

Chemistry (CHEM)

CHEM 102 CHEMISTRY AND SOCIETY (3)

Lecture, 2 hours; laboratory, 3 hours. An introductory course in chemistry for non-majors. Covers the basics of chemistry in an effort to better understand current environmental issues. The laboratory will consist of experiments covering chemical principles and phenomena discussed in the lecture. Satisfies GE, category B1 (Physical Sciences) and GE laboratory requirement.

CHEM 105 ELEM OF GENERAL, ORGANIC AND BIOCHEM (5)

Lecture, 4 hours; laboratory, 2 hours. A survey of the principles of chemistry, with emphasis placed on those that apply to living organisms. The course is designed for students in nursing and majors that do not require further courses in chemistry. Course is not a prerequisite for any chemistry course. Satisfies GE, category B1 (Physical Sciences) and GE laboratory requirement.

CHEM 107 INTRODUCTION TO PHYSICAL SCIENCE FOR TEACHERS (3)

Lecture, 3 hours. A non-mathematical course designed to introduce students to a range of topics in physics and chemistry that are required by the California Science Standards for grades K-8, including the laws of motion, energy, the structure of matter, the states of matter, electricity and magnetism, light and optics. Lectures include many demonstrations to illustrate physical science principles and students will be asked to think about how they would demonstrate or explain various concepts.

CHEM 110 INTRODUCTORY GENERAL CHEMISTRY (3)

Lecture, 3 hours. Develop fundamental knowledge and necessary skills in General Chemistry for students who plan to major in science or pre-health programs. This course assumes no previous chemistry background from the student and may be used as a first chemistry course or a refresher course to enhance an insufficient chemistry background. Topics covered in the course include significant figures, unit conversions, naming chemical compounds, chemical equations, concentration units, pH, acids and bases, the mole concept and stoichiometry. CHEM 110 may be taken to prepare for CHEM 115A. This course is not applicable to the chemistry major, minor, or GE requirement.

CHEM 115A GENERAL CHEMISTRY (5)

Lecture, 3 hours; laboratory 3 hours. Principles of chemistry for students in science, pre-health and related areas of study. This course will introduce students to science and scientific thought by using problem-solving strategies in both a conceptual and mathematical manner. First semester topics include atomic and molecular structure, states of matter, chemical reactions, stoichiometry and thermodynamics. Second semester topics include kinetics, equilibrium, buffers, and electrochemistry. Satisfies GE, category B1 (Physical Sciences), and laboratory requirements.

CHEM 115B GENERAL CHEMISTRY (5)

Lecture, 3 hours; laboratory 3 hours. Continuation of CHEM 115A. Prerequisite: CHEM 115A. Satisfies GE, category B1 (Physical Sciences), and laboratory requirements.

CHEM 125A HONORS ANALYTICAL GENERAL CHEMISTRY (5)

Lecture, 3 hours; laboratory 3 hours (5 units). This one-year sequential honors analytical general chemistry course is designed for students who have a prepared background in chemistry. Topics traditionally covered in the first semester of general chemistry (periodic trends, stoichiometry, aqueous chemical reaction and molecular geometry) will be briefly reviewed. However, this first semester course (CHEM 125A) will focus on bonding, kinetics, solutions, acid-base equilibrium, thermodynamics, and electrochemistry. Prerequisite: 4 or higher on the high school AP chemistry exam, or a pass on the departmental chemistry placement exam. Letter grade or Cr/NC. Fall A / Spring B. GE credit for area B1.

CHEM 125B HONORS ANALYTICAL GENERAL CHEMISTRY (5)

Lecture, 3 hours; discussion 1 hour; laboratory 3 hours (5 units). The second semester (CHEM 125B) starts by applying the topics covered in the first semester to statistics, chemical literature, chromatography, spectroscopy and biological chemistry. After completion of this course students will receive credit for the full year of general chemistry and one semester of quantitative analysis (CHEM 255). Prerequisite: 4 or higher on the high school AP chemistry exam, or a pass on the departmental chemistry placement exam. Letter grade or Cr/NC. Fall A / Spring B. GE credit for area B1.

CHEM 255 QUANTITATIVE ANALYSIS (4)

Lecture, 2 hours; laboratory, 6 hours. Theory and practice of methods of analysis, including volumetric, gravimetric and selected instrumental techniques. Prerequisite: CHEM 115B. CAN CHEM 12 or CHEM 125A.

CHEM 310A FUNDAMENTALS OF PHYSICAL CHEMISTRY (3)

Lecture, 3 hours. Development and applications of the concepts of thermodynamics, equilibrium, kinetics, quantum mechanics, and spectroscopy to chemical systems. Prerequisites: CHEM 255; CHEM 125B; MATH 211S; PHYS 210AB or 214 and 216; or consent of instructor.

CHEM 310B FUNDAMENTALS OF PHYSICAL CHEMISTRY (3)

Lecture, 3 hours. Continuation of CHEM 310A. Prerequisites: CHEM 310A; CHEM 255; CHEM 125B; MATH 211S; PHYS 210AB or 214 and 216; or consent of instructor.

CHEM 316 FUNDAMENTALS OF PHYSICAL CHEM LAB (2)

Lecture, 1 hour; laboratory, 3 hours. Physicochemical measurements, with an emphasis on error analysis, instrumental techniques, report writing and presentation. Prerequisites: CHEM 310A; concurrent enrollment in CHEM 310B or consent of instructor.

CHEM 325 INORGANIC CHEMISTRY (3)

Lecture, 3 hours; Atomic structure, symmetry and group theory of small molecules and the relationship of these concepts to bonding theory and molecular spectroscopy. Applications of symmetry and group theory to coordination chemistry of transition metal complexes in organometallic, environmental, bioinorganic, and materials chemistry. Other topics include kinetics and reaction mechanism of inorganic and organometallic compounds including electron transfer. Prerequisites CHEM 310B, or concurrent enrollment.

CHEM 335A ORGANIC CHEMISTRY (5)

Lecture, 3 hours; laboratory lecture, 1 hour; laboratory, 3 hours. Basic course in the general theory and reactions of organic chemistry. Emphasis on basic principles. Recommended for science and pre-professional majors. Prerequisite: CHEM 115B; CHEM 125A or consent of instructor.

CHEM 335B ORGANIC CHEMISTRY (3)

Lecture, 3 hours. Continuation of CHEM 335A. Prerequisite: CHEM 335A.

CHEM 336 ORGANIC CHEMISTRY LAB (2)

Laboratory lecture, 1 hour; laboratory, 3 hours. Fundamental techniques of organic chemistry, emphasizing synthetic organic chemistry, modern instrumental methods, and qualitative organic analysis. Designed to complement CHEM 335B. Prerequisite: CHEM 335A.

CHEM 397 CHEMISTRY PRACTICUM (1-6)

Supervised chemistry work experiences that involve practical application of previously studied theory. Intended for professional growth and/or collection of data for future theoretical interpretation. Not applicable toward the chemistry major or minor. May be repeated for up to a total of 6 units. Two hours of work per week for each unit of credit. Cr/NC only. Prerequisite: junior standing or consent of instructor.

CHEM 401 INSTRUMENTAL ANALYSIS AND CHEMICAL SYNTHESIS (3)

Lecture, 1 hour; laboratory 6 hours. An integrated inquiry and project-based upper-division course. The projects will cover the synthesis and characterization of organic and inorganic molecules and characterization of student-prepared molecules. This course is only offered in the fall. Prerequisites: CHEM 255 or CHEM 125B; and CHEM 336 highly recommended.

CHEM 402 ADVANCED SYNTHESIS AND INSTRUMENTAL ANALYSIS (3)

Lecture, 1 hour; laboratory 6 hours. Project-based synthesis, purification and characterization of inorganic, organic and organometallic molecules. Capstone course for BS chemistry degree. Topics will include air-sensitive syntheses, standard Schlenk line techniques, characterization through IR, optical and NMR spectroscopy, mass spectrometry and electrochemistry. Prerequisite: CHEM 401. Highly recommended: CHEM 325, or consent of instructor.

CHEM 441 BIOCHEMICAL METHODS (3)

Project based course involving characterization of proteins from natural sources utilizing biochemical methods and experimental design techniques common in biotechnology and research. Capstone course for biochemistry degree. Offered in spring only. Prerequisites: CHEM 445 or 446 (may be concurrent), CHEM 255 and a foundation in spectroscopy, kinetics strongly recommended.

CHEM 445 STRUCTURAL BIOCHEMISTRY (3)

Lecture, 3 hours. A study of the structure: function relationships of amino acids, proteins, enzymes, carbohydrates, lipids and nucleic acids. Also includes topics such as enzyme kinetics, membrane transport and signaling. Only offered in the fall. Prerequisites: CHEM 335B or CHEM 232 and a foundation in kinetics and thermodynamics, or consent of instructor.

CHEM 446 METABOLIC BIOCHEMISTRY (3)

Lecture, 3 hours. A study of bioenergetics and the metabolism of biological molecules including carbohydrates, lipids, nucleic acids, and proteins. This course is only offered in the spring. Prerequisites: CHEM 335B or CHEM 232, CHEM 445 or BIOL 123, and a foundation in kinetics and thermodynamics, or consent of instructor.

CHEM 494 UNDERGRADUATE RESEARCH AND SERVICE LEARNING (1-6)

This course serves as a 'senior experience' for our graduating majors. Under supervision by the chemistry faculty, students will participate in individual investigations of student- or faculty-initiated chemical problems. May be taken only by petition to the Chemistry Department. May be repeated. Prerequisites: consent of instructor.

CHEM 495 SPECIAL STUDIES (1-3)

Investigation of existing information on a specific or general topic of interest to the student. May be repeated. Prerequisite: consent of instructor; upper-division standing in chemistry or closely related science.

CHEM 496 SELECTED TOPICS IN CHEMISTRY (1-3)

A study of an advanced topic in chemistry. May be repeated for credit with new subject matter.

CHEM 497 RESEARCH SEMINAR (1)

Laboratory, 3 hours. Capstone course for B.A. and B.S. degrees. The course will focus on techniques involved in the preparation and delivery of technical seminars. This final project will be a formal oral presentation to the chemistry department on a research paper from the chemical literature or the student's undergraduate research project. Instruction includes the appropriate coverage of the selected topic, use of the chemical literature, and the preparation and use of PowerPoint, graphic and web-based applications to create an informative talk. Prerequisites: senior standing or consent of instructor.

CHEM 499 INTERNSHIP (1-4)

Chemistry field experience in industrial, hospital or similar laboratory settings. Enrollment by prior arrangement with supervising faculty member and community sponsor. Please see department advisor for details. Three hours of work per week for each unit of credit. Internship assignments may be paid. Cr/NC only. May be repeated.