



Jordan University of Science and Technology
Faculty of Engineering
Chemical Engineering Department

CHE780 Special Topics

Second Semester 2023-2024

Course Catalog

3 Credit Hours. A Structured course on advanced topics in chemical engineering and is counted only once towards the graduation requirements. The special topic for the second semester 2023/2024 is as follows: Title: Instrumental Analysis
 Description: measurements basics , Atomic Spectroscopy (Introduction, Atomic Absorption, Atomic Emission, Atomic Mass and Atomic X-Ray), Molecular Spectroscopy (Introduction to Ultraviolet-Visible Molecular Absorption and Applications, Infrared spectrometry and its application, Surface Characterization by Spectroscopy and Microscopy), separation methods of analysis (Introduction, gas chromatography, liquid chromatography, supercritical fluid chromatography) and thermal methods of analysis,

Teaching Method: Blended

Text Book

Title	Principles of Instrumental Analysis
Author(s)	Douglas A. Skoog, F. James Holler, Stanley R. Crouch
Edition	6th Edition
Short Name	Text book
Other Information	Cengage Learning

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #1	Quantitative Chemical Analysis	Daniel Harris	6th Edition	W. H. Freeman and Company

Instructor

Name	Prof. Mohammad Al Harahsheh
Office Location	-
Office Hours	
Email	msalharahsheh@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 10:30 - 11:30 Room: قاعة الماجستير

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction	Chapter 1 From Text book
Week 2	Signal and Noise	Chapter 5 From Text book
Week 3	An Introduction to Spectrometric Methods	Chapter 6 From Text book
Week 4	Atomic Absorption Spectrometry	Chapter 9 From Text book
Week 5	Atomic Emission Spectrometry	Chapter 10 From Text book
Week 6	Atomic and Molecular Mass Spectrometry	Chapters 11 & 20 From Text book
Week 7	Atomic X-ray Spectrometry	Chapter 12 From Text book
Week 8	Ultraviolet-Visible Molecular Absorption Spectrometry	Chapters 13 & 14 From Text book
Week 9	Infrared Spectrometry	Chapter 16 From Text book
Week 10	An Introduction to Chromatographic Separations	Chapter 26 From Text book
Week 11	Gas Chromatography	Chapter 27 From Text book
Week 12	High-Performance Liquid Chromatography	Chapter 28 From Text book
Week 13	Supercritical Fluid Chromatography and Extraction	Chapter 29 From Text book
Week 14	Thermal Methods of Analysis	Chapter 31 From Text book
	Surface Characterization by Spectroscopy and Microscopy	Chapter 21 From Text book

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Describe measurement basics, errors, signals, noise and their evaluation methods	15%	
Outline the basic principles of spectroscopic methods and the basics of electromagnetic radiation related to spectroscopic methods	15%	
Discuss the basics of atomic (Absorption, emission, and mass spectroscopy) and molecular spectroscopic methods, their instruments' components and their principles of operation	25%	
Compare and contrast the principles of separation methods of analysis (gas, liquid, and high performance liquid chromatography) and thermal methods of analysis (TGA, DTA and DSC)	25%	

Recommend suitable instrumental method for particular analysis problem both for qualitative and quantitative determinations	5%	
Examine selected example problems of selected instrumental analysis methods to cover both for qualitative and quantitative determinations	15%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7

Evaluation	
Assessment Tool	Weight
Mid Exam	35%
Activities	15%
Final	50%

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