



**King Saud University**  
**Department of Chemistry**

**CHEM 350**

**Instrumental Methods of Analysis**

**First Semester 2016/2017**



**Credit Hours:** 4 hours (2+2)

**Time:** Lecture: Sun & Tue 10:00–10:50, Lab: Mon 01:00–04:50

**Lecture Theater:** Building No. 5 (A 073 0140)

**Instructor:** Dr. Ahmad Agel

**Web Site:** fac.ksu.edu.sa/aifseisi

**Office No.:** 1A7 & AA53

**Office Hours:** Sun & Tue: 11:00–12:00, Mon & Wed: 10:00–12:00 and by appointment

**E-mail:** aifseisi@ksu.edu.sa

**Teaching Assistant:** Mr. Kamaleldin Omer Ahmed

**Prerequisites:** CHEM 101 or 103

**Course Objectives ...**

The main purpose of this course is to help the students to learn and understand several concepts in spectroscopic and electro-analytical methods. By the end of this course, students expected to:

- Understand the basic principles of electromagnetic radiation.
- Be familiar with some of the spectroscopic techniques such as fluorometry, phosphorometry and chemiluminescence.
- Understand the basics of molecular and atomic spectrometry.
- Know the proper analysis tool for specific metals or compounds.
- Understand the basic principles of electro analytical techniques.
- Recognize the theory of the three main categories electro analytical methods; potentiometry, coulometry and voltammetry.
- Learn how to treat with the spectroscopic and electrochemical experimental data.

This course also designed to give students the opportunity to perform and evaluate different spectroscopic and electro analytical experiments, to identify various standard compounds, and to deal with some traditional and modern analytical instruments.

**Course Description ...**

This course is designed to provide principles and practical experience in spectroscopic and electro analytical methods for BSc students. The course consists of two hours lecture and two hours lab per week. Lectures and experiments provide the fundamentals needed to understand the techniques and instrumentations involved in these powerful analytical tools.

### **Textbook & References ...**

- 1- Ibrahim Al-Zamil, "Analytical Chemistry, Instrumental Analysis" 2<sup>nd</sup> Ed., Al-Khrigi Library, 1998 (in Arabic).
- 2- Gary D. Christian "Analytical Chemistry" 6<sup>th</sup> Ed., John Wiley & Sons, 2004.
- 3- Douglas A. Skoog, James J. Leary, "Principles of Instrumental Analysis", 4<sup>th</sup> Ed., Saunders College Publishing, 1992.
- 4- Robert D. Braun, "Introduction to Chemical Analysis", McGraw-Hill Book Company, New York. NY. 1982.

### **Course Contents (Lecture) ...**

The course includes series of lectures and experiments covers the following subjects:

- Interaction of electromagnetic radiation with matter.
- Basic principles of molecular and atomic spectrometry.
- Spectrometric instrumentation.
- Atomic absorption, emission and fluorescence spectrometry.
- Basic principles of electro analytical techniques.
- Potentiometry and potentiometric titrations.
- Coulometry and conductimetry.
- Voltammetry & related techniques.

### **Course Contents (Laboratory) ...**

During this practical course, students will be exposed to some traditional and modern techniques for analysis of several chemicals. Various spectroscopic and electro chemical techniques such as AAS, AES, ICP, and other instruments for measuring cell potential and voltage will be included. Each experiment consists of general principles, components of the system and applications.

### **Evaluation & Assessment ...**

Midterm exam .....	20%
Assignment, discussion, homework's & attendance .....	10%
Laboratory (reports & quizzes) .....	30%
Final exam (comprehensive) .....	40%

*Good Luck !*