



Course Specifications

Course Title:	Separation Methods and Thermal Analysis
Course Code:	4023562-3
Program:	Chemistry
Department:	Chemistry
College:	Faculty of Applied Science
Institution:	Umm Al-qura University

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A. Course Identification

1. Credit hours: 3hrs (2 theoretical + 1 practical)
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: 6 th level / 3 rd year
4. Pre-requisites for this course (if any): Spectrophotometric and Electrochemical techniques
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	√	74%
2	Blended		
3	E-learning	√	26%
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (E-learning + Exams + office hours)	15
	Total	67

B. Course Objectives and Learning Outcomes

1. Course Description

This course explores the fundamental basis of separation methods and thermal analysis. It is designed to give the student a solid conceptual background and hands-on practice to understand how analytical techniques can be used to separate the mixtures; including their limits and advantages. The emphasis is on mixture analysis and the course covers basic different chromatographic devices and concepts, and thermal analysis.

2. Course Main Objective

By the end of this course, the student should fully aware of:

1. Have all information about mixtures in chemistry
2. Familiar with separation process and methods of thermal analysis.
3. Able to use many separation tools for separate both organic and in organic mixtures.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Recognize the separation methods in analytical chemistry, classifications, and solvent extraction technique	K1, K2
1.2	Identify the principles of chromatographic methods and its classification.	K1
1.3	Describe the different types of chromatography and electrophoresis methods.	K3
2	Skills :	
2.1	Apply separation methods in analytical chemistry.	S1 & S2
2.2	Compare calometric analysis and thermal titrations.	S3
2.3	Explain the principles of chromatographic methods and its classification.	S1
2.4	Analyze liquid-liquid chromatography and Solid-liquid chromatography.	S3
2.5	Summarize the principles and devices of GC and HPLC.	S1
3	Values:	
3.1	Ability to work in a team to perform specific experimental tasks and participate in class or laboratory discussions.	V3
3.2	Ability to work independently to handle chemicals.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Separation methods in analytical chemistry, classifications, and solvent extraction technique.	4
2	Principles of chromatographic methods and its classification.	1+1E=2
3	Column chromatography.	1+1E=2
4	Liquid-liquid chromatography and Solid-liquid chromatography.	1+1E=2
5	Ion exchanger chromatography, ionic chromatography and HPLC.	2
6	Plane chromatography.	1+1E=2
7	Thin layer chromatography (TLC), paper chromatography (PC) and electrophoresis method.	1+1E=2
8	Gas chromatography in qualitative, quantitative, medical and petroleum analysis.	4+2E
9	Principles and devices of previous analysis methods, Thermal analysis methods: thermo gravimetric analysis (TGA), (DTG), (DSC) and (DTA).	2+2E=4
10	Calometric analysis and thermal titrations.	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 and Understanding		
1.1	Recognize the separation methods in analytical chemistry, classifications, and solvent extraction technique	Lecture	Mid-term and final Exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	Identify the principles of chromatographic methods and its classification.	Lecture +E-Learning	Mid-term and final Exams Active participation of students within their group on blackboard
1.3	Describe the different types of chromatography and electrophoresis methods.	Self-Directed private Study	Assignments and activities on blackboard
2.0	Skills		
2.1	Apply separation methods in analytical chemistry.	Lecture E-Learning	Mid-term and final Exams Active participation of students within their group on blackboard
2.2	Compare calometric analysis and thermal titrations.	Self-Directed private Study	Assignments and activities on blackboard
2.3	Explain the principles of chromatographic methods and its classification.	Lecture E-Learning	Mid-term and final Exams Active participation of students within their group on blackboard
2.4	Analyze liquid-liquid chromatography and Solid-liquid chromatography.	Lecture	Mid-term and final Exams
2.5	Summarize the principles and devices of GC and HPLC.	Self-Directed private Study	Assignments and activities on blackboard
3.0	Values		
3.1	Ability to work in a team to perform specific experimental tasks and participate in class or laboratory discussions.	Lab work	Practical Lab report and Exam
3.2	Ability to work independently to handle chemicals.	Lab work	Practical Lab report and Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	E-learning	All weeks	5%
2	Assignments and activities	All weeks	5%
3	Mid-term Exam	6	20%
4	Practical Lab Work (Reports and Exams)	11	30%
5	Final Exam.(2 hours exam)	12	40%
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"> • 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). • Dhruva Charan Dash. Analytical Chemistry)2017(PHI Learning Private Limited.
Essential References Materials	Lecture handouts available on the coordinator website.
Electronic Materials	<ul style="list-style-type: none"> • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> • 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.	Peer Reviewer	Direct
Extent of achievement of course learning outcomes.	Program Leader	Direct
Quality of learning resources.	Student	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	Quality committee and department counsel
Reference No.	1 st meeting
Date	2022

Head of Chemistry Department



Dr Moataz Morad

