

# CHEMISTRY (CHEM)

## **CHEM1000** CHEMISTRY OF THE BUILT ENVIRONMENT

This course provides a fundamental introduction to chemistry topics with a focus on the built environment. Fundamental principles of chemistry with emphasis on solving problems encountered in business and commerce. Topics include: the atomic model; writing, balancing; and predicting reactions; stoichiometry; the periodic table; properties of acids, bases, and salts; properties of aqueous solutions. **Corequisite:** MATH1000 (4 credits) fall, spring

## **CHEM1005** CHEMISTRY A

This course will introduce the students to basic concepts in chemistry through contemporary applications. Topics will include atomic model and periodic chart, solutions, chemical formulas, balancing chemical reactions, and acids and bases. Laboratory sessions illustrate principles. **Prerequisite:** MATH1005 (4 credits)

## **CHEM1100** GENERAL CHEMISTRY I

An introduction to chemistry for technical majors, covering atomic structure, molecular orbitals and bonding, reduction/oxidation, metals, and modern materials. There is a focus on the understanding of atomic and molecular structure, and its effects on bulk structure. Laboratory exercises supporting the understanding of the lecture topics will be included, with a focus on good laboratory practice. (4 credits) fall, spring.

## **CHEM1600** GENERAL CHEMISTRY II

A second semester of introductory chemistry covering topics in nuclear structure and reactions, solution chemistry and colligative properties, chemical kinetics, chemical equilibrium, thermodynamics, and electrochemistry. An introduction to advanced topics in environmental chemistry, transition metals and organic chemistry is included. Multi-concept laboratory projects that connect to lecture topics are used, with an emphasis on good laboratory technique, experimental design, data collection and critical evaluation data. **Prerequisite:** CHEM1100 (4 credits) fall, spring

## **CHEM2000** BASICS OF ORGANIC & BIOCHEMISTRY

This course is intended to introduce students to key concepts in organic chemistry and biochemistry, and to describe the significant connections between these topics and health, disease and the molecular treatment of disease. Specific topics include saturated and unsaturated hydrocarbons, alcohols, phenols, esters, aldehydes, ketones, carboxylic acids, amines, carbohydrates, lipids, proteins, enzymes, nucleic acids, molecular genetics and metabolism. **Prerequisites:** BIOL1100 and CHEM1100 (4 credits) fall, spring

## **CHEM2200** PROTEINS MEDICINE & DISEASE

A second semester in introductory chemistry focusing on the relevance of protein sequence and structure in health, disease and drug design. Specific topics include introduction to organic molecules, enzyme kinetics and inhibition and protein structure. There will also be an emphasis on correlating protein chemistry aspects to mechanisms of disease, methods of drug discovery, and computational methods used in the drug discovery process. A combination of projects involving wet and computational laboratory methods will be included. **Prerequisite:** CHEM1100 (4 credits)

## **CHEM2500** ORGANIC CHEMISTRY I

This course is an introduction to organic chemistry. It covers basic organic nomenclature and functional groups, stereochemistry, the reactions of alkanes, alkenes, and alkynes, and instrumental analysis of organic molecules. **Prerequisite:** CHEM1600 (4 credits) fall

## **CHEM2990** INDEPENDENT STUDY IN CHEMISTRY

This course investigates a topic of special interest to faculty and students that is outside regular course offerings. **Prerequisite:** Consent of the academic unit and instructor (1 - 4 credits)

## **CHEM3500** ORGANIC CHEMISTRY II

This course is a continuation of Organic Chemistry I. It covers benzene and its associated reactions, alcohols and their associated reactions, an introduction to carbonyl chemistry, as well a continuation of instrumental analysis as applied to these classes of molecules. Conjugated systems and their detection using UV/V is spectroscopy will be introduced. Polymer chemistry and lipids are also addressed. **Prerequisites:** CHEM2500 (4 credits) spring

## **CHEM3550** BIOCHEMISTRY

This course starts with structural descriptions of macromolecules, with particular focus on proteins and the structure/function relationships. Enzymes and the principles of catalysis are discussed, followed by a comprehensive survey of the pathways and regulation of metabolism, including glycoses, the Krebs Cycle, electron transport, as well as lipid, carbohydrate, and protein metabolism. Laboratory exercises supporting the understanding of the lecture topics will be included, with a focus on good laboratory practice. **Prerequisites:** CHEM1100; and CHEM2000 or CHEM2500 (4 credits) summer

## **CHEM3600** INORGANIC CHEMISTRY

This course will introduce students to bonding and structure of inorganic molecules. This course covers atomic and molecular bonding theories, symmetry, group theory, crystal structures, coordination chemistry, organometallic chemistry, and an introduction to material science. Computational techniques will be used to supplement the understanding of transition metal geometric and electronic structure. In lab, students will perform several advanced syntheses of inorganic coordination compounds and organometallic compounds. **Prerequisite:** CHEM2500 (4 credits) summer

## **CHEM3800** SPECIAL TOPICS IN CHEMISTRY

These courses present topics that are not covered by existing courses and are likely to change from semester to semester. Refer to the Class Schedule for a specific semester for the courses offered that semester. (1 - 4 credits)

## **CHEM4200** ADVANCED LABORATORY TECHNIQUES IN CHEMISTRY

In this course students will apply a wide range of theoretical concepts and laboratory skills learned in previous courses, and apply them to rigorous synthetic challenges. Students will synthesize and characterize multiple compounds of interest, developing laboratory skills and a deeper appreciation for the connection between theory and practice. **Prerequisites:** CHEM3500 (4 credits) fall