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; informal reports are submitted. The remainder of the term is devoted to special projects in which students apply what they have learned as undergraduate students to solve assigned 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**

   (Determination of trace amounts of Cd, Cu, and Pb ions in water samples using a potentiostat; evaluate the effect of electrode surface on cyclic voltammograms; electrochemical bench)

5. **2 Special Projects**

   Students work in pairs on two 5-week long special projects under the supervision of a faculty mentor. They are responsible for searching the literature for an appropriate method for solving the problem; writing and presenting a proposal; collecting and analyzing the data; and preparing a report of their findings. Everyone does a 20-minute oral presentation for their peers on one of their projects and writes a formal report for the other.