B.S. Senior Year – Spring Semester Lab

CEM 435 Analytical Chemsitry Laboratory

Description: Spectroscopic, electrochemical, and chromatographic analytical methods.

Credit: 3 Credits (1 hour lecture and 4 hours laboratory per week)

Prerequisites: CEM 434 and completion of Tier I writing requirement.

The first four experiments focus on techniques not used previously in analytical and physical laboratory courses. The remainder of the term is devoted to special projects in which students apply what they have learned as undergraduate students to solve chemical problems in the laboratory.

1. **Atomic Absorption and Optical Emission Spectroscopies**

   (Comparison of flame AA, graphite furnace AA, and ICP-OES techniques for quantitation of aqueous metal ion solutions)

2. **Liquid Chromatography**

   (Flow rate optimization; quantitative analysis of a mixture of PAH's using an internal standard; use of an HPLC simulation program to investigate the effects of various paraments on a chromatographic separation)

3. **Gas Chromatography/Mass Spectrometry**

   (Qualitative analysis of an organic mixture; use of temperature programming to separate and analyze two organic compounds; quantitation of a mixture using an internal standard and a SIM method)

4. **Electrochemistry**

   (Effect of scan rate and redox couple concentration on faradaic current in cyclic voltammograms; examination of charging current as a function of scan rate in cyclic voltammetry and of potential step size in chronoamperometry; effect of potential step size and redox couple concentration on faradaic current in chronoamperometry)

5. **2 Special Projects**

   Students work in pairs on special projects which are 4 weeks in duration. They are responsible for searching the literature for an appropriate method for solving the problem; collecting and analyzing the data; and preparing a report of their findings. Everyone does a 20-minute oral powerpoint presentation for their peers on one of their projects.