



**Jerash University
Faculty of Pharmacy
Course Syllabus**

Course Information	
Course Title	Instrumental Analysis
Course Number	1101212
Prerequisites	1101113
Instructor	Dr. Khansaa Al- Essa
Office Location	Alkhawrzmi (433)
Office Hours	Mon. & Wen. at 10:00-11:00 PM
E-mail	Khansaa.essa@gmail.com
Course Description	
<p>The students in this course are introduced to the different types of calibration methods and figures of merits for the instruments. Then the properties of electromagnetic radiation will be covered briefly followed by the important components and types of optical instruments, atomic absorption and emission, ultraviolet and visible, X-ray. Quantitative application for each technique will be discussed.</p>	

Text Book	
Title	Principles of Instrumental Analysis.
Author(s)	Douglas A. Skoog , F. James Holler , Stanley R. Crouch
Publisher	Thomson Learning Academic Resource center.
Year	2007
Edition	Sixth Edition
References	D.C. Harris, Quantitative Chemical Analysis, 7th Ed., W.H. Freeman and Co., New York, NY, 2007.

Assessment Policy		
Assessment Type	Expected Due Date	Weight
First Exam	First Exam:	25%
Second Exam	Second Exam:	25%
Seminar and homework		10%
Final Exam	To be announced by the department.	40%

Course Objectives
1. Understand the different calibration methods and when to use each method
2. Evaluate the performance characteristics of an instrument in terms of figures of merits such as limit of detection, sensitivity, selectivity,...etc.
3. Understand the principles and theory of operation for the most common instruments for chemical instrumentation
4. Be able to perform analysis using the covered instruments

Course Content		
Week	Topics	Chapter in Text (handouts)
1	Introduction <ul style="list-style-type: none"> - Classification of Analytical Methods - Types of Instrumental Methods - Instruments for Analysis - Calibration Instrumental Methods - Figures of Merits, Calibration Methods 	Chapter 1
2	Atomic Spectroscopy <ul style="list-style-type: none"> - Properties of Electromagnetic Radiation - Wave Properties of Electromagnetic Radiation 	Chapter 6
3	Components of Optical Instruments <ul style="list-style-type: none"> - Sources of Radiation - Wavelength Selector - Sample containers - Radiation Transducers - Signal Processors and readouts 	Chapter 7
4	An Introduction to Optical Atomic Spectroscopy <ul style="list-style-type: none"> - Optical Atomic Spectra - Atomization Methods - Sample Introduction Methods 	Chapter 8
5	Atomic Absorption and Atomic Fluorescence Spectroscopy <ul style="list-style-type: none"> - Sample Atomization Techniques - Atomic Absorption Instrumentation - Interferences in Atomic Absorption Spectroscopy - Atomic Fluorescence Spectroscopy 	Chapter 9
6	Atomic Emission Spectroscopy <ul style="list-style-type: none"> - Emission Spectroscopy Based on Plasma sources. - Emission Spectroscopy Based on Arc and Spark. 	Chapter 10
6	Atomic Mass Spectroscopy <ul style="list-style-type: none"> - General Features of Atomic Mass Spectroscopy. - Mass Spectrometers. 	Chapter 11
7	An Introduction to UV/Vis Molecular Absorption Spectroscopy <ul style="list-style-type: none"> - Measurement of Transmittance and Absorbance - Beer's Law, Limitations to Beer's Law - Instrumentation 	Chapter 13
8	Application of UV/Vis Molecular Absorption Spectroscopy <ul style="list-style-type: none"> - The Magnitude of Molar Absorptivity - Absorbing Species - Qualitative and Quantitative Analysis by Absorption Measurements 	Chapter 14
9	An Introduction to IR Spectrometry <ul style="list-style-type: none"> - Theory of IR Absorption Spectroscopy. - IR Instrumentation - IR Sources and Transducers 	Chapter 16
10	An Introduction to Chromatographic Separations <ul style="list-style-type: none"> - A General Description of Chromatography - Migration Rates of Solutes - Zone Broadening and Column Efficiency - Optimization of Column Performance - Summary of Important Relationships for Chromatography 	Chapter 26
11	High-Performance Liquid Chromatography <ul style="list-style-type: none"> - Scope of HPLC 	Chapter 28

	<ul style="list-style-type: none"> - Column Efficiency in Liquid Chromatography - Liquid Chromatography Instrumentation - Partition Chromatography - Adsorption Chromatography - Ion Exchange Chromatography - Size- Exclusion Chromatography - Affinity Chromatography - Thin Layer Chromatography 	
12	Gas Chromatography <ul style="list-style-type: none"> - Principles of Gas-Liquid Chromatography - Instruments for Gas-Liquid Chromatography - Gas Chromatographic Columns and Stationary Phases 	Chapter 27

Useful Resources
Library Books. Internet.

تعليمات إضافية
1. الغش مخالف لقوانين الجامعة، لذلك ستعرض نفسك للعقوبات- حسب قوانين الجامعة- إن حاولت الغش.
2. حضور المحاضرات أمر أساسي وإذا وصل غيابك عن محاضرات المادة إلى 15% من المجموع الكلي للمحاضرات ستحرم من المادة تبعاً لقوانين الجامعة.
3. الرجاء اغلاق الهواتف الخلوية اثناء المحاضرة ، وعدم استخدامها اثناء الامتحان .