

**CHEM 106. Analytical Measurements Laboratory (4)**

Prerequisites: CHEM 102 (with a grade of C or better), 108 or 110A, or permission of instructor. Principles and methods of analytical measurements of organic and inorganic substances by instrumental and non-instrumental techniques. (2 lecture, 6 lab hours)\* F

**CHEM 108. Introductory Physical Chemistry (4)**

Prerequisites: MATH 76 (MATH 77 strongly recommended), CHEM 8 or 128A, and PHYS 2A and 2B or 4A, 4AL, 4B, 4BL, and 4C. Basic treatment of gas laws, thermodynamics, phase equilibria, properties of solutions, kinetics, and spectroscopy. F

**CHEM 110A-B. Physical Chemistry (3-3)**

Prerequisites: MATH 77; CHEM 1B, 8 or 128A; CHEM 110A requires PHYS 4B; CHEM 110B requires PHYS 4C or permission of instructor. Mathematical treatment of the laws of thermodynamics, reaction kinetics, elementary statistical and quantum mechanics, properties of solutions, kinetic theory of gases, crystal structure, molecular structure, and nuclear chemistry. 110A - F; 110B - S

**CHEM 111. Physical Chemistry Laboratory (3)**

Prerequisite: CHEM 110B or concurrently, CHEM 102. May not be taken concurrently with 106. Techniques of physical measurements, error analysis and statistics; ultra-violet, infrared, and nuclear magnetic resonance spectroscopy; dipole moments, viscosity, calorimetry, kinetics, phase diagrams, thermodynamic measurements, and report writing. (1 lecture, 6 lab hours)\* S

**CHEM 123. Advanced Inorganic Chemistry (3)**

Prerequisites: CHEM 1B, 102 and 110A (or concurrently). Treatment of ionic and covalent bonding, atomic structure, molecular structure, and reaction mechanisms. Introduction to visible and infrared spectroscopy of transition metal complexes, special topics. F

**CHEM 124. Synthesis and Characterization (2)**

Prerequisite: CHEM 123 or concurrently. Techniques of preparation to include high temperature reactions, vacuum line and glove box preps, nonaqueous syntheses, solid state reactions. Emphasis on structural characterizations using instrumental methods. (6 lab hours)\* S

**CHEM 125. Applied Analytical Techniques (3)**

Prerequisites: CHEM 8 or 128A and CHEM 102 or 105. Analytical techniques and their applications in clinical, environmental, agricultural, forensic, and bioscience laboratories. (2 lecture, 3 lab hours)\*

**CHEM 127. Organic Problems (1)**

Prerequisites: CHEM 8 or 128A; 128B concurrently. Designed to review organic chemistry, in particular for those students who have taken only a brief course in organic chemistry. *CR/NC* grading only; not applicable to the requirements of a major in chemistry.

**CHEM 128A-B. Organic Chemistry (3-3)**

For chemistry majors; recommended for premedical students and other science majors. CHEM 128A not open for credit to students with credit in CHEM 8. Prerequisites: CHEM 1B with a grade of C or better or permission of instructor; for CHEM 128B: CHEM 128A with a grade of C or better. Introduction to structure and reactivity of principal classes of organic compounds with emphasis on theory and mechanism. FS

**CHEM 129A-B. Organic Chemistry Laboratory (2-2)**

Prerequisites or corequisites: CHEM 128A (for 129A); 128B and 129A (for 129B), or permission of instructor. CHEM 129A must be taken before CHEM 129B. Laboratory study of the methods, techniques, syntheses, and instrumentation or representative classes of organic compounds; introduction to research techniques by way of independent projects; introduction to qualitative organic analysis. (6 lab hours)\* FS

**CHEM 140T. Topics in Chemistry (1-4; max total 6 if no area repeated)**

Prerequisite: permission of instructor. Seminar covering special topics in one of the areas of chemistry: analytical, biochemistry, inorganic, organic, physical. Some topics may have a laboratory. FS

**CHEM 150. General Biochemistry (3)**

Prerequisite: CHEM 8. (CHEM 150 and 153 together constitute a year sequence.) Chemistry and metabolism of basic cellular constituents including carbohydrates, lipids, proteins, and nucleic acids. FS

**CHEM 153. Physiological Chemistry and Metabolism (3)**

Prerequisite: CHEM 150 or 155. Continuation of CHEM 150 or 155. Intensive discussion of the degradation and biosynthesis of major cellular constituents; energy metabolism; control of metabolic processes and pathological implications in mammalian systems. S

**CHEM 155. Fundamentals of Biochemistry (3)**

Primarily for chemistry majors; recommended for premedical students and graduate students in the sciences. Prerequisite: CHEM 128B. (CHEM 155 and 153 together constitute a year sequence.) Structure, function, and metabolism of chemical entities in living systems. F

**CHEM 156. Biochemical Laboratory Techniques (3)**

Prerequisites: senior standing or permission of instructor; CHEM 150 or 155 (or concurrently), 102 or 105, 129A. Provides the student with a range of techniques and methodology appropriate to the study or phenomena at the biochemical, cellular, and organismic levels. Satisfies the senior major requirement for the B.A. in Chemistry. (1 lecture, 6 lab hours)\* S

**CHEM 160. Research Techniques (3)**

Concepts in the design of experiments. Development of practical research skills through the planning and undertaking of a short laboratory project. Satisfies the senior major requirement for the B.S. in Chemistry. (1 lecture, 6 lab hours)\*

**CHEM 170. Chemistry in the Marketplace (3)**

Not open to chemistry majors. Prerequisites: G.E. Foundation and Breadth Area B. The impact of chemistry and chemicals on society and individual lives. G.E. Integration IB. (3 lecture hours) FS

**CHEM 190. Independent Study (1-3; max total 6)**

Prerequisite: permission of instructor. See *Academic Placement — Independent Study*. Approved for *RP* grading. FS

\*In all lab courses, the wearing of approved safety glasses is mandatory.