



Jordan University of Science and Technology
Faculty of Pharmacy
Pharmaceutical And Biological Manufacturing Department

MANU221 Instrumental Analysis
First Semester 2025-2026

Course Catalog
3 Credit Hours. Pharmaceutical instrumental analysis introduces students to the fundamental tools and techniques of instrumental analysis, focusing on their applications in pharmaceutical and biopharmaceutical sciences. The course covers key spectroscopic methods, such as UV/Visible spectroscopy, infrared spectroscopy, and nuclear magnetic resonance spectroscopy, alongside mass spectrometry, techniques widely used in drug analysis and quality control. Chromatographic methods, including high-performance liquid chromatography and gas chromatography, are also explored, with an emphasis on their applications in assessing pharmaceutical compounds qualitatively and quantitatively.
Teaching Method: Blended

Text Book	
Title	Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical Chemists
Author(s)	David Watson
Edition	5th Edition
Short Name	Ref#1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#2	Analytical Chemistry	Gary D. Christian	8th Edition	

Instructor	
Name	Dr. Aref Zayed
Office Location	-
Office Hours	
Email	alzayed@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Mon, Wed : 12:00 - 13:00 Room: M3305

Prerequisites		
Line Number	Course Name	Prerequisite Type
821029	HSS102MANU Analytical Chemistry	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	Topic	References
Weeks 1, 2	Introduction to Instrumental Methods of Analysis & Quality Control of Pharmaceutical Preparations	From Ref#2
Weeks 1, 2	Spectrometry: An Introduction to Spectral Methods of Analysis and Their Applications to Pharmaceutical Preparations.	From Ref#1
Weeks 2, 3, 4	Ultra-violet (UV) and Visible Spectrophotometric Methods of Analysis and Applications in Drug Assays	From Ref#1
Weeks 5, 6, 7	Infrared Spectroscopy (IR) and Its Applications	From Ref#1
Weeks 3, 4, 5	Nuclear Magnetic Resonance Spectroscopy (NMR), Applications and Uses in the Identification of Organic Compounds	Asynchronous From Ref#1
Weeks 7, 8, 9	Mass Spectrometry (MS) and its applications in quantitative and qualitative analytical methods.	From Ref#1
Weeks 7, 8	- Introduction to other instrumental methods: Polarimetry, Atomic emission spectrophotometry (AES), inductively coupled plasma emission spectroscopy, and Fluorescence spectrophotometry	Asynchronous From Ref#1
Weeks 10, 11, 12	Liquid Chromatography	From Ref#1
Weeks 9, 10	Gas Chromatography	Asynchronous From Ref#1
Weeks 10, 11, 12	Interpretation of Spectra and Chromatograms in GMP Context	
Weeks 11, 12, 13	Case Studies in Quality Control and Process Troubleshooting	

Relationship to Program Student Outcomes (Out of 100%)											
PLO MANU1.1	PLO MANU1.2	PLO MANU2.1	PLO MANU2.2	PLO MANU3.1	PLO MANU3.2	PLO MANU3.3	PLO MANU4.1	PLO MANU4.2	PLO MANU4.3	PLO MANU4.4	PLO MANU4.5

Policy	
Exams	All exams are closed book and notes. The final exam is comprehensive, covering all course material. Requests for incomplete exams require approval from the dean of faculty.
Cheating	Cheating is strictly prohibited, and any student found engaging in cheating will be subject to disciplinary action in accordance with university regulations.
Attendance	Per the policy, if a student exceeds an absence rate of 20% from lectures, the system will automatically drop the course.
Participation	In-class participation is required
Withdrawal	There is a designated withdrawal deadline through student services. Students must adhere to this deadline as indicated in the academic year calendar and subsequently inform the registration unit accordingly.

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