Jordan University of Science and Technology

Faculty of Science & Arts

Chemistry Department

CHEM732 Advanced Chemical Separation Methods - JNQF Level: 9

First Semester 2023-2024

Course Catalog
3 Credit Hours. The ultimate goal of this course is to give the student the skills required for method development employing popular chromatographic techniques. The course will cover in depth separation equilibria and operational aspects of separation. Problem solving employing gas chromatography and liquid chromatography. Employing mass spectrometry in identification and detection of separating analytes. Environmental and biomedical applications
Teaching Method: On Campus

Text Book	
Title	The Essence of Chromatography
Author(s)	C. F. Pool
Edition	2nd Edition
Short Name	Chromatography
Other Information	

Instructor	
Name	**Prof. Yahya Tahboub**
Office Location	D3 L-0
Office Hours	Sun : 11:30 - 12:30 Sun : 13:30 - 14:30 Mon : 10:30 - 11:30 Mon : 13:30 - 14:30 Tue : 12:30 - 13:30 Wed : 11:30 - 12:30
Email	tahboub@just.edu.jo

Class Schedule & Room

Section 1:
Lecture Time: Sun, Tue : 15:30 - 17:00
Room: M1301

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Validation of Analytical Methods	
Weeks 2, 3	Separation Equilibria: Thermodynamics of separation, auxiliary equilibria, acid-base equilibria, complexation	
Weeks 4, 5, 6	Operational Aspects of Separation: Methods of separation, chromatographic separations, resolution, evaluation of needed performance to achieve separation (band broadening), multi-component separations	
Weeks 7, 8	The Separation Process in Gas Chromatography, Injection Methods and Detection Methods	
Week 9	The Chromatographic Process in Liquid Chromatography. Injection and Detection in Liquid Chromatography,	
Week 10	The Chromatographic Process in Liquid Chromatography. Injection and Detection in Liquid Chromatography,	
Week 11	Type of Mass Spectrometers	
Week 12	Gas Chromatography-Mass Spectrometry	
Week 13	Liquid Chromatography-Mass Spectrometry	
Week 14	Method Development Employing Gas Chromatography	
Week 15	Method Development Employing liquid ChromatographyMethod Development Employing liquid Chromatography	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Have knowledge of life inside the chromatographic column including theoretical treatment [1b, 1e] [1L9K1, 1L9K3]	25%	
Design, optimize, and validate chromatographic methods for the separation and analysis of complex mixtures, considering factors such as resolution, sensitivity, and reproducibility [1b, 1e, 1h] [1L9K2, 1L9S2, 1L9C2]	25%	
Have knowledge of theory and instrumentation of mass spectrometry and its employment in chromatographic detection including MALDI-TOF [1a, 1j, 1k] [1L9K1, 1L9S2, 1L9C6]	25%	

Demonstrate advanced proficiency in various chromatographic techniques and select appropriate methods for specific analytical challenges. [1a, 1b, 1e, 1f] [1L9K2, 1L9S1, 1L9S3, 1L9C6]	25%	

Relationship to Program Student Outcomes (Out of 100%)										
a	b	c	d	e	f	g	h	i	j	k
14.58	27.08			27.08	6.25		8.33		8.33	8.33

Relationship to NQF Outcomes (Out of 100%)							
L9K1	L9K2	L9K3	L9S1	L9S2	L9C2	L9S3	L9C6
20.83	14.58	12.5	6.25	16.67	8.33	6.25	14.58

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