B.S. Senior Year – Fall Semester Lecture

CEM 434 Analytical Chemistry

Description: Instrumental methods of analysis, including spectroscopy, chromatography and electrochemistry.

Credit: 3 Credits (3 hour lecture and 1 hour recitation per week)

Prerequisite: CEM 483 and CEM 395 and CEM 352

Lecture Topics:

Measurement Basics

- Basic Statistics for Data Analysis
- Signal Processing and Noise

Spectroscopy

- Components of Optical Instruments including interferometers & lasers
- Atomic Spectroscopy: Absorption & Emission, ICP
- X-ray Methods: XRF, XPS, and Auger
- Molecular Spectroscopy: Absorption, Fluorescence, FTIR
- Mass Spectrometry
- Surface Characterization by Spectroscopy and Microscopy:
  AFM, STM, TEM, & SEM

Electrochemistry

- Potentiometry:
  Reference Electrodes
  Ion Selective Electrodes including pH electrodes
- Coulometry
- Voltammetry:
  Cyclic Voltammetry
  Stripping Methods
  Squarewave Voltammetry

Separations

- General Principles of Chromatographic Separations
- Gas Chromatography
- GCMS
- Liquid Chromatography
- Ion Chromatography
- Size Exclusion Chromatography

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- Capillary Electrophoresis