



# Organic Coursework at Cal Poly Pomona

## Organic Chemistry

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- **CHM 2010/L (3/1): Elements of Organic Chemistry.** The fundamental concepts of organic chemistry will be presented, for students who are required to take one semester of organic chemistry. Topics covered include chemical bonding, molecular structure, stereochemistry, nomenclature, physical properties, thermodynamics and kinetics, acid-base chemistry, organic reaction mechanisms, synthesis and biomolecules. Laboratory introduction to general techniques of the organic laboratory for the separation, purification and identification of organic substances. Survey of simple reactions of various functional groups. Not open to chemistry majors. *Lecture: 180 students. Laboratory: 24 students.*
- **CHM 3140/L (4/1): Organic Chemistry I.** Modern concepts of chemical bonding, molecular structure, conformations, nomenclature, thermodynamics and kinetics, acid-base chemistry, stereochemistry, organic reaction intermediates and mechanisms, and synthesis. The physical properties, preparations and reactions of alkanes, haloalkanes, alkenes, alkynes and alcohols. Laboratory introduction to synthesis, isolation, purification, and characterization of organic compounds. A focus of this applied learning will be the theory, interpretation, and application of identifying compounds utilizing IR and NMR spectra. *Lecture: 40 students. Laboratory: 24 students.*
- **CHM 3150/L (3/1): Organic Chemistry II.** The study of the properties, synthesis and reactions of alcohols, ethers, aldehydes, ketones, enols and enolates, carboxylic acids, carboxylic acid derivatives, conjugated systems, aromatic compounds, amines. Special topics include advanced synthetic strategies, biomolecules, and polymers. Laboratory focus on principles of synthesis, characterization isolation, purification, and characterization of organic compounds. A focus of this applied learning will be the theory, interpretation, and application of identifying compounds utilizing IR, NMR, Mass Spectroscopy. *Lecture: 40 students. Laboratory: 20 students.*

## Upper Division Organic Chemistry

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- **CHM 4090 (2): Polymer Chemistry.** Types of polymers and polymerization reactions; properties of polymer solutions and the determination of molecular weights; elasticity and other bulk properties. *Lecture: 32 students.*
- **CHM 4220/L (2/2): Organic Synthesis.** An advanced theoretical and practical study of modern methodologies and strategies in synthetic organic chemistry. The laboratory component utilizes modern techniques to synthesize, purify, and characterize organic compounds. *Lecture and laboratory: 16 – 24 students.*

- **CHM 4230/L (2/2): Physical Organic Chemistry.** Theoretical and practical study of experimental techniques used by organic chemists to investigate problems in reaction mechanisms, catalysis, solution chemistry and substituent effects. *Lecture and laboratory: 16 – 24 students.*
- **CHM 4240/L (2/2): Organic Analysis.** Advanced treatment of modern methods for the structural determination of organic compounds. Emphasis will be on spectroscopic methods, but classical functional group analysis will also be explored. Spectroscopic methods include IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, advanced NMR experiments (e.g., DEPT, HETCOR, COSY, HMBC, NOESY), and mass spectrometry. Purification and structure determination of organic compounds using modern techniques and spectroscopic methods as well as classical functional group analysis. Projects include natural product isolation and separation and identification of mixtures of unknowns. *Lecture and laboratory: 16 – 24 students.*
- **CHM 4590 (3): Green Chemistry.** Principles and important concepts of green chemistry. Exploration of how organic chemistry, product development, plant safety, market development, environmental impacts, and financial incentives holistically affect the development of green processes and cleaner technology. *Lecture: 32 students.*

## Graduate Organic Chemistry

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- **CHM 5390 (3): Synthetic Organic Chemistry.** Study of main group and transition group organic reactions with focus on reagents, mechanisms, stereochemistry and retro-synthetic analysis as applied to multi-step synthesis.
- **CHM 5400 (3): Physical Organic Chemistry.** Theoretical and practical study of experimental techniques used by organic chemists to investigate problems in reaction mechanisms, catalysis, solution chemistry, and substituent effects.
- **CHM 5430 (3): Current Advances in Organic Chemistry.** Recent advances in topics in a select area of organic chemistry are examined: for example, reaction mechanisms, spectroscopy, heterocycles, natural products, organometallic, bioorganic, industrial and photochemistry. May be taken up to five times, only with different topics, for a total credit of 15 units.