



Course Title: Methods of chromatographic separation

Course Code: CEM 323

Program: Chemistry

Department: Chemistry

College: Science

Institution: Majmaah university

Version: TP-153

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Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	5
C. Course Content	6
D. Students Assessment Activities	7
E. Learning Resources and Facilities	8
F. Assessment of Course Quality	9
G. Specification Approval	9



A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (6th level)

4. The primary objective of this course is to provide an overview of different chemical methods of separation using solvents; chromatographic methods: column chromatography (solid - liquid) and (liquid – liquid), thin layer chromatography, gas chromatography, high performance liquid chromatography (HPLC).

Experiments: some selected experiments for isolation and identification of some selected applicable material using different chromatographic techniques.

5. Pre-requirements for this course (if any):

Surface chemistry, colloids and catalysis

6. Pre-requirements for this course (if any): Nil

Surface chemistry, colloids and catalysis

7. Course Main Objective(s):

1. The primary objective of this course is to provide an overview of modern chromatographic separation techniques. The theory of commonly used separation mechanisms, current instrumentation and applications from various areas
2. Identify the different types of chromatographic methods.
3. identify the different components of chromatography instruments and their role
4. performing some experiments in different chromatographic methods

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30 (lectures)	100%
		30 (practical)	100%
2	E-learning	0	0
3	Hybrid	-	-
	1. Traditional classroom 2. E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30

2.	Laboratory/Studio	30
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Know the concepts and principles of chemical separation methods and the ability to evaluate and interpret chromatographic principles	K1	-Lectures. - Seminars. -Discussions -Brainstorming	-Theoretical tests (Quarterly and final) -Quizzes. - Homework presentations
1.2	Recognize laboratory skills, quality control standards, and the concepts of chromatographic experiments.	K2	Lab experiments discussions	Practical exam Lab reports
2.0	Skills			
2.1	Demonstrate laboratory skills, proper safety procedures, and regulatory compliance in laboratory settings.	S1	-Self-learning -Cooperative Education Lab experiments	Practical exam Lab reports
2.2	Communicate	S2		



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	effectively orally and written using appropriate presentation formats for different issues with recipients of different types.		-Self-learning -Cooperative Education lectures	Presentations Small quizzes
3.0	Values, autonomy, and responsibility			
3.1	Apply standards of integrity, transparency and ethical behavior in various academic and professional fields	V1	-Simulation programs - Cooperative work - Working in groups	- Practical reports - Note card -Research papers
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	History and Introduction to Separations	4
2	Mass Transport Processes	2
3	Thermodynamic and Molecular Basis of Equilibrium Separations	2
4	Introduction to Chromatography and Theory of Retention	4
5	Chromatography on Planar Surfaces	4
6	HPLC Instrumentation	6





7	Adsorption Chromatography (Liquid-Solid Chromatography)	2
8	Ion-Exchange Chromatography - Ion Chromatography	2
9	Size-Exclusion Chromatography	2
10	Gas Chromatography	2
	total	30
	Experiments in paper chromatography	8
1	Experiments in thin layer chromatography	8
2	Experiments in column chromatography	6
3	Experiments in gas chromatography	2
4	Experiments in high performance liquid chromatography	2
8	Revision	4
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Midterm1	6th	10%
	Midterm2	10th	10%
2	E-exam	15th	10%
3	Group discussion and activities	Every week	10%
4	Practical examination	16th	20%



No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
5	Final written Examination	18th	40 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Analytical Chemistry, 7th Edition by Gary D. Christian 2006 . ISBN;0495012017,978-0495012016
Supportive References	Chromatography E. Heftmann, E. Heftmann 2004
Electronic Materials	http://www.chemistry.ohio-state.edu
Other Learning Materials	Bb, power point

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class rooms are available with smart boards and internet
Technology equipment (projector, smart board, software)	Computers and internet are available for online study and video tutorials.
Other equipment (depending on the nature of the specialty)	Labs are available with required glassware and chemicals

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	students	questionnaire
Effectiveness of Students assessment	students	Electronic questionnaire
Quality of learning resources	students	questionnaire
The extent to which CLOs have been achieved	Staff members	Internal revision reports
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CHEMISTRY
REFERENCE NO.	17
DATE	15/12/2024