



Course Specifications

Course Title:	Qualitative Analysis
Course Code:	241CHEM-2
Program:	Bachelor of Science in Chemistry
Department:	Chemistry
College:	Science
Institution:	King Khalid University

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A. Course Identification

1. Credit hours: 2 (1+1)
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: Level 4 / Year 2
4. Pre-requisites for this course (if any): 101CHEM
5. Co-requisites for this course (if any): No co-requisite

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	1	50%
2	Blended	0	0
3	E-learning	0	0
4	Correspondence	0	0
5	Other	1	50%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	15
2	Laboratory/Studio	30
3	Tutorial	0
4	Others (specify)	0
	Total	45
Other Learning Hours*		
1	Study	10
2	Assignments	10
3	Library	10
4	Projects/Research Essays/Theses	0
5	Others(specify)	0
	Total	30

*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

- The course should be regularly assessed.
- Students should be taught to differentiate between qualitative and quantitative analysis.
- Regular homework to be given to students to enhance their knowledge about the qualitative analysis.
- This course focuses on various terms regarding qualitative analysis to develop better understanding about this field.
- Different topics such as common ion effect, solubility product, equilibrium constant and buffer solutions to be comprehensively covered.
- General methods of qualitative analysis related to carbohydrates and amino acids, will be covered.

2. Course Main Objective

- what is qualitative analysis
- To recognize between qualitative and quantitative analysis
- To develop fundamental understanding about analytical analysis
- To know the difference between types and methods of analytical analyses.
To know applied methods of qualitative analysis on carbohydrates and amino acids.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	To gain the knowledge of the fundamental concepts and principles of qualitative analysis	K1, K2, K3
1.2	To understand the methods of quantitative analysis and their application in daily life.	K1, K2
2	Skills :	
2.1	To analyze, interpret and explain the practical application of the quantitative analysis based on the course topics.	S1, S2
2.2	To use the gained knowledge to explain some medicinal applications (caries and kidney stone).	S1, S2
3	Competence:	
3.1	To present an oral explanation for a subject in the field.	C1, C2, C3 and C4
3.2	To interact positively with colleagues in a group work.	C2, C3 and C4
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work	C2
3.4	To summarize the literature and sources for a specific topic in the course.	C4

C. Course Content

No	List of Topics	Contact Hours
Theoretical contents		
1	Introduction to analytical chemistry	1
2	Understanding expression of concentrations	1
3	Concept of effective concentration	1
4	Stoichiometric calculations	2
5	Electrolytes and non-electrolytes	1
6	Ostwald's dilution law	1
7	Chemical equilibrium & Le Chatelier's principle Parameters affects the chemical equilibrium	2
8	Solubility product, theory, concept and its applications	2
9	Homogeneous and no-homogeneous reactions	2
10	Qualitative analysis of carbohydrates Qualitative analysis of amino acids	2
Total		15
Practical contents		
1	Safety in the Laboratory	2
2	Qualitative Analysis of Group I Cations- The Silver Group (Ag^+ , Hg_2^{2+} and/or Pb^{2+} .)	2
3	Separation of mixture containing Group I Cations- (Ag^+ , Hg_2^{2+} and/or	2

	Pb ²⁺ .)	
4	Qualitative Analysis of Group 2 Cations- Copper subgroup – (Hg ²⁺ , Pb ²⁺ , Cu ²⁺ , Bi ³⁺ , Cd ²⁺)	2
5	Separation of mixture containing Qualitative Analysis of Group 2 Cations- Copper subgroup – (Hg ²⁺ , Pb ²⁺ , Cu ²⁺ , Bi ³⁺ , Cd ²⁺)	2
6	Qualitative Analysis of Group 3 Cations-Fe ²⁺ , Fe ³⁺ , Cr ³⁺ ,Al ³⁺ ,	2
7	Separation of mixture containing Qualitative Analysis of Group3 Cations- , Fe ²⁺ , Fe ³⁺ , Cr ³⁺ ,Al ³⁺ ,	2
8	Qualitative Analysis of Group 4 Cations- Co ²⁺ , Zn ²⁺ , Ni ²⁺ , Mn ²⁺	2
9	Separation of mixture containing Qualitative Analysis of Group 4 Cations- Co ²⁺ , Zn ²⁺ , Ni ²⁺ , Mn ²⁺	2
10	Qualitative Analysis of Group 5 Cations- Ca ²⁺ , Ba ²⁺ , Sr ²⁺	2
11	Separation of mixture containing Qualitative Analysis of Group 5 Cations- Ca ²⁺ , Ba ²⁺ , Sr ²⁺	2
12	Qualitative Analysis of Group 6 Cations-Mg ²⁺ , Na ⁺ , K ⁺	2
13	General method for separating a mixture of cations from different groups	4
Total		30

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	To gain the knowledge of the fundamental concepts of qualitative analysis	Lectures, interactive teaching sessions, Tutorials, problems solving sessions	Written exams, electronic quizzes, Oral discussion and examinations
1.2	To understand the application of qualitative analysis in daily life phenomena..		
2.0	Skills		
2.1	Analyze the results and make the proved conclusions based on qualitative analysis methods.	Lectures, problem solving sessions	Written exams, oral exams
2.2	To Recognize the weakness and strengths of qualitative analysis	problem solving sessions	Oral discussion, written examinations
3.0	Competence		
3.1	To motivate the students to ask any questions related to the course content	opened essays on selected topics	Class activities
3.2	To interact positively with colleagues in a group work.	Interactive teaching sessions	Oral presentation on a group report
3.3	Giving the student advanced concepts related to stoichiometry	Interactive teaching sessions, homework in group	Discussion within a group
3.4	To summarize the literature and sources for a specific topic in the course.	Guided reading of books and articles	Written Reports and summaries

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Oral presentation	5 th	2.5
2	quiz	8 th	2.5
3	Laboratory&	15 th	25
4	Midterm exam-1	6 th	10
5	Midterm exam-2	11 th	10
6	Final exam	16 th	50

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

& separated from theory lecture with independent lecturer

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
10 office hour a week.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ol style="list-style-type: none"> 1. Fundamentals of Analytical Chemistry, D.A.Skoog, D.M.West, F.J.Holler and S.R.Crouch, 8th ed., 2004, Brooks/Cole. 2. Analytical Chemistry by D. Kealey & P.J. Haines, by BIOS Scientific Publications Ltd. 2002. 3. Chemical Analysis, Modern Instrumental Methods and Techniqes. By Francis Rouessac & Annick Rouessac. John Wiley & Sons, LTD. 1998 4. الكيمياء التحليلية- التحليل الحجمى والوزنىأ.د. ابراهيم زامل الزامل ، د. محمد عبد العزيز الحجاجى، د.سعد عبد العزيز الطمرة، د. محمود محمد بانه. توزيع دار الخريجي للنشر والتوزيع-1414هـ- 1993
Essential References Materials	1. Analytical Chemistry 5th Ed. Solution manual by Gray Christian, 1994, John Wiley & Sons. In.
Electronic Materials	<ol style="list-style-type: none"> 1. http://www.chem.vt.edu/chem-ed/a.html 2. http://elearning.kku.edu.sa
Other Learning Materials	No other learning materials.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom and lab
Technology Resources (AV, data show, Smart Board, software, etc.)	Accessible databases
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	-

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course delivery (teaching methods and assessment methods)	Student	Questionnaire
	Departmental Plan and curriculum committee; external reviewers	Reports and workshops
	Program Leader	Meetings
Course contents (update)	Departmental Plan and curriculum committee; external reviewers	Reports and workshops
Quality of learning resources	External reviewers	Reports

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	Department counsel
Reference No.	1/22/142
Date	15-9-1442