

CHEMISTRY COURSE OFFERINGS

FALL 2009

CHEM0001 Chemical Fundamentals w/Lab Atomic and molecular structure; intermolecular forces and states of matter; the relationship of structure and bonding to the physical and chemical properties of matter; patterns of chemical reactions. Qualitative thermodynamics and equilibrium. Three lectures, one laboratory, one recitation. Only one of Chemistry 1, 11, or 16 may be counted for credit. *Kryatov*

CHEM 0002 Chemical Principles w/Lab Physical and chemical equilibria, properties of solutions, thermochemistry and thermodynamics. Chemistry of selected elements. The laboratory includes preparative inorganic chemistry. Additional topics may include electrochemistry, nuclear chemistry, coordination chemistry, organic chemistry, polymer chemistry, biochemistry. Three lectures, one laboratory, one recitation. Only one of Chemistry. **Prerequisites:** Chemistry 1, 11, 16, or permission of instructor. *Batchelder*

CHEM0011 General Chemistry Topics covered are the same as in Chemistry 1 and 2, but discussed in greater detail and with a higher degree of mathematical rigor. Designed to provide a strong foundation for advanced courses in chemistry. For well-prepared students intending to be science majors. Some familiarity with elementary calculus concepts assumed. Three lectures, one seminar on frontiers in chemistry, one laboratory, one recitation. 1.5 course credits. Only one of Chemistry 1, 11, or 16 and one of Chemistry 2 or 12 may be counted for credit. **Prerequisites:** Score of at least 3 on the AP chemistry exam or permission of instructor; Mathematics 11 (may be taken concurrently). *Dewald*

CHEM0031 Physical Chemistry Fundamental principles of chemical thermodynamics and kinetics and their application to the energetics and rates of chemical reactions in the gaseous and solution states. Three lectures. **Prerequisites:** Physics may be taken concurrently. Chemistry 2 or 12, Mathematics 12 or equivalent, and Physics 2, 4, or 12, or permission of instructor. *Kenny*

CHEM0033 Physical Chemistry Lab Thermodynamic, kinetic, and electrochemical experiments. One laboratory. One-half course. **Prerequisites:** Chemistry 31 or concurrent registration. *Batchelder*

CHEM0051 Organic Chemistry I Structure, bonding, stereochemistry, and reactions of carbon compounds. Mono- and polyfunctional compounds, aliphatic and aromatic structures. Synthesis, reaction mechanisms, electronic interpretations of reactivity, spectroscopy. Two 75-minute lectures, one recitation. One course. (Note: The laboratory course, Chemistry 53, is normally taken concurrently with Chemistry 51.) **Prerequisites:** Chemistry 2 or 12. *Stolow*

CHEM00053 Organic Chemistry I Lab Experiments based on topics in Chemistry 51. One laboratory, one lecture. One-half course. **Prerequisites:** Chemistry 51. *Stolow*

CHEM0061 Inorganic Chemistry Chemistry illustrative of the kinds of bonding in inorganic compounds, including discussions of ionic, covalent, electron-deficient, and coordination compounds. Three lectures. Only one of Chemistry 61 or 161 may be taken for credit. **Prerequisites:** Chemistry 31 and 52. *Haas*

CHEM0063 Inorganic and Synthetic Chemistry Laboratory Experiments include those based on topics in Chemistry 61. Techniques in synthesis, spectroscopy, and reactivity studies. Applications of inorganic compounds in synthesis, catalysis, materials sciences, and biology. One laboratory, one lecture, one-half course. **Prerequisites:** Chemistry 61 or 161. *Rybak-Akimova*

CHEM0091 Research I Training in the methods of chemical research. Frequent conferences and library assignments. Open to qualified advanced students. At least fifteen hours per week of laboratory or research work in chemistry required. Pass-fail grading.

CHEM0092 Research II Continued training in the methods of research. At least fifteen hours per week of laboratory or other research work in chemistry required. Students write a report of research accomplished

CHEM0131 Statistical Thermodynamics Entropy and principles of probability. Maxwell-Boltzmann statistics, heat, work, energy and chemical driving forces. Fermi Dirac statistics, counting of states and conduction. Calculation of chemical potential and equations of state from models and fundamental constants. Determination of equilibrium and transport properties. Applications may include Coulombic interactions and electrochemistry, binding and catalysis. Discussion of water and aqueous solutions.

Prerequisites: Chemistry 031 and 032, Mathematics 13, Mathematics 38 recommended. *Shultz*

CHEM0133 Quantum Mechanics Covers Schrödinger equation and basic quantized systems, statistical interpretation and uncertainty, perturbation theory, scattering, symmetries and invariances, approximation methods, energy calculations. **Prerequisites:** Chemistry 32; Mathematics 38 recommended. *Sykes*

CHEM0141 Instrumental Analysis Theory, operation, and application of principal instruments used in chemical analysis and research. Selected special topics such as molecular, atomic, and mass spectroscopies; electrochemistry; and chromatography are included. Designed to acquaint the student with modern laboratory techniques used in all areas of chemistry. **Prerequisites:** Chemistry 31, 42, and 51, or permission of instructor. *Robbat*

CHEM0142 Advanced Analytical Methods In-depth study of several modern specialized techniques and their application to current qualitative and quantitative problems in environmental, materials, and biochemical areas of analysis. **Prerequisites:** Chemistry 42 or 141, or permission of instructor. *Kounaves*

CHEM0150 Intermediate Organic Chemistry Survey of the principles of organic chemistry. Topics include reaction mechanisms, synthesis, and spectroscopic methods of structure determination. Three lectures. **Prerequisites:** Chemistry 52, or permission of instructor. *Thomas*

CHEM0152 Advanced Organic Synthesis Study of noteworthy syntheses of complex molecules with a view to developing a rationale and methodology for synthesis. Examination of the mechanism and scope of new bond-forming methods and functional group transformations. Three lectures. **Prerequisites:** Chemistry 52. *Bennett*

CHEM0161 Advanced Inorganic Chemistry Atomic and molecular structure. Symmetry operations and symmetry point groups. Chemical bonding in inorganic and coordination compounds. Types of inorganic reactions and their mechanisms. Reactivity of major classes of inorganic compounds. Descriptive chemistry of selected main-group elements. More rigorous than Chemistry 61. May receive credit for only one of Chemistry 61 or 161. **Prerequisites:** Chemistry 32 and 52. *Rybak-Akimova*

CHEM0171 Biochemistry I (Cross-listed as Biology 171.) First course in two-course sequence. Chemistry of biological molecules: proteins, lipids, carbohydrates, nucleic acids, etc. Mechanisms of enzyme and ribozyme catalysis. Metabolic pathways, integrated metabolic systems, and molecular physiology. One course. **Prerequisites:** Biology 13, Chemistry 52. *Kritzer*

CHEM0237 Special Topics in Physical Chemistry. Selected topics of contemporary interest in physical chemistry. Three lectures. Prerequisite: consent. *Utz*