Home works	All weeks	5 %
2	Participation	All weeks	5 %
3	Written Test (1)	6th week	15%
4	Written Test (2)	11th week	15%
5	Final Exam (Practical)	15th week	20%
6	Final Exam (theoretical)	16th week	40%

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

Office hours: 10 hrs

E. Learning Resources

Required Text(s):

Reece et. al (2013) Campbell Biology 10th edition. Benjamin Cunnings.

Mauseth, J. (2008) Plant Anatomy. Blackburn Press

Wojciech Paulina (2015) Histology: a text and atlas. LWW

Recommended Reading List

Electronic Materials, Web Sites

Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. **Accommodation (Lecture rooms, laboratories, etc.)**
   - Class room is already provided with data show
   - The area of class room is suitable concerning the number of enrolled students (68) and air conditioned.
2. **Computing resources**
   - Providing class rooms with computers and labs with data show.

3.Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

- Availability of some reference bacterial strains
- Availability different specific media and chemicals used for isolation.

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Questionaries • Open discussion in the class room at the end of the lectures
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Processes for Improvement of Teaching • Preparing the course as PPT. • Using scientific movies. • Coupling the theoretical part with laboratory part • Periodical revision of course content.
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution) • After the agreement of Department and Faculty administrations
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Periodical revision by Quality Assurance Units in the Department and institution

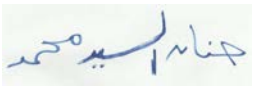
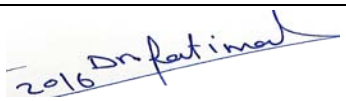
Faculty member responsible for the course:

Prepared by faculty staff: 1.Botany / Zoology academic staff members 2.Khaled Elbanna	**Signature:**
Date Report Completed: 09/2015	
Revised by: 1. Dr. Khaled Elbanna 2. Dr. Hussein H. Abulreesh 3. Dr. Shady Elshahawy	**Signature:**
Date: 1.10.2015	

Program Chair Dr. Hussein H. Abulreesh	**Signature:**
Dean **Prof. Samir Natto**	**Signature:**
Date:	

- **مرفقات:**

نماذج من الاختبارات الدورية والنصفية والنهائية

Modified by: 10/2016	
Dr. Hanan Osman	**Signature:** 
Dr. Fatimah Al-Shehrei	**Signature:** 
Dr. Widad Al-Juhani	**Signature:** 
Dr. Maha Al-Jabri	**Signature:** 
Dr. Randa A. Elbassat	**Signature:** *Randa A. Elbassat*
Dr. Rasha Ali Ebiya	**Signature:** *Rasha Ebiya*
Dr. Doaa M. Shehata	**Signature:** *Doaa Shehata*

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course title General Physics

Course code: 4031012-4

Revised 13 December 2015

Course Specification

For Guidance on the completion of this template, please refer to of Handbook 2 Internal Quality Assurance Arrangements

Institution: UM AL – QURA UNIVERSITY
College/Department : Faculty of Applied Science – Department of Physics

A Course Identification and General Information

1. **Course title General Physics** 2. **Course code: 4031012-4**
2. Credit hours: 4hrs
3. Program(s) in which the course is offered. : BSc Physics
4. Name of faculty member responsible for the course: **One of the academic staff member**
5. Level/year at which this course is offered: 1st Year / Level 2
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any): ---
8. Location if not on main campus: Main campus and Alzaher.

B Objectives

After completing this course student should be able to:

1. Define the concepts of the measurements.
2. Define the concepts measuring length.
3. Define the concepts of measuring time.
4. Define the concepts of measuring weight.
5. Differentiate between the distance, the position, and the displacement.
6. Differentiate between the speed and the velocity.
7. Differentiate between the average velocity and the instantaneous velocity.
8. Define the concepts of the acceleration.
9. Differentiate between the average acceleration and the instantaneous acceleration.
10. Differentiate between the linear acceleration and the free fall acceleration.
11. Differentiate between the vectors and the scalars
12. Analyze the vectors into their components.
13. Calculate the multiplication of the vectors.
14. Define the concepts of the force.
15. Define the relation between the force and the acceleration.
16. Apply Newton's laws of motion.
17. Differentiate between the Work and the Energy.
18. Differentiate between the Energy and the power.
19. Define the Kinetic energy of the body.
20. Define the concept of the density of the body.
21. Define the concept of the pressure within the fluid.
22. Define the concept of Pascal principle.
23. Define the concept of Archimedes' principle.
24. Define the concept of Bernoulli's Equation.
25. Define the concept of the temperature

26. Differentiate between the Celsius Scale and Fahrenheit scale of temperature.
27. Define the laws of reflection through plane mirrors and spherical mirrors.
28. Define the laws of refraction through thin lenses.
29. Apply the laws of thin lenses.

In addition to these items, the students should gain practical skills through performance some experimental class.

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached):

The course will cover the principle of physics, such as measurements, work and energy, Newton's laws, heat, fluid mechanics, and light. This course will provide a conceptual and experimental background in physics sufficient to enable students to take courses that are more advanced in related fields.

1 Topics to be Covered

Topics	No of Weeks	Contact hours
❖ **Measurement** 1- The physical quantities, standards, and Units. 2- The international system of units. 3- The Standard of time 4- The Standard of length 5- The Standard of Mass 6- Precision and significant figures. 7- Dimensional analysis.	**1**	**3**
❖ **Vectors** 1- Vectors and Scalars. 2- Adding vectors : graphical methods 3- Components of vectors. 4- Adding vector: component method. 5- Multiplications of vectors. 6- Vector laws in physics.	**2**	**6**

❖ **Motion in one dimension** 1- Particles kinematics. 2- Description of motion 3- Average velocity 4- Instantaneous velocity. 5- Accelerated motion. 6- Motion with Constant Acceleration 7- Freely falling Bodies. 8- Measuring free fall acceleration.	**1**	**3**
❖ **Motion in two and three dimensions** 1- Position, velocity, and acceleration. 2- Motion with constant acceleration 3- Projectile motion 4- Uniform circular motion 5- Velocity and acceleration vectors in circular motion	**1**	**3**
❖ **Force and motion** 1- Position, velocity, and accelerations 2- Motion with constant acceleration. . 3- Newtons first and second laws. 4- Forces. 5- Newtons second law 6- Newton's third law. 7- Units of force 8- Weight and mass 9- Measuring forces 10- Applying Newton's laws.	**2**	**6**
❖ **Work and Energy** 1. Work done by constant force. 2. Work done by a variable force: one dimensional case. 3. Work done by a variable force: two dimensional case. 4. Kinetic energy and work-energy theory. 5. Power.	**1**	**3**

❖ **Fluids Statics** 1. Fluids and Solids 2. Density and pressure. 3. Variation of density in a fluid at rest. 4. Pascal Principle. 5. Archimedes' Principle. 6. Surface tension.	**1**	**3**
❖ **Fluid dynamics** 1. General concepts of fluid flow 2. Streamlines and the equation of continuity. 3. Bernoulli's Equation 4. Application of Bernoulli's Equation 5. Viscosity.	**1**	**3**
❖ **Temperature, Heat and the first law of Thermodynamics.** 1. Heat: Energy in transit 2. Heat capacity and specific heat. 3. Heat capacity of solids 4. Temperature. 5. The Celsius and Fahrenheit Scales. 6. Heat transfer.	**2**	**6**
❖ **Reflection and refraction of light at plane surface** 1. Reflection and Refraction 2. Deriving the law of refrlection 3. Image formation by plane mirrors. 4. Deriving the law of refraction. 5. Total internal reflection.	**1**	**3**
❖ **Reflection and refraction of light at plane surface** 1. Spherical mirrors 2. Spherical refracting surfaces. 3. Thin lenses 4. Compound optical systems 5. Optical instruments	**1**	**3**
❖ **Exercises and Solved problems**	**1**	**3**
	15 weeks	**45hrs**

2 Course components (total contact hours per semester):			
Lecture : 45	**Tutorial:**	**Practical: 42**	**Other:**

Practical part:

1. Safety and Security at the lab.
1. Introduction.
2. Precise measurements.
3. Vectors.
4. Determination of specific gravity.
5. Determination of Surface tension of a liquid.
6. Determination of viscosity of a liquid.
7. Determination of sound velocity in air.
8. Determination of refractive index of a Prism.
9. Determination of the melting point of wax.
10. Verification of lens formula.
11. Verification of mirrors formula.
12. Determination of specific heat.

3. Additional private study/learning hours expected for students per week. (This should be an average : for the semester not a specific requirement in each week):
6 Office hours to help students for solving assigned problems

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge : Description of the knowledge to be acquired

Upon successful completion of this course The student will be able to:

1- Understanding the principle and concepts of physics.
2- Applying the physics law to different environmental situation.
3- Improving logical thinking.
4- Using mathematical formulation to describe the physical principle or phenomena
5- Ability to explain how things are working.
6- Teaching strategies to be used to develop that knowledge
7- Demonstrating the basic information and principles through lectures and the achieved applications
8- Discussing phenomena with illustrating pictures and diagrams
9- Lecturing method:
    a. Blackboard
    b. Power point
    c. e-learning
10- Tutorials
11- Revisit concepts
12- Discussions
13- Brain storming sessions
14- Start each chapter by general idea and the benefit of it;
15- Learn the student background of the subject;
16- Show the best ways to deal with problem;

17- Keep the question "why" or "how" to explain always there

Build a strategy to solve problem.

(ii) Teaching strategies to be used to develop that knowledge

- The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. Students will be given opportunity to understand the role of important physics law in different applications.
- At the end of the programme, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course.
- All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions.
- Using images and movies
- Encouraging students to collect the new information about what the new in Physics.
- Enable the reference books and scientific sites concerning Physics in internet.

(iii) Methods of assessment of knowledge acquired:

- Solve some example during the lecture.
- Exams**:**
  - Quizzes
  - Short exams (mid term exams)
  - Long exams (final)
  - Homework.
  - Activities.
- Discussions with the students.
- Ask the student to clear the misunderstanding of some physical principle.
- Ask quality question.

b. Cognitive Skills

(i) Cognitive skills to be developed

Having successfully completed the course students should be able to:

1- Define the physical phenomena.
2- Apply the laws of physics.

3- Analyse the physical phenomena.
4- Express the physical phenomena mathematically.
5- Doing small researches

(ii) Teaching strategies to be used to develop these cognitive skills:

1- Preparing main outlines for teaching
2- Following some proofs
3- Define duties for each chapter
4- Home work assignments
5- Encourage the student to look for the information in different references
6- Ask the student to attend lectures for practice solving problem

(iii) Methods of assessment of students cognitive skills

1- Midterm's exam. Exams, short quizzes
2- Asking about physical laws previously taught
3- Writing reports on selected parts of the course
4- Discussions of how to simplify or analyze some phenomena

c. Interpersonal Skills and Responsibility

At the end of the course, the student will be able to:

- Work independently.
- The students learn independently and take up responsibility.

(i) Teaching strategies to be used to develop these skills and abilities

1- Search through the internet and use the library.
2- Lab work.
3- Case Study.
4- Small group discussion.
5- Enhance educational skills.
6- Develop their interest in Science through :(lab work, field trips, visits to

scientific and research.

7- Encourage the student to attend lectures regularly

8- Give students tasks of duties

(iii) Methods for assessment of the students interpersonal skills and capacity to carry responsibility

- Evaluate the efforts of each student in preparing the report.
- Evaluate the scientific values of reports.
- Evaluate the work in team
- Evaluation of the role of each student in lab group assignment
- Evaluation of students presentations

d. Communication, Information Technology and Numerical Skills

1. Description of the skills to be developed in this domain. At the end of the course, the student will be able to:

1. Enhancing the ability of students to use computers and internet.
2. Interpret Physical phenomena.
3. Present Physical phenomena orally.
4. Know how to write a report.
5. Computation
6. Problem solving
7. Data analysis and interpretation.
8. Feeling physical reality of results

2. Teaching strategies to be used to develop these skills

1. Homework (preparing a report on some topics related to the course depending on web sites).
2. Seminars presentation
3. Field visits

(iii) Methods of assessment of students numerical and communication skills

1. Evaluation of presentations

2. Evaluation of reports
3. Practical exam
4. Homework.
5. Final exams.
6. Research.

e. Psychomotor Skills (if applicable)

(ii) Teaching strategies to be used to develop these skills

- Follow up students the students in lab and during carryout all physical experiments.

4. **Methods of assessment of students psychomotor skills**

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Home works	All weeks	10 %
2	Participation in activities lectures and labs	All weeks	10 %
3	Written Test (1)	6th week	10%
4	Written Test (2)	11th week	10%
5	Final Exam (Practical)	15th week	20%
6	Final Exam (theoretical)	16th week	40%

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

Each student will supervise by academic adviser in physics Department and the time table for academic advice were given to the student each semester.

E. Learning Resources

Required Text(s):

-

Physics, 4th edition , By: Halliday, Resnick, and Krane, Wiley (1992)

Recommended Reading List

University Physics with modern Physics, 13th edition, by: Hugh D. Young and Roger A. Freedman, Addison-Wesley, (2012).

Electronic Materials, Web Sites

(eg. www.youtube.com.)

Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- Class room is already provided with data show
- The area of class room is suitable concerning the number of enrolled students (68) and air conditioned.
- Library
- Laboratory for fundamental of physics

2. Computing resources

- Computer room
- Scientific calculator.

3.Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

- .

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Questionaries • Open discussion in the class room at the end of the lectures
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Revision of student answer paper by another staff member. • Analysis the grades of students.
3. Processes for Improvement of Teaching • Preparing the course as PPT. • Using scientific movies. • Coupling the theoretical part with laboratory part • Periodical revision of course content.
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution) • After the agreement of Department and Faculty administrations
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Periodical revision by Quality Assurance Units in the Department and institution

Date: 13 December 2015

Head of the Physics Department

Dr. Hatem Alamri

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications
(Calculus 1 4041101-4**)**

COURSE SPECIFICATIONS

Institution	Umm Al-Qura University
College/Department	Faculty of Applied Science/ Department of Mathematical Science

A. Course Identification and General Information

1. Course title and code: **Calculus(I)** (4041101-4)
2. Credit hours 4 Hours
3. Program(s) in which the course is offered.
   BSc. Mathematics
   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course ****
5. Level/year at which this course is offered First year/first semester
6. Pre-requisites for this course (if any) Non
7. Co-requisites for this course (if any)
8. Location if not on main campus Al-Abdia Campus
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	✓	What percentage?	100
b. Blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

B Objectives

1. **What is the main purpose for this course?**

By the end of the course the students will be able to

- use the concepts of introductory calculus
-have concise and authoritative definitions of mathematical terms
-solve linear equations and inequalities
-solve quadratic equations and inequalities
-evaluate the limit of functions.
-find derivatives of functions using theorems and rules.
-extend the concept of limits to infinity.
-differentiate implicit and explicit functions .
-study a function :where it goes, how it evolves, studying its monotonicity and critical points, concavity and inflexion points
-integrate functions

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)
   1. Encouraging students to collect problems from web based reference material and supervise classroom discussions.
   2. Update references used in teaching process.
   3. Use e-learning facilities more efficiently.
   4. Use computer packages for solving exercise

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Real numbers, Exponents and Radicals, Polynomials: BasicOperations and Factoring . Solving Equations, Rational Expressions: Basic Operations, Inequalities, Absolute Values.	3	12
Definition of Functions(Domain and Range), Graphs of Functions, Operations on Functions, Trigonometric Functions and Identities	2	8
Introduction to Limits, Theorems on limits, Limit from Right and from Left, Definition of Continuity	2	8
Definition of Derivative (Using Limits), Rules and Theorems for Finding Derivatives, Derivative of Trigonometric Functions, Chain Rule, Higher Order Derivatives, Implicit Differentiation	3	12
Maxima and Minimam, Monotonicity, Local Maxima and Minimam, Concavity, Sketching the Graphs	2	8
Integration of Functions, Definite Integrals	2	8

2. Course components (total contact hours and credits per semester):

	Contact Hours				Self-Study	Other	Total
	Lecture	Tutorial	Laboratory	Practical			
Contact Hours	56	-	-	-	-	-	56
Credit	4						4

3. Additional private study/learning hours expected for students per week. 4 Hours

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Define the related basic scientific facts, concepts, principles and techniques calculus	Lectures Tutorials Discussion Problem Solving	Exams Home work.
1.2	Recognize the relevant theories and their applications in basic mathematics.		
2.0	**Cognitive Skills**		
2.1	Representing problems mathematically.	Lectures Tutorials Solve Problem	Exams Quizzes. Homework.

2.2	How to distinguish different rules in calculus.	Brain Storming	Discussion
3.0	**Interpersonal Skills & Responsibility**		
3.1	Develop connections of calculus with other disciplines	Cooperative education Competitive education	Home work. Reports. Quizzes. Discussion
	Solve problems using a range of formats and approaches in basic science		
3.2	show the ability to work independently and within groups.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Learn how to summarize lectures or to collect materials of the course.	Lectures tutorials brain storming	Home work. Reports. Discussion
4.2	Learn how to solve difficulties in learning: solving problems – enhance educational skills		
5.0	**Psychomotor**		
Not applicable			

5. Schedule of Assessment Tasks for Students During the Semester			
No.	Assessment task	Week due	Proportion of Final Assessment
1	Midterm 1	6th week	15 %
2	Midterm 2	12th week	15%
3	Homework + reports + Quizzes	During semester	20%
4	Final exam	End of semester	50 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)
1- Office hours per week in the lecturer schedule (6 hours per week).
2- Contact with students by e-mail,SMS, and e-learning facilities.

E. Learning Resources

1. Required Text(s)

Mathematics for preparatory year program, Book1, Oxford University Press,2013

2. Essential References

Calculus (Ninth Edition)by Dale Varberg, Edwin Purcell and Steven Rigdon

3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List):

4.Electronic Materials, Web Sites etc http://en.wikipedia.org/wiki/Calculus
5. Other learning material such as computer-based programs/CD, professional standards/regulations: Maple

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.) -Classroom with capacity of 25-students. - Library.
2. Computing resources: Not available
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list): None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: • Student feedback through electronic facilities organized by the deanship of registration and acceptance.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Evaluation of the teachers by internal & external faculty members. • Visiting to the classrooms. • Mutual visits between colleagues and giving advices to each other after each lecture
3 Processes for Improvement of Teaching • Analysis of student course evaluation and feedback • Peer evaluation and feedback • Review of course portfolios • Workshops on pedagogical methods
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Analysis of course assessments by other reviewers on a periodic basis.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Material and learning outcomes are periodically reviewed internally and externally. • Comparing course content and teaching methodologies with similar courses offered at other departments and universities. • Studying the outcomes of the students' evaluations of the course and use it to improve teaching strategies.

Faculty or Teaching Staff: _____
Signature: _____ Date Report Completed: _____
Received by: _____ Dean/Department Head
Signature: _____ Date_____

Umm Al-Qura University

English Language Center

English Language for Applied Sciences

1. Basic Information

1. COURSE: **English Language**	2. COURSE NUMBER: **7004101-4**
3. Course Required ■ Elective ☐	4. Number of Credits: **4**
6. COURSE PREREQUISITES: **None**	5. Number of Contact Hours: 10 h a week for a total of 160h/semester
7. Resource Book: ***Milestones in English A1 and A2***	
7. COURSE TIME: First Year 1st Semester	

2. English Language اللغة الإنجليزية ٧٠٠٤١٠١-٤

Course Description

English Language 705101-4 is an English for General Purposes (EGP) course that develops the language skills needed for academic study in English by teaching essential vocabulary, preparing students for speaking and building basic academic writing skills. As such, it is a pre-requisite for the ESP courses offered by the ELC. All classes are held in language labs.

At the end of the first semester, successful students are expected to be at the beginning of the intermediate level of English, ready to take their course in English for Specific Purposes (ESP).

Students are evaluated as follows:

1. Active participation, attendance, on time submission of finished assignments: 20%

2. Midterm Exam: 30%

3. Final Exam: 50%

3. English Language (for Applied Sciences) اللغة الإنجليزية ٧٠٠٤١٠١-٤

Course Delivery Plan

Course Delivery Plan		
Coverage of Planned Program		
Weekly Instruction: 10 hours; Total: Semester Instruction: 160 hrs		
Number of Textbooks: 2		
Milestones in English: Student's Book with Online Skills A1		
Milestones in English: Student's Book with Online Skills A2		
Week No.	**Unit / topic***	**Planned Hours**
Textbook: Milestones in English A1		
Week 1	Introduction to the course Material familiarization, etc.	**10**
Week 2	Unit 1: Introductions	**10**
Week 3	Unit 2: People and places	**10**
Week 4	Unit 3: Family and things	**10**
Week 5	Unit 4: Food around the world	**10**
Week 6	Unit 5: Free time	**10**
Week 7	Unit 6: Daily life	**10**
Week 8	Unit 7: The world around us	**10**
Week 8: Wednesday & Thursday: Midterm Exam		
Week 9	Unit 8: Life in the past	**10**
Week 10	Unit 9: Famous people	**10**
Week 11	Unit 10: Plans	**10**
Textbook: Milestones in English A2		
Week 12	Unit 1: Your world	**10**
Week 13	Unit 2: My day	**10**
Week 14	Unit 3: Work	**10**
Week 15	Unit 4: Places	**10**
Week 16	Unit 5: Retail	**10**
Week 16: Wednesday & Thursday: Midterm Exam		

Umm Al-Qura University

English Language Center

English Language for Applied Sciences

1. Basic Information

1. COURSE: English Language for Applied Sciences اللغة الإنجليزية للعلوم التطبيقية	2. COURSE NUMBER: **7004102-4**
3. Course Required ■ Elective ☐	4. Number of Credits: **4**
6. COURSE PREREQUISITES: **English Language 7004101-4**	5. Number of Contact Hours: 10 h a week for a total of 160h/semester
7. COURSE TIME: First Year 2nd Semester	

2. English Language for Applied Sciences

اللغة الإنجليزية التطبيقية

Course Description

English Language for Applied Sciences is a course designed for the students of the College of Applied Sciences covering a variety of technical themes. The course exposes the students to authentic samples of technical English in both oral and written forms. Following an integrated approach, the course exploits the technical English samples for introducing lexical items and grammatical structures that are necessary for the day-to-day communicative functions required of students of Applied Sciences. Drawing on authentic source materials, the course offers a wide range of independent and group activities the purpose of which is to familiarize students in a gradual manner with various aspects of technical English. A number of practice and productive exercises are included to help students master the four language skills.The course contents are suitably and amply supplemented with visual aids and authentic audio content on CD. After successful completion of the course students are expected to understand a variety of technical and scientific texts, use technical vocabulary and develop a modest ability to produce texts.

Students are evaluated as follows:

1. Active participation, attendance, on time submission of finished assignments: 20%

2. Midterm Exam: 30%

3. Final Exam: 50%

3. English Language for Applied Sciences: Course Delivery Plan

Coverage of Planned Program ***Weekly Instruction: 10 hours; Total: Semester Instruction: 160 hrs*** ***Number of Textbooks: 1 (Technical English by Terry Phillips)***		
Week No.	**Unit / topic***	**Planned Hours**
Week 1	An introduction to the course Points and Lines	**10**
Week 2	Fractions and Ordinals Arithmetic	**10**
Week 3	Surfaces and angles Spaces and Volumes	**10**
Week 4	Measuring Algebra and Formulas	**10**
Week 5	Natural or Man-made	**10**
Week 6	Bits and Bytes	**10**
Week 7	Computer Networking	**10**
Week 8	Elements and Compounds	**10**
Week 8: Last meeting: Midterm Exam		
Week 9	States of Matter Properties of Matter	**10**
Week 10	Symbols and Keys Structures and Plans	**10**
Week 11	Forces, Loads and Tools	**10**
Week 12	Energy and Motion	**10**
Week 13	Cells, Organs and Systems	**10**
Week 14	Chains, Webs and Cycles	**10**
Week 15	Micro-machines and ICT	**10**
Week 16	Electricity and Magnetism	**10**
Week 16: Last meeting: Final Exam		

Arabic Language (501101-2)

Topics list:

*The parts of speech : nouns,verbs,and particles with shewing the grammatical state of each - (mabni and mo'rab) of nouns and verbs

(it means experiencing grammatical states or not)

*Syntax- definition of (Irab) syntactic analysis, its kinds, and signs (main and other)

* analyzing with subsidary signals *

* The fine nouns, analysis, conditions or rules of analyzing with (particles) - (dual) and (Masculine sound plural) – analyzing what is pluralized with (أ) and (ت)

*analyzing (uninflected words) , knowing (when) it can be inflected or not ?

The five verbs.

*Morphological balance (الميزان الصرفي) – abstract and derivated – knowing how to look up the new word in the dictionary.

* A study of AL-Hujurat until ⟹ verse 12

A study of the farewell speech of……. And some of the poems. Prophet Mohammad (peace be upon him)

Islamic Culture I (601101-2)

Topics to be covered in this course:

(1)- Introduction to Islamic Culture

(2)- Introduction to the study of Creed

(3)- Faith in God (Believe in the existence of God – The unification of Godliness)

(4)- Faith in God (The unification of Divinity – the unification of names and attributes)

(5)- Faith in Angels and Heavenly Books

(6)- Faith and believe in the Messengers of God peace be upon them

(7)- Faith on the Day of Resurrection (1)

(8)- Faith on the Day of Resurrection (2)

(9)- Faith in Destiny

(10)- Worship in Islam (1)

(11)- Worship in Islam (2)

(12)- Ethics in Islam (1)

(13)- Ethics in Islam (2)

Islamic Culture II (601201-2)

Topics to be covered in this course

(1)- The Holy Quran – its documentation and recitation

(2)- Maximize the holiness of the Quran

(3)- Interpretation of

(4)- The interpretation of Surat Al-Hujurat (the Chambers), the 49th Sura of the Quran (Chapter 26) Part one – This Sura contains: etiquette and norms to be observed in the Muslim community, including the proper conduct towards the prophet, an injunction against acting on news without verification, a call for peace and reconciliation, as well injunctions against defamation, suspicion, and backbiting. The Sura also declares a universal brotherhood among Muslims. The thirteenth verse, one of the most famous in the Quran, is understood by Muslim scholars to establish equality with regards to race and origin; only God can determine one's nobility based on his piety.

(5)- The interpretation of Surat Al-Hujurat (the Chambers), the 49th Sura of the Quran (Chapter 26) Part two

(6)- The status and importance of the Prophetic Sunnah

(7)- The care of Muslims in Prophetic Sunnah

(8)- The duty of Muslims towards the Messenger of God

(9)- Explanations of Prophet Hadiths (Prophet saying) 1

(10)- Explanations of Prophet Hadiths (Prophet saying) 2

(11)- Explanations of Prophet Hadiths (Prophet saying) 3

(12)- Explanations of Prophet Hadiths (Prophet saying) 4

(13)- Explanations of Prophet Hadiths (Prophet saying) 5

Islamic Culture III (601301-3)

Topics to be covered in this course:

(1)- Introduction to the study of Systems in Islam

(2)- Family system in Islam

(3)- The stages of family formation in Islam

(4)- Rights and duties among family members in Islam

(5)- Methods of settling disputes in Islam

(6)- Economic system in Islam (1)

(7)- Economic system in Islam

(8)- Political system in Islam (1)

(9)- Political system in Islam (2)

(10)- Political system in Islam (3)

(11)- The penal system in Islam

(12)- Human rights in Islam

(13)- Human rights in Islam

Islamic Culture IV (601401-2)

Topics to be covered

(1)- Muslim society between idealism and deviation (13 cases) – to be covered in 7 weeks

(2)- The situation of the contemporary Muslim society and the reasons for its advancement (10 cases) to be covered in 6 weeks

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The Biography of the Prophet Mohammad Peace be upon Him (102101-2)

Topics to be covered in this course

The prophet Mohammad from His berth to His mission

(1)- Prophet's attribution

(2)- Prophet mission

(3)- The mission: Mecca period

(4)- The mission: Madinah period

(5)- The spread of Islamic call

(6)- The death of the prophet Mohammad peace be upon him

The Biography of the Prophet Mohammad Peace be upon Him (102101-2)

Topics to be covered in this course

The prophet Mohammad from His berth to His mission

(1)- Prophet's attribution

(2)- Prophet mission

(3)- The mission: Mecca period

(4)- The mission: Madinah period

(5)- The spread of Islamic call

(6)- The death of the prophet Mohammad peace be upon him