Graduate Classes offered in the Department of Chemistry U.C. Riverside

For information about which classes are being taught during the academic year, see the UCR schedule of classes on the web, http://classes.ucr.edu/

CHEM 201A - Advanced Physical Chemistry: Quantum Mechanics (3) Lecture, 3 hours. Covers concepts in quantum mechanics including wavepackets, uncertainty, single particles in multiple dimensions, and approximate methods for solving the Schrodinger equation.

CHEM 201B. Advanced Physical Chemistry: Quantum Mechanics and Spectroscopy (3) Lecture, 3 hours. Covers concepts in quantum mechanics with particular applications to spectroscopy.

CHEM 201C. Advanced Physical Chemistry: Elementary Statistical Mechanics (3) Lecture, 3 hours. Covers concepts in elementary statistical mechanics including ensembles, interpretations of thermodynamic functions, and quantum statistics.

CHEM 201D. Advanced Physical Chemistry: Thermodynamics (3) Lecture, 3 hours. Covers concepts in thermodynamics including fundamental equations, potentials, Maxwell relations, and stability criteria.

CHEM 201E. Advanced Physical Chemistry: Kinetics (3) Lecture, 3 hours.
Covers concepts in kinetics including reaction mechanisms and the molecular interpretation of reaction dynamics.

CHEM 202. Advanced Instrument Design (2) Lecture, 1 hour; laboratory, 3 hours. Focuses on the technical aspects of design and manufacture of instrumentation for physical chemistry and related fields. Introduces design and simulation software and provides hands-on experience in the realization of advanced instrumentation development projects. Students who complete a project and take the final examination receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade.

CHEM 203. Nanoscience and Nanotechnology (3) Lecture, 3 hours. Gives a condensed, interdisciplinary overview of selected fields of nanoscience and emerging nanotechnological applications.
Special focus is on applications relevant for the campus research community that are not based on electronic applications of silicon.

CHEM 206A. Introduction to Computational Quantum Chemistry (3) Lecture, 3 hours. Introduces computational techniques in quantum chemistry. Includes Hartree-Fock theory, Density Functional Theory, and electron correlation methods. Emphasizes practical applications in a research setting.

CHEM 206B. Modeling Chemical and Biochemical Molecules (3) Lecture, 3 hours. Introduces students to the principles, concepts, and techniques for modeling chemical and biological systems. Covers the various methods and techniques for molecular simulations, energy calculations, obtaining initial data, accessing data reliably, visualization and analysis of molecules, and screening and designing chemicals for proteins.

CHEM 207. Chemical Group Theory (3) Lecture, 3 hours. The principles of group theory and molecular symmetry. Applications in several areas of chemistry.

CHEM 208. Interdisciplinary Overview of Current Issues in Semiconductor Processing (3) Lecture, 3 hours. An interdisciplinary overview of present-day semiconductor processing. Introduces topics such as properties of semiconductors, cleanroom environment, epitaxy, ion implantation, etching, lithography, device architecture, testing, and fault detection. May offer field trips. Cross-listed with PHYS 202.

CHEM 209 (E-Z). Advanced Topics in Physical Chemistry (2-3) lecture, 2 hours (2 units) or 3 hours (3 units). Selected advanced topics from modern physical chemistry.

CHEM 210. Advanced Organic Reactions (3) Lecture, 3 hours. Covers modern organic reactions and reagents and their mechanistic pathways, with emphasis on recent developments.

CHEM 211A. Advanced Organic Chemistry (3) Lecture, 3 hours. Covers structure and bonding in organic compounds, with emphasis on more advanced aspects of the field.

CHEM 211B. Advanced Organic Chemistry (3) Lecture, 3 hours. Covers the kinetics and mechanism of organic reactions, with emphasis on more advanced aspects of the field.

CHEM 211C. Advanced Organic Chemistry (3) Lecture, 3 hours. Covers synthetic organic chemistry, with emphasis on more advanced aspects of the field.

CHEM 215A. Organic Synthesis (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B,

CHEM 211C. An advanced treatment of synthetic organic chemistry. CHEM 215A is not a prerequisite to CHEM 215B.

CHEM 215B. Organic Synthesis (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of synthetic organic chemistry. CHEM 215A is not a prerequisite to CHEM 215B.

CHEM 216A. Physical Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of physical organic chemistry.

CHEM 216B. Physical Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of physical organic chemistry.

CHEM 217. Polymers: Synthesis and Characterization (3) Lecture, 3 hours; extra reading, 3 hours. Introduces fundamentals of polymer synthesis, types of polymers, stereo architectures, and applications. Explores modern methods of synthesis, emphasizing catalytic methods. Describes industrial synthetic methods. Examines polymer physics and characterization, emphasizing physical methods.

CHEM 221A. Advanced Analytical Chemistry: Separation Science (3) Lecture, 3 hours. Provides an overview of modern analytical separations including theory, instrumentation, and applications.

CHEM 221B. Advanced Analytical Chemistry: Optical Spectroscopy (3) Lecture, 3 hours. Provides an overview of modern analytical optical spectroscopic techniques including theory, instrumentation, and applications.

CHEM 221C. Advanced Analytical Chemistry: Chemical Instrumentation (3) Lecture, 3 hours. Provides an overview of modern electronics, including analog and digital electronics, as it pertains to the development of modern chemical instrumentation.

CHEM 221D. Advanced Analytical Chemistry: Electrochemistry (3) Lecture, 3 hours. Provides an overview of modern electrochemistry including basic theory, applications, and instrumentation of potentiometry and amperometry.

CHEM 221E. Advanced Analytical Chemistry: Mass Spectroscopy (3) Lecture, 3 hours. Provides an overview of modern mass spectroscopy including basic theory, instrumentation, and applications. Focus is on biological applications.

CHEM 223. Nature of the Chemical Bond (3) Lecture, 3 hours. Explores all aspects of chemical bonding including molecular orbital theory, valence bond theory, and noncovalent bonding, with coverage of key concepts from all subdivisions of chemistry.

CHEM 229 (E-Z). Advanced Topics in Analytical Chemistry (2 or 3) Lecture, 2-3 hours. Selected advanced topics from modern analytical chemistry. Course content will vary.

CHEM 239 (E-Z). Advanced Topics in Inorganic Chemistry (2-3) lecture, 2 hours (2 units) or 3 hours (3 units). Covers selected advanced topics in modern inorganic chemistry. The contents of the segments vary.

CHEM 231A. Structure and Bonding in Inorganic Chemistry (3) Lecture, 3 hours. Covers advanced synthesis, structure, and bonding in inorganic, coordination, and organometallic chemistry.

CHEM 231B. Reactivity and Mechanism in Inorganic and Organometallic Chemistry (3) Lecture, 3 hours. Covers advanced synthesis, reactivity, and mechanism in inorganic, coordination, and organometallic chemistry.

CHEM 231C. Solid State and Materials in Inorganic Chemistry (3) Lecture, 3 hours. Covers the advanced synthesis, structure, bonding, and properties of inorganic materials.

CHEM231A. Covers the advanced chemistry of metals in biology and model compounds.

CHEM 242. Combinatorial Chemistry and Chemical Genomics (3) Lecture, 3 hours. Explores topics in chemical genomics. Part I involves combinatorial principles, library methods, solid-phase and split-pool synthesis, deconvolution, library design and informatics, and parallel synthesis. Part II involves screening and selection systems, forward and reverse chemical genetic approaches, phenocopies and epistasis, preparation and use of molecular arrays, and target identification. May be taken Satisfactory (S) or No
Credit (NC) with consent of instructor and graduate advisor.

CHEM 245. Chemistry and Physics of Aerosols (3) Lecture, 3 hours. Fundamentals of chemical and physical processes controlling behavior and properties of airborne particles. Topics include particle mechanics; electrical, optical, and thermodynamic properties; nucleation; surface and aqueous phase chemistry; gas particle partitioning; sampling; size and chemical analysis; atmospheric aerosols; and environmental effects. Cross-listed with ENTX 245 and SWSC 245.

CHEM 246. Fate and Transport of Chemicals in the Environment (4) Lecture, 4 hours. Covers the identification of toxicants and their sources in the environment; equilibrium partitioning of chemicals in the environment (between air, water, soil, sediment, and biota) using physico-chemical properties; and the transport and chemical transformations of chemical compounds in air, water, and soil media. Includes case studies of fate and transport of selected toxic chemicals. Cross-listed with ENSC 200 and ENTX 200.