

## CH: Courses in Chemistry

### Department of Natural Sciences

#### CH 101-102 General Chemistry 8 Cr

A course in the principles of chemistry for students majoring in the sciences. Topics for the first semester include structure of atoms and molecules, chemical reactivity, stoichiometry, energy, and theories of chemical bonding. Second semester will cover intermolecular forces, kinetics, and chemical equilibrium. Three (3) lectures and one 2½ hour laboratory per week. High school chemistry and two (2) years of high school algebra are recommended. Students must receive a "C" or better in CH101 to enroll in CH 102. Offered annually.

#### CH 111 Essentials of Chemistry: General 4 Cr

A one-semester course in the fundamentals of general inorganic chemistry. Principal topics include atomic structure; atomic-molecular description of matter, solutions, and equilibrium; and basic calculations and measurements. Recommended for general studies students and students in nursing and health information management. Three (3) lectures and one 2½ hour laboratory per week. Fall semester.

#### CH 112 Essentials of Chemistry: Organic and Biochemistry 3 Cr

A one-semester course in the fundamentals of organic chemistry and biochemistry. Principal topics include organic nomenclature; chemistry of functional groups; structures and reactions of fats, carbohydrates, proteins, enzymes, and nucleic acids. Recommended for students in nursing. Three (3) lectures per week; no laboratory. Prerequisite: CH 101/102 or CH 111 or consent of the instructor. Students must receive a "C" or better in the prerequisite to enroll in CH112. Spring semester.

#### CH 205 Quantitative Analysis 4 Cr

A detailed study of chemical equilibria and the classical methods of chemical analysis. Solubility, acid-base reactions, oxidation-reduction chemistry, complexometric reactions, phase equilibrium and the interaction of light with matter are studied in the context of analytical techniques, including volumetric analysis, titrimetry, gravimetry, chromatography and spectrophotometry. Basic issues of chemical hygiene are also covered along with experimental error and statistics. The laboratory stresses good laboratory technique through the quantitative analysis of unknown samples by classical and modern methods. Three 50-minute lectures and one four-hour laboratory per week. Prerequisites: CH 101-102. Spring semester.

#### CH 301-302 Organic Chemistry 8 Cr

The chemistry of carbon-based compounds. The course will examine the main classes of organic compounds in terms of preparation, structure, physical and spectral properties, methods of functional group transformation, and mechanism of reaction. In the second semester of the laboratory sequence, students will perform an independent organic laboratory project. There will be an emphasis on oral and written scientific communication of the projects results. Three lectures and one three hour laboratory per week. Prerequisite: Grade of "C" or better in CH 102 or consent of instructor. Students must pass CH 301 with a "C" or better to enroll in CH 302. Offered annually.

#### CH 306 Instrumental Methods 4 Cr

An examination of modern instrumental methods of chemical analysis from a theoretical and practical standpoint. Students learn the chemical principles that underlie instrument operation and

study the functions of instrument components and their organization into chemical measurement systems. An emphasis is placed on the utility and limitations of each instrument. Principal instrumental techniques include atomic and molecular optical spectroscopy, gas and liquid chromatography, mass spectrometry, nuclear magnetic resonance spectroscopy and electrochemical methods. The laboratory provides hands-on access by the students to a wide variety of state-of-the-art chemical instrumentation. Three 50-minute lectures and one four-hour laboratory per week. Prerequisite: CH 205. Fall semester. Fulfills writing intensive requirement.

#### CH 353 Biochemistry 4 cr.

A study of the chemical principles governing biological macromolecules. Topics include protein structure and function, enzyme mechanisms and kinetics, carbohydrates and lipids, energetics and major metabolic pathways. The laboratory will include both computer simulations and an introduction to current molecular techniques in the field. Both lecture and lab will emphasize problem solving and experimental data analysis. Three (3) lectures and one three-hour laboratory per week. Prerequisites: CH 301-302, BI 161. Fall semester. May fulfill writing intensive requirement. Enrollment limited.

#### CH 391-392 Physical Chemistry 8 Cr

Subjects covered are thermodynamics; group theory, statistical mechanics, rates and mechanisms; quantum mechanics; atomic and molecular structure. Lab explores various experimental strategies and techniques of physical chemistry and includes investigations of energetics, molecular structure and reaction dynamics requiring the use of instrumental systems. Two semester course: Three 50 minute lectures and one three hour lab per week. Prerequisite: CH 302, MA 233 and PHYS 206. Student must pass prerequisites with a "C" or better to enroll in CH 391-392. Offered annually.

#### CH 405 Advanced Inorganic Chemistry 4Cr

A detailed study of current topics in inorganic chemistry, including coordination chemistry, organometallic chemistry, homogeneous catalysis and bioinorganic chemistry. Emphasis will be placed on orbital interactions, reactivity and reaction mechanisms of inorganic molecules. Lab covers synthesis and spectroscopy of inorganic compounds. Prerequisite: CH 205. Three 50 minute lectures and one three hour lab per week. Spring semester, even numbered years.

#### CH 406 Advanced Organic Chemistry 4 Cr

A study of synthesis and mechanism in organic chemistry. The synthesis section will encompass the study of theory, design and methods of modern organic synthesis. The mechanistic section will include the study of mechanisms and methods of mechanism elucidation. Original papers will be read and analyzed. Oral and written scientific communication will be emphasized. Three lectures per week plus two hour seminar. Prerequisite: CH 302. Spring semester, odd numbered years.

#### CH/BI 477 Honors Thesis Writing 1 Cr

This course is intended to guide students through the process of writing an honors thesis based upon data the student have collected. The course consists of weekly meetings during which the parts of the thesis (Introduction and Literature Review, Materials and Methods, Results, and Discussion) will be discussed. Poster and Power Point presentations are covered. By the end of the semester, students will have completed a rough draft of their theses. One (1) hour lecture/discussion per week. Required of all students who wish to graduate with honors. Prerequisite: 3.25 gpa and completion of an honors research project. Fall semester.

**CH 489 Senior Seminar 1 Cr**

A weekly seminar course with discussion of current chemical literature, presentations by professionals in the field, instruction in the effective communication of chemistry, and student presentations. Required for all chemistry majors. Prerequisite: senior standing. Spring semester.