



Course Specifications

Course Title:	Qualitative Analytical Chemistry
Course Code:	4022134-2
Program:	Chemistry
Department:	chemistry
College:	Faculty of Applied Science
Institution:	Umm Al-qura University

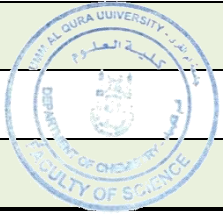


Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	4
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	6
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	7
G. Course Quality Evaluation	7
H. Specification Approval Data	8

A. Course Identification

1. Credit hours:
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 3 rd level /2 rd year
4. Pre-requisites for this course (if any): General Chemistry (1)
5. Co-requisites for this course (if any): ---

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		100%
2	Blended		-
3	E-learning		-
4	Correspondence		-
5	Other		-

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	15
2	Laboratory/Studio	42
3	Tutorial	
4	Others (specify)	
	Total	57
Other Learning Hours*		
1	Study	20
2	Assignments	5
3	Library	-
4	Projects/Research Essays/Theses	-
5	Others (specify)	10
	Total	35

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Qualitative Analytical Chemistry course provide students with the necessary background of qualitative analysis of different compounds and its application.

2. Course Main Objective

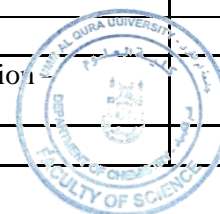
By the end of this course student will be able to know the fundamentals of analytical chemistry and has the ability to identify different methods used for qualitative analysis.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Recognize classification and application of qualitative analysis	K5
1.2	Discover the factors affecting on the solubility, precipitation	K1
1.3	Explain methods to express concentration and Identify chemical , kinetic equilibrium and acid base equilibrium	K2
1.4	Recognize ionic and nonionic, electrolytic and non-electrolytic compounds	K5
1.5	Know Colloidal solutions and conditions of ideal precipitation	K5
1.6	Mention the importance of complex formation as application in qualitative analysis	K5
2	Skills :	
2.1	Develop the reverse think skills and student gains the practical skills to choose the suitable methods for aqueous solutions solubility	S2
2.2	Gains the skills for acid base equilibrium and Redox equilibrium	S1
2.3	Select the suitable method for expressing concentration	S5
2.4	Design different methods to determine the rate of chemical reactions	S4
2.5	predict conditions of ideal precipitation	S2
2.6	plan to make research program in qualitative analysis according to systematic steps	S2
2.7	Compare between the different equations in Redox process	S2
3	Competence:	
3.1	Manage resources, time and collaborate with members of the group.	C1
3.2	Work effectively both in a team, and independently on solving chemistry problems.	C2
3.3	Communicate effectively with his lecturer and colleagues	C1
3.4	Use IT and web search engines for collecting information.	C3

C. Course Content

No	List of Topics	Contact Hours
1	Inorganic qualitative analysis: its classifications and its applications	1
2	The solutions (Types of solutions – the solubility and factors effecting solubility – Solubility of aqueous ,ionic and non ionic compounds –methods for expression concentrations	1
3	The chemical equilibrium – The rate of chemical reactions.	1
4	Acid- Base equilibrium, Dissociation of water, pH and Neutralization Indicators	1
5	Hydrolysis of salts, acids and weak base	1
6	Buffer solution in qualitative analysis	1
7	Colloidal solutions (colloidal particles and electric charge – pepitization colloidal particles precipitation – conditions of ideal precipitation)	2
8	The precipitates and law of solubility product	1



9	Mid term exam	1
10	The factors effecting on the solubility of precipitates and separations of ionic groups.	1
11	equilibrium of complex formation (Coordination complexes, its structure and types of bonds in ionic complexes)	1
12	Types of ionic complexes –application of equilibrium law on complexes reactions - application of complex formation in qualitative analysis	1
13	Oxidation reduction equilibrium	1
14	General revision and preparatory exam	1
Total		

Laboratory Part.

- Identify acidic radicals of first group using dil HCl
- Identify acidic radicals of second group and Conc. H₂SO₄
- Identify acidic radicals of third group using BaCl₂
- Revision on acidic radicals
- Identify basic radicals of first group (Hg₂²⁺, Pb²⁺, Ag⁺)
- Identify basic radicals of second group (Hg²⁺, Cu²⁺, Cd²⁺, Bi³⁺)
- Identify basic radicals of third group (Al³⁺, Cr³⁺, Fe³⁺)
- Identify basic radicals of fourth group (Mn²⁺, Zn²⁺, Co²⁺, Ni²⁺)
- Identify basic radicals of fifth group (Sr²⁺, Ca²⁺, Ba²⁺)
- Identify basic radicals of sixth group (NH₄⁺, Mg²⁺, Na⁺, K⁺)
- Revision on basic radicals

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	Recognize classification and application of qualitative analysis	• Lectures	• Exams • long and short essays posters lab manuals
1.2	Discover the factors affecting on the solubility, precipitation	• Lectures	• Exams
1.3	Explain methods to express concentration and Identify chemical , kinetic equilibrium and acid base equilibrium	• Lectures • Scientific discussion	• Exams • web-based student performance systems
1.4	Recognize ionic and nonionic, electrolytic and non electrolytic compounds.	• Lectures	• Exams
1.5	Know Colloidal solutions and conditions of ideal precipitation	• Lectures	• Exams
1.6	Mention the importance of complex formation as application in qualitative analysis	• Lectures • Scientific discussion	• Exams • home work
2.0	Skills		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	Develop the reverse think skills and student gains the practical skills to choose the suitable methods for aqueous solutions solubility	• Lectures	• Exams
2.2	Gains the skills for acid base equilibrium and Redox equilibrium	• Lectures	• Exams • Group discussion
2.3	Select the suitable method for expressing concentration	• Lectures • Web-based study	• Exams • Home work assignment containing problem thinking activities
2.4	Design different methods to determine the rate of chemical reactions	• Lectures	• Exams • Home work
2.5	predict conditions of ideal precipitation	• Lectures • Web-based study	Quiz
2.6	plan to make research program in qualitative analysis according to systematic steps	• Lectures	• Quiz
2.7	Compare between the different equations in Redox process	• Lectures	• Exams • posters • demonstrations
3.0	Competence		
3.1	Manage resources, time and collaborate with members of the group.	presentation	Observation of group's team work performance
3.2	Use university library and web search engines for collecting information and search about different topics.	project	Write a report
3.3	Work effectively both in a team, and independently on solving chemistry problems.	group discussion	Observation of group's team work performance
3.4	Communicate effectively with his lecturer and colleagues	group discussion	Observation by the instructor
3.5	Use IT and web search engines for collecting information.	presentation	Observation by the instructor

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework or activities.	--	10 %
2	Midterm Exam.	8	20 %
3	Practical Exam.	14	30 %
4	Final Exam. (2hours Exam)	16	40 %
5	Total		100 %

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- We have faculty members to provide counseling and advice.

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

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • 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).
Essential References Materials	<ul style="list-style-type: none"> • Lecture Hand outs available on the coordinator website
Electronic Materials	<ul style="list-style-type: none"> • http://en.wikipedia.org/wiki/Petroleum1 - http://www.chemhelper.com/ • http://www.chemweb.com/ • http://www.science.uwaterloo.ca/~cchieh/cact/ <p style="text-align: center;">http://www.sciencedirect.com/</p>
Other Learning Materials	<ul style="list-style-type: none"> • Microsoft Power Point and Microsoft Word • Qualitative analysis video • Teaching CD for qualitative analysis

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	-Classrooms capacity (30) students. -Providing hall of teaching aids including computers and projector.
Technology Resources (AV, data show, Smart Board, software, etc.)	Room equipped with computer and projector and TV.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	No other requirements.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	questionnaire (indirect)
Extent of achievement of course learning outcomes	Program Leader	results data analysis (direct) and questionnaire (indirect)
Quality of learning resources	Course instructor	Questionnaire (indirect)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Dr Marwa Galal Elghalban
Reference No.	
Date	

Received by: Dr. Ismail Althagafi

Department Head

Signature:



Date: 20/12/2019

