

## CHEM 312 Syllabus

Course Code	Course Name	Credits	Prerequisite(S)	Classification
CHEM 312	Instrumental Methods of Analysis	3 2T+3P	CHEM 211	Department Requirement

**Course Description** Instrumental Methods of Analysis (Chem.312), three credit hours, taught 5th level/3rd year chemistry students. The course focuses on spectroscopic and electro analytical methods.

**Class Scheduling** Classes are held 2 times/week each for 50 minutes. Labs are held 1 time/week for 170 minutes.

**Textbook** Principles of Instrumental Analysis, Skoog, Holler and Crouch. 2018, 7th edition Cengage Learning  
  
Chemistry, Christian, G. D. 2014, 7th, John Wiley & Sons, USA.

**Course Coordinator** Dr. Effat Bahaidarah  
Dr. Abdulaziz Bashammakh

Relationship to SOs	1	2	3	4	5	6
	X		X			X

**CLOs**

CLO1. Describe the concept of interaction of electromagnetic radiation with matter. (SO1)

CLO2. Recognize the different principles of spectroscopic and electrochemical techniques. (SO1)

CLO3. Calculate different factors that related to spectrometric methods. (SO1)

CLO4. Compare various instrumental methods according to their advantages and disadvantages. (SO1)

CLO5. Apply the graphical analysis to analyze laboratory results. (SO3)

CLO6. Demonstrate self-learning in writing and oral communication skills. (SO6)

## Contents

List of Topics	No. of Weeks
Introduction	1
An Introduction to Spectrometric Methods	2
An Introduction to Ultraviolet-Visible Molecular Absorption Spectrometry	3
An Introduction to Infrared spectrometry	1
Molecular Luminescence Spectrometry	1
Atomic X-ray Spectrometry	1
An Introduction to Optical Atomic Spectrometric	3
Atomic Emission Spectrometry	1
Electro-Analytical Methods	2
Total	15
Laboratory Section:  Determination of the absorption curve of a substance.  Use of a spectrophotometer for the determination of concentration of a solution.  The simultaneous a spectrophotometric determination of a permanganate and dichromate mixture.  Spectrophotometric determination of the pKa of bromothymole blue. Spectrophotometric studies of complex ions (Molar ratio &Continuous variation method).  Spectrophotometric titration of ferric iron with EDTA.  Explore the behavior of 4-nitrophenol in acidic and basic media as well as determination of unknown 4-nitrophenol concentrations based on calibration curve.  Potentiometric Titration of Phosphoric Acid.	13