

CHE-Chemistry

CHE101 - General Chemistry I

This is an introductory course for majors and non-majors. Topics covered include atomic structure, chemical reactions, stoichiometry, the gaseous state, chemical bonding, phase changes, and enthalpy. Either five total classroom hours in the studio format, or three class hours and three laboratory hours, each week.

CHE102 - General Chemistry II

This course is a continuation of General Chemistry I and is for majors and non-majors. Topics covered include solutions, kinetics, thermodynamics, gaseous and ionic equilibrium, acids and bases, and solubility equilibrium.

CHE103 - Chemistry for the Everyday World

Chemical principles are introduced and applied to issues and problems facing society. The fundamental language and symbols of descriptive chemistry are covered and used as a means of describing the natural world. To promote science literacy, case studies of important current topics in science with an impact on society will be examined.

CHE104 - Introduction to Experimental Chemistry

This course is specifically designed for students who have declared a major in chemistry. The primary objective of this course is to prepare entering chemistry majors for successful study in the chemistry program. The course will introduce students to the experimental nature of chemistry, focusing on the methodology, tools, and techniques that chemists utilize in their work. Mathematical, scientific, laboratory, and ethical skills are developed.

CHE306 - Inorganic Chemistry

A foundation course for chemistry majors and minors. Topics covered include covalent, ionic, and metallic bonding, molecular symmetry, solid state structures, acid/base and oxidation reduction chemistry, as well as transition metal complexes.

CHE320 - Analytical/Instrumental Chemistry

This is a foundation course for chemistry majors and minors in which the principles of analytical chemistry are introduced. The course initially focuses on the traditional “wet” chemical technique of titrimetry and progresses to study of instrumental methods of analysis. Specific topics covered include acid/base, precipitation, and complexometric titrations as well as optical spectroscopy and chromatography.

CHE331 - Organic Chemistry I

An introduction to the basic principles that govern the reactions of carbon-based compounds. Particular emphasis is placed on introduction of the basic functional groups and their structural and stereochemical properties.

An introduction to reactions of functional groups, including alkanes, alkyl halides, alcohols, alkenes, alkynes and conjugated systems through study of reaction mechanisms, molecular modeling and synthesis. Students are introduced to and trained in important purification techniques and instrumentation used for characterizing molecules.

CHE341 - Organic Chemistry II

This is an in-depth course for chemistry majors and minors which continues the study of important functional groups including alcohols, ethers, carboxylic acids, esters, amides, aldehydes, ketones, amines, phenols and aryl halides. There is a special focus on reactions, mechanisms and synthetic strategies, and introduces and demonstrates the use of spectroscopy to further understand molecular structure.

CHE342 - Organic Chemistry II Lab

This is a laboratory section for non-chemistry majors to accompany Organic Chemistry II (CHE 341). Students continue experiments that study organic functional groups transformations using advanced techniques and instrumentation. There is a special emphasis on molecular structure analysis using spectroscopy.

CHE371 - Intermediate Chemistry Laboratory I

This is a foundation course for chemistry majors with an emphasis on synthesis and characterization of organic, inorganic, and organometallic molecules using higher level experimental protocols and spectroscopic methods. Topics in this integrated laboratory course include proper use of the experimental notebook, molecular modeling, and spectroscopic theory.

CHE372 - Intermediate Chemistry Laboratory II

This is a foundation course for chemistry majors with a continued emphasis on synthesis and characterization of organic, inorganic, and organometallic molecules. This second semester, integrated laboratory course will have an increased focus on using analytical techniques and spectroscopic instrumentation to achieve these goals. These experiences will culminate in an assigned individual research project.

CHE381 - Environmental Chemistry

This is an in-depth course in the chemistry curriculum. It is a comprehensive overview of major environmental problems based on origin, fate, toxicity and remediation of chemical pollutants. Modern environmental pollution issues such as: global warming, ozone depletion, photochemical smog, acid rain, fine particulate matter, pesticides, toxic metals and alternative energy are introduced. Chemical principles for understanding various air, water and soil pollution and relevant control strategies are also covered.

CHE410 - Chemistry Internship

This is an upper-division elective course intended for chemistry majors who wish to advance their academic growth through an external work environment. Designed to supplement classroom and laboratory studies, internships provide students with additional knowledge and skills and apply previously learned information to on-site situations. Student will work under joint supervision between the internship location and a department faculty member. Students are to complete the university internship training process before registration for the course.

(Var. 1-6 crs.)

CHE415 - Biochemistry I

A comprehensive survey of the properties, reactions and structure of amino acids, proteins, enzymes, carbohydrates, fats and lipids, and nucleic acids. Special focus on protein structure and nomenclature, enzyme catalysis and kinetics, mechanistic analysis, and in-depth study of important metabolic pathways.

CHE421 - Advanced Inorganic Chemistry I

This is an in-depth course for chemistry majors in which the topics of molecular orbital theory, symmetry and group theory and organometallic chemistry are presented. The course covers the theory, application, and instrumentation associated with advanced inorganic chemistry.

CHE433 - Advanced Organic Chemistry

Advanced study of organic compounds in terms of structure and chemical properties. The student is introduced to complex structure evaluation through interpretation of advanced spectroscopy applications. The student continues evaluation of organic functional group manipulation through study of reaction, mechanism and retrosynthetic analysis, culminating in literature organic synthesis analysis.

CHE461 - Physical Chemistry I

This is a foundation course for chemistry majors and it is the first of a two-semester sequence of physical chemistry. The laws of thermodynamics are introduced and applied to physical, chemical, electrochemical systems and solutions. Properties of gases, liquids and solids are reviewed. Phase stability, phase diagrams, chemical reaction kinetics and reaction mechanisms are also covered.

CHE462 - Physical Chemistry II

This is an in-depth course for chemistry majors and it is the second of a two-semester sequence of physical chemistry. Quantum mechanics is introduced and applied to the electronic, vibrational and rotational properties of molecules. Atomic and molecular structure is analyzed in great detail based on electronic, vibrational and rotational spectroscopy.

CHE471 - Advanced Chemistry Lab I

A foundation course for chemistry majors. The primary focus will be on use of instrumentation to obtain data, calculate and increase understanding of chemical phenomenon.

CHE472 - Advanced Chemistry Lab II

This is the second of a two-semester advanced laboratory sequence designed to expose students to advanced chemical laboratory techniques. Emphasis is given to physical chemistry aspects of a wide range of hands-on experiences including equilibrium thermodynamics, molecular spectroscopy, properties of macromolecules and chemical kinetics. This is an in-depth course for chemistry majors offering students an opportunity to excel in tackling open-ended chemistry problems. Great importance is given to the critical and effective analysis and discussion of experimental findings. This is a writing intensive course where students spend considerable time creating publication-quality reports of experimental work. This class meets three hours each week.

CHE483 - Adv Environmental Chemistry

This is an in-depth elective course in the chemistry curriculum. It focuses on the sources, transport, reactions, effects and fate of chemical species in the atmosphere, hydrosphere and geosphere. Transformation and interaction of chemical contaminants within and between the three environmental systems are covered. Advanced chemistry concepts such as thermodynamics, photolysis, catalytic reactions, chemical equilibria, and kinetics are emphasized in the course. Case studies and contemporary literature in the field are discussed.

CHE484 - Polymer Chemistry

This is an upper level chemistry course. It introduces nomenclature, classification, synthesis, chemical and physical properties, characterization, and processing methods of polymers. Polymerization reaction mechanisms, physical and chemical properties of polymer-based materials are discussed as well as their common industrial and technological applications. Various major classes of polymers are studied in detail. A look at the historical development of polymer based materials is provided with an emphasis on current and potential applications of polymers as blends, composites, and other superior materials for advanced technological applications.

CHE491 - Chemistry Research I

This is an in-depth course for chemistry majors. Under the direction of a faculty mentor, the student will focus on execution of a research project including a comprehensive literature review, project management, independent notebook maintenance, and experimental design and execution. This experience will culminate in a seminar presentation.

CHE492 - Chemistry Research II

This is an in-depth course for chemistry majors. Under the direction of a faculty mentor, the student will continue to focus on execution of a research project including a comprehensive literature review, project management,

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independent notebook maintenance, and experimental design and execution. Using their laboratory activities, students will be expected to communicate their research findings in a professionally prepared written report.

CHE497 - Special Topics in Chemistry

This is an in-depth course for chemistry majors who have successfully completed CHE 461 (Physical Chemistry I). The specific advanced topics taught will be chosen by the instructor(s) for the given semester. The material presented in this course is unique and not found in any other courses offered in the chemistry program and the content will vary from semester to semester. This course will be “turn” taught by multiple faculty members, each appearing for a portion (module) of the class meetings. The course topics depend on the current trends in chemistry, instrumentation and the preference of the instructor.