



Analytical Coursework at Cal Poly Pomona

Lower Division Analytical Chemistry

- **CHM 2210/L (2/2): Quantitative Analysis.** Fundamentals of gravimetric and volumetric analysis. Acid-base concepts and pH calculations. Statistical concepts including data reduction and error analysis. Introduction to modern instrumental analysis. Focus on laboratory work, with class discussion supplying supporting theory. *Lecture: 54 – 72 students. Laboratory: 18 students/section.*

Upper Division Analytical Chemistry

- **CHM 3420/L (1/1): Spectroscopic Methods.** Lecture covers theory and practice of modern analytical techniques based primarily on atomic and molecular spectroscopy. Laboratory provides hands-on experience with a variety of modern analytical spectroscopic techniques. *Lecture: 48 – 64 students. Laboratory: 16 students/section.*
- **CHM 3430/L (1/1): Separation Methods.** Lecture covers theory and practice of modern analytical separation methods primarily encompassing various chromatographic techniques. Laboratory provides hands-on experience with modern analytical separation methods. *Lecture: 48 – 64 students. Laboratory: 16 students/section.*
- **CHM 3440/L (1/1): Electroanalytical Methods.** Lecture covers theory and practice of modern analytical electrochemistry, with particular emphasis on potentiometry, voltammetry, amperometry, coulometry, chronopotentiometry, and cyclic and pulse methods. Laboratory provides hands-on experience with electrochemical methods used in quantitative analysis. Emphasis in laboratory is placed on potentiometric titration, ion selective electrodes, coulometry, conductometry, cyclic voltammetry, and polarography. *Lecture: 32 students. Laboratory: 16 students/section.*
- **CHM 3470/L (1/1): Theory of Chemical Instrumentation.** Analytical chemists are required to setup, troubleshoot, repair and sometimes construct the instruments they use for analytical measurements. Designed to explain the theory and application of some commonly used electronic components and techniques in modern instruments, such as microcontroller, AD/DA conversion and data acquisition, sources of noise in instrumental analysis, circuit of noise filter and signal amplification. Laboratory offers hands-on experience with the application of some commonly used electronic components and techniques in modern instruments, such as microcontroller, AD/DA conversion and data acquisition, sources of noise in instrumental analysis, circuit of noise filter and signal amplification. *Lecture: 32 students. Laboratory: 16 students/section.*

- **CHM 4210 (2): Solution Equilibria in Analytical Chemistry.** Study of advanced acid-base theory, complexation, nonaqueous acid-base, solvent extraction, and ion-exchange equilibria. *Lecture: 32 students.*
- **CHM 4480 (3): Modern Mass Spectrometry and FR-NMR.** Introduction of the theoretical and practical applications of one- and two-dimensional NMR and mass spectrometry, including instrumentation and spectral interpretation. Students gain a basic understanding of a variety of NMR pulse sequences and will have a fundamental and technical understanding of ionization sources, mass analyzers, and their limitations. *Lecture: 32 students.*
- **CHM 4490 (2/1): Environmental Analysis.** Sample collection and preparation techniques for different environmental media, such as water, air, and soil. Instrumental analysis of various environmental samples. *Lecture: 32 students. Laboratory: 16 students/section.*
- **CHM 4500 (3/1): Bioanalytical Analysis.** Analytical techniques used in the study of problems in biotechnology and clinical medicine. Uniqueness of problems inherent to the analysis of biological samples, contemporary methodologies, and technique. Laboratory offers application of state-of-the-art separation and assay techniques used to address problems in biotechnology and clinical medicine. *Lecture: 40 students. Laboratory: 16 students/section.*
- **CHM 4600 (2): Air Pollution Problems.** Concepts of air pollution: major air pollutants; sources; future problems. *Lecture: 32 students.*

Graduate Analytical Chemistry

- **CHM 5230 (3): Chemical Spectroscopy and Characterization.** Application of electronic, vibrational (IR/Raman), rotational, and nuclear spectroscopies, scattering methods, and atomic force microscopy to the characterization of matter.
- **CHM 5510L (2): Advanced Instrumentational Analysis Laboratory.** Applications of advanced instrumental analysis to explore problems associated with analytical, organic, inorganic, physical, and biochemistry.
- **CHM 5810 (3): Instrumental Analysis.** Theory and application of instrumental analysis in contemporary areas such as pharmaceutical chemistry, environmental chemistry, food chemistry, and clinical chemistry from the perspective of an analytical chemist.
- **CHM 5820 (3): Water Sampling and Analysis.** Chemical principles that govern the reactions, transport, effects, and fates of chemical species in water, including sampling techniques and analytical methods.

Other available courses include **CHM 4990 and **CHM 5990**, which are Special Topics courses designed by individual faculty. One recent example is **Analytical Toxicology**.