(CH) CHEMISTRY

Courses

CH 180. Principles of Gen Chemistry. 3 Hours.
This course explores fundamental quantitative and qualitative principles of inorganic, organic and biological chemistry and provides a basic understanding of theoretical and applied aspects of general chemistry. Topics in inorganic chemistry include measurement, atomic theory and chemical bonding, chemical reactions and mass relationships, kinetic theory and gas laws, acids, bases, pH and buffers. Organic chemistry will provide an overview of the nomenclature, properties and reactivity of major groups of organic compounds, while biochemistry will focus on the chemistry of carbohydrates, lipids, proteins, and enzymes. An overview of biochemical energetics, nucleic acids and protein synthesis is also included.

CH 181. Chemistry I. 3 Hours.
This introduction to chemistry provides a basic understanding of theoretical and practical aspects of inorganic chemistry. The course includes the metric system, chemical elements and symbols, the structure of the atom, chemical bonds, molecules and compounds, and chemical reactions.

CH 182. Chemistry II. 3 Hours.
This course is a continuation of Chemistry I. It focuses on organic chemistry and biochemistry and provides a background for understanding the chemical mechanisms of health and disease. Organic chemistry will emphasize the study of carbon, its special properties, and its compounds. Biochemistry will focus on the chemicals of living organisms, carbohydrates, lipids, proteins, and nucleic acids. Selected physiological topics such as energy metabolism, the genetic code, and protein synthesis are included. Prerequisite(s): CH 181.

CH 287. Organic Chemistry I. 3 Hours.
This course comprises the first semester of a one-year introduction to the chemistry of carbon-containing compounds. It provides fundamentals of modern organic chemistry with an emphasis on chemical bonding, stereochemistry, and reaction mechanisms. Chemistry, as one of the exact sciences, requires quantification. Therefore, development of the critical thinking and problem solving strategies, as well as the experimental know-how and laboratory skills are major objectives of the course. Introduction to microscale lab techniques, modern analytical instrumentation, as well as computation technology additionally supports objectives of the course. Prerequisite(s): CH 182.

CH 288. Organic Chemistry II. 3 Hours.
This course comprises the second semester of a one-year introduction to the chemistry of carbon-containing compounds. It provides fundamentals of modern organic chemistry with an emphasis on stereochemistry, modern instrumental methods in identification of organic compounds, energetics, reaction mechanisms, and selected applications in biochemistry. Critical analysis of structure-properties` relationships in organic chemistry, and their applications, as well as more advanced know-how (FT-NMR or FT-IR, and UV/Vis spectroscopies) and laboratory skills (applications of semi-empirical molecular computations, and multistep synthetic procedures) are major objectives of this course. Prerequisite(s): CH 287.

CH 349. Environmental Inorganic Chemistry. 3 Hours.
In this course, students obtain an understanding of the fundamental chemistry implicit in the environment. Students also become familiar with aspects of mineralogy, oceanography, soil science, sedimentology and microbiology. The course emphasizes natural geochemical processes and how they operate over a variety of scales. Topics range from global issues such as atmospheric pollution and its effect on global warming and ozone destruction to the link between microbiological populations and local and global scale nutrient and chemical cycling. The course is designed to introduce the student to major systems and cycles in the environment and how materials and energy are cycled in these systems. Prerequisite(s): CH 181 and CH 182 and CX 181 and CX 182 and MS 180.

CH 352. Biochemistry. 3 Hours.
In this offering, the student will be exposed to reductionism in the field of biology. Biochemistry overlaps and articulates with many fields of endeavor. The discipline embraces physiology, pharmacology, enzymatics, nutrition, immunology, structural biology, biotechnology, and molecular biology all at the same time. The course curriculum will focus upon the role of enzymes in guiding metabolic processes and pathways. The student will come to understand the details of biological functioning at these three levels of organization: Metabolism, metabolic pathways, enzymatic mechanisms and kinetics. Prerequisite(s): CH 182 and BY 191 and BL 191.

CH 390. Biochemical and Molecular Methods. 4 Hours.
This is a combined lecture and lab course that focuses on the theory, techniques, and instrumentation used in the Biochemistry laboratory. The methods covered include gene cloning, protein purification, chromatography, electrophoresis, spectroscopy, centrifugation, nucleic acid structure, protein structure, and PCR. Students apply these methods isolating and characterizing proteins and nucleic acids. Prerequisite(s): CH 352 and CH 287 and CX 287.

CH 450. Physical Biochemistry. 4 Hours.
All biological processes are governed by the same physical and chemical principles that control all chemical reactions. Thermodynamics and, kinetics are core disciplines in the study of biophysical chemistry. This course examines the fundamental concepts of physical chemistry and biophysical techniques to study the biological processes in the cell. Topics include entropy, free energy, kinetics of complex biological reactions, non covalent forces that determine protein and nucleic acid stability (hydrophobic effect, electrostatic interactions and the hydrogen bond). Other topics for the course include the structural organization in nucleic acids and proteins, nucleic acid-protein interactions, and the underlying principles of chemical kinetics and thermodynamics that guides their behavior. Prerequisite(s): MS 182 and SC 285 and SL 285 and SC 286 and CH 352.