CHEMISTRY (CHE)

CHE 105 Chemistry for Health Sciences 4 credits
This one-term laboratory course, designed for nursing and health science majors, builds on general chemistry concepts to provide an overview of organic and biochemistry with an emphasis on applications to the chemistry of the human body. Topics include solutions and body fluids, acid-base chemistry, relation between structure and reactivity for biochemical molecules, metabolic pathways, and applications of nuclear chemistry. (Prerequisites or co-requisite: MAT 165 or an equivalent course.)

CHE 115 General Chemistry I 4 credits
Systematic introduction to the conceptual and symbolic aspects of chemistry. Critical and quantitative thought as applied to the topics of measurement, atomic theory, periodicity and electronic structure of atoms, molecular/ionic structure/bonding, stoichiometry, reactions in aqueous solution, thermochemistry, and gases. (Prerequisites: High School chemistry and one year of algebra or consent of instructor)

CHE 116 General Chemistry II 4 credits
Continuation of General Chemistry 1. Major topics include phases and phase changes, properties of solutions, rates and mechanisms of chemical reactions, chemical equilibrium, acids and bases, aqueous equilibria, thermodynamics, electrochemistry, coordination chemistry, and nuclear chemistry. (Prerequisite: Minimum grade of C- in CHE 115)

CHE 141 Household Chemistry 3 credits
A general education course emphasizing applications of chemistry to daily living. Topics range from baking to medications, from cleaning to cosmetics and from secrets under the sink to close encounters with clothing. Hands-on lab activities supplement the topics. (Prerequisites: A high school chemistry course and access to a kitchen and basic utensils)

CHE 221 Organic Chemistry I 4 credits
This course is the first semester of the comprehensive course in organic chemistry. Topics covered include structure and bonding, nomenclature, constitutions and configurations, stereochemistry, instrument methods [e.g. NMR, IR, MS, GC], reaction kinetics and thermodynamics, mechanisms, and the syntheses and reactions of various functional groups of organic chemistry. (Prerequisite: CHE 116)

CHE 222 Organic Chemistry II 4 credits
This course is the second semester of a comprehensive course in organic chemistry. The course includes the reaction mechanisms and multi-step synthetic routes for organic functional groups that include oxygen, nitrogen, and aromatic systems. Additional topics include amino acids and proteins, carbohydrates, lipids and synthetic polymers. (Prerequisite: CHE 221)

CHE 326 Analytical Chemistry I 4 credits
This course builds on fundamental components of the general chemistry sequence. Careful consideration of uncertainty in measurements, error propagation, and accurate use of instruments are emphasized through consideration of chemical concepts including solubility, equilibria, and acid-base reactions. (Prerequisite: CHE 116)

CHE 328 Biochemistry I 4 credits
This course is an introduction to the structure, function, synthesis, and breakdown of biomolecules. Biological processes including enzyme catalysis, bioenergetics, and metabolism are studied at the molecular level. The lab involves students in the production of protein through recombinant DNA technology. (Prerequisite: CHE221)

CHE 329 Biochemistry II 4 credits
This course is a continuation of CHE 328. Topics covered include detailed analysis of enzyme mechanisms, catabolic and anabolic metabolism, metabolic regulation, transcription, translation, and protein synthesis. Processes important to modern DNA technology and biotechnology will also be discussed. The lab of focuses on manipulation of DNA, proteins, and microorganisms. (Prerequisite: CHE328)

CHE 330 Dietary Biochemistry 4 credits
Examination of the digestion and utilization of macromolecules from a biochemical viewpoint. Metabolic pathway activation/regulation via diet. Factors influencing macromolecule content of common foodstuffs. (Prerequisite: CHE 328)

CHE 335 Medicinal Chemistry 3 credits
This course will provide an overview of the drug discovery and development process from a chemistry perspective. Methods for the discovery, design, and optimization of new drug candidates will be studied. In addition, the clinical, regulatory, manufacturing, and legal requirements for introducing a new drug to the market will be reviewed and discussed. (Prerequisite: CHE 116)

CHE 341 Thermodynamics 4 credits
This course is an introduction to chemical thermodynamics. The mathematics of chemical energy exchange will be studied in detail and used to build an understanding of why gases behave as they do, why chemical reactions never go to completion (equilibria), and the intricacies of phase transitions. Concepts will be related back to biological and everyday examples such as protein folding, enzyme substrate binding, internal combustion engines, and refrigeration. (Prerequisite: CHE 116, MAT 135)

CHE 421 Introduction to Polymer Chemistry 4 credits
This course covers organic mechanisms of polymer synthesis including condensation, radical, ionic, emulsion, ring-opening, and metal-catalyzed polymerizations. Additional topics discussed include polymer chain conformations, solution thermodynamics, molecular weight characterization of polymers, and physical properties of polymers. Laboratories will involve polymer characterization and synthesis. (Prerequisite: CHE 221)

CHE 450 Special Topics in Chemistry 1 credit
The topic for this course will be chosen from a wide range of current research and development in chemistry. Students will read background material, participate in discussions, and complete labs and/or writing assignments as instructed.

CHE 456 Research in Chemistry 1-6 credits
This course offers students an opportunity to do original research in an area of expertise of one of the chemistry faculty members. When applicable, the research will be followed with presentation of a paper at an undergraduate research conferences and submission of a paper for publication. Two to three hours of laboratory and/or library work per credit per week.

CHE 488 Independent Study 1-4 credits

CHE 497 Chemistry Teaching Assistant 1-4 credits
Students enrolled in this course will work with a faculty member to gain teaching experience in chemistry courses. Activities may include: designing laboratory exercises; working with students in laboratory, classroom and tutoring environment; preparing and delivering lectures; developing course materials; grading.

CHE 498 Internship in Chemistry 1-12 credits
The internship is designed to provide students with a work/educational experience that may help determine future educational and occupational goals.