



ChE 456: Instrumental Analysis

3 credit hour, 3 contact hour lecture, 3 credit hour Eng.

Instructor

Instructor: Dr. Mohammad Al-Harabsheh

E-mail: msalharabsheh@just.edu.jo

Textbooks & References

A. Textbook

	Textbook 1
Title	Principles of Instrumental Analysis
Author(s)	Skoog, Holler and Nieman
Publisher	Thomson Learning
Year	
Edition	6 th

B. References

1. Quantitative Chemical Analysis, By Daniel Harris, 8th Edition, Palgrave Macmillan
2. Chemical Analysis: Modern Instrumental Methods and Techniques. By Francis Rouessac and Annick Rouessac. Wiley
3. Web resources: There are many websites available on the internet which cover the topics of course including:

A. <http://www.cem.msu.edu/~cem333/LectureMenu.html>

B. <http://www.chem.wvu.edu/chem210/#Notes>

Specific Course Information

A. Course Catalog:

Analytical measurements and measurement systems, separation methods of analysis, spectroscopic methods of analysis, thermal methods of analysis, electrochemical methods of analysis, Mass and NMR spectroscopy, Automated methods of analysis..

B. Prerequisites or co-requisites

CHE 463 Separation Processes

C. Required/Elective or Selected Elective

Required

Objectives and Outcomes*

1. Understand measurement basics, errors, signals, noise and their evaluation methods [1,2,6]
2. Understand the basic principles of spectroscopic methods and be familiarized with some basics of electromagnetic radiation related to spectroscopic methods [1,2,6]

* Number in brackets refer to the Program outcomes

3. Understand the basics of atomic spectroscopic methods (Absorption, emission, and mass spectroscopy) and be familiar with instruments components and their principles of operation [1,2,6]
4. Understand the basics of molecular spectroscopic methods and be familiar with instruments components and their principle of operation [1,2,6]
5. Understand the principles of separation methods of analysis (gas, liquid, and high performance liquid chromatography) [1,2,6]
6. Understand the basic principles of thermal methods of analysis (TGA, DTA and DSC) [1,2,6]
7. Understand the methods and procedures used for identification of elements and compounds obtained from single and multiple instrumental methods [1,2,6]
8. Know the techniques that are best for qualitative determinations and others are best for quantization [1,2,4,6]
9. be able to suggest suitable instrumental method for particular problem [1,2,4,6]

Contribution of Course to Meeting the Professional Component

Relationship to Student Outcomes (%)

1	2	3	4	5	6	7
4	4		4		4	

Relationship to Chemical Engineering Program Objectives

PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
√	√	-	-	√	√

Topics Covered

Week # 1	Measurement basics	Chapter 5
Week # 2	Introduction to spectroscopic methods	Chapter 6
Week # 3-6	Atomic spectroscopy	Chapters 6-12
Week # 7	Molecular spectroscopy	Chapters 13-14, 16-17, 20-21
Week # 8-12	Separation methods	Chapters 26-29
Week # 13-14	Electro-analytical methods of analysis	Chapter 22
Week # 15	Thermal and radiochemical methods	Chapter 31

Evaluation

Homework & Quizzes	10%
First Exam	25%
Second Exam	25 %
Final Exam	40 %