

chemistry. (CHEM 110A fall semester; CHEM 110B spring semester)

**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) (Spring semester)\*

**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. (Fall semester)

**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) (Spring semester)\*

**125. Laboratory Instrumentation (3)**  
Not open to chemistry majors. Prerequisites: CHEM 8 or 128A and CHEM 105. Basic electricity/electronics, light and optical systems as they apply to the design, use and limitations of instrumentation typical to the analytical and bioscience laboratory. (1 lecture, 6 lab hours)\*

**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.

**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 or CHEM 4 with a grade of *C* or better; 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.

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

Prerequisites: CHEM 128A or concurrently for 129A; CHEM 128B or concurrently *and* CHEM 129A for 129B. 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)\*

**130. Organic Analysis (3)**  
Prerequisites: CHEM 102, 128B, 129B. Characterization of organic compounds through study of chemical and physical properties; application of spectroscopy, chromatography and functional group analysis to elucidation of structure. (1 lecture, 6 lab hours)\*

**139. Chemistry and the Consumer (3)**  
Prerequisite: CHEM 3B, 8, or 128A. The impact of chemistry on society and individual lives. Topics selected from: foods as chemicals, food additives, drugs and medication, petrochemistry and the source of chemicals, pesticides and agricultural chemicals, chemical ethics, and current topics of interest.

**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.

**142. Introduction to Biotechnology (3)**  
Prerequisite: CHEM 150 or permission of instructor. Emphasizes the principles and industrial utilization of recombinant DNA, monoclonal antibodies, enzyme and cell immobilization, fermentation technology, and downstream processing.

**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.

**151. General Biochemistry Laboratory (2)**  
Prerequisites: CHEM 8, 105, 109, 150 (or concurrently). Chemical and physical properties of naturally occurring compounds; introduction to techniques of chromatography, polarimetry, electrophoresis, photometry, and enzymology. (6 lab hours)\*

**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. (Spring semester)

**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. (Fall semester)

**156. Biochemical Laboratory Techniques (3)**  
Prerequisites: senior standing or permission of instructor; CHEM 150 or 155 (or concurrently), 102 or 105, 109 or 129A. Provides the student with a range of techniques and methodology appropriate to the study of phenomena at the biochemical, cellular, and organismic levels. Satisfies the senior major requirement for the B.A. in Chemistry. (1 lecture, 6 lab hours) (Spring semester)\*

**160. Research Techniques (3)**  
Prerequisite: senior standing or permission of instructor. 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)\*

**170. Chemistry in the Marketplace (3)**  
Not open to chemistry majors. Prerequisites: completion of General Education Quantitative Reasoning and Area B2 Breadth requirements, completion of CHEM 10 or 3A or 1A. The impact of chemistry and chemicals on society and individual lives. G.E. Integration IB. (3 lecture hours)

**171. Fireworks, Gemstones, and Dyes: The Science of Color (3)**  
Primarily for non-science majors. Prerequisites: completion of General Education Quantitative Reasoning and Area B Breadth requirements. The chemistry and physics behind the color of objects and color perception, and the interaction of light with matter. G.E. Integration IB. (2 lecture, 3 lab hours)

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