



Course Specifications

Course Title:	Instrumental Analysis 1
Course Code:	342CHEM-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
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 6/ Year 3
4. Pre-requisites for this course (if any): 242Chem-3
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	100 %
2	Blended	0	0
3	E-learning	0	0
4	Correspondence	0	0
5	Other	0	0

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	0
	Total	30
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 describes the different instrumental techniques, theoretical aspects, instrumentation and applications

2. Course Main Objectives

- To classify different instrumental techniques of analysis.
- To classify the spectrophotometric methods of analysis and to identify their instrument components.

- To differentiate between the various methods of electroanalysis and to study their applications.
- To identify the basic principles of chemical separation methods and their applications.
- To analyze the chromatographic data and charts.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	To recognize the theoretical backgrounds of chemical separation methods	K1, K3
1.2	To recognize the theoretical backgrounds of spectrophotometric methods of analysis	K1
1.3	To differentiate between the different methods of electroanalysis	K1
2	Skills:	
2.1	To apply the theoretical basis of chemical separation methods	S1, S2
2.2	To interpret spectrophotometry applications	S1, S2
2.3	To apply the use of different electroanalytical methods	S1
2.4	To identifying the properties and applications of thermal and radiation analysis methods	S1
3	Competence:	
3.1	To present an oral explanation for a subject in the area.	C1, C3
3.2	To interact positively with colleagues in a group work.	C1, C2
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work	C4, C5
3.4	To summarize the literature and sources for an area in the course.	C2, C3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and classification of instrumental techniques	2
2	UV-Visible spectrophotometric techniques (theory, instrumentation, application)	4
3	Flame Photometric techniques (theory, instrumentation, application)	2
4	Atomic Absorption spectrometry techniques (theory, instrumentation, Interferences, application)	3
5	Introduction to electrochemical techniques	2
6	Potentiometric technique of analysis, Applications	3
7	Conductometric technique of analysis, Applications	2
8	Introduction of chromatographic methods of Analysis & the plane chromatography	2
9	High performance liquid chromatography (theory, instrumentation, chart analysis, applications)	4
10	Gas chromatography (theory, instrumentation, chart analysis, applications)	4
11	Solvent extraction	2
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 recognize the theoretical backgrounds of chemical separation methods	Classical lectures and data show-based lectures.	Assignments, Quizzes and exams (midterm and final)
1.2	To recognize the theoretical backgrounds of spectrophotometric methods of analysis	Demonstration using models and movies.	
1.3	To differentiate between the different methods of electroanalysis	Lectures In class cooperative groups.	
2.0	Skills		
2.1	To apply the theoretical basis of chemical separation methods	Classical lectures and data show-based lectures.	Assignments, Quizzes and exams (midterm and final)
2.2	To interpret spectrophotometry applications	Demonstration using models and movies.	
2.3	To apply the use of different electroanalytical methods	Problem solving Tutorials	
2.4	To identifying the properties and applications of thermal and radiation analysis methods	In class cooperative groups.	
3.0	Competence		
3.1	To present an oral explanation for a subject in the area.	In class cooperative groups.	Direct observation
3.2	To interact positively with colleagues in a group work.	Team Learning Oral presentation	Collaborative assignments
3.3	To contribute with colleagues to prepare and deliver a presentation and report of group work	Tutorial Personal work Team Learning	Discussion within a group
3.4	To summarize the literature and sources for an area in the course.	Surveying literature Review and Report	Written Reports and summaries

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignment	6 th	5%
2	1 st periodic exam	7 th	15%
3	Assignment	11 th	5%
4	2 nd periodic exam	12 th	15%
5	Assignment	13 th	5%
6	Report	15 th	5%
7	Final exam	18 th	50%

*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:

10 office hours are offered for students for individual consultations. Communications are available on-site, phone conversations, and chatting by social media.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	ابراهيم زامل الزامل, الكيمياء التحليلية – التحليل الآلي ، دار الخريجي للنشر و التوزيع، 1998، الطبعة الثالثة. (Ibrahim Zamil Al-Zamil وAnalytical Chemistry- Instrumental Analysis, Al-Kheraiji bookshop. and printing press, 1998, Third Edition. Arabic language)
Essential References Materials	1- Daniel C. Harris, Quantitative Chemical Analysis, W. H Freeman and company, 2007, Seventh Edition. 2- G.D. Christian, P. K. Dasgupta, K. A. Analytical Chemistry, Schug, Wiley, 2014, Seventh Edition 3- Douglas A. Skoog, F. James Holler, Stanley R. Crouch, Principles of instrumental analysis, Belmont CA Thomson Brooks/Cole, 1999, Sixth Edition.
Electronic Materials	1- Microsoft excel 2- Youtube website 3- http://chemwiki.ucdavis.edu/Analytical_Chemistry 4- http://www.c4lpt.co.uk/recommended/index.html
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room
Technology Resources (AV, data show, Smart Board, software, etc.)	One computer, one data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course delivery (teaching methods and assessment methods)	Students	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