

Chemistry Course Descriptions for 2007-2008 Catalog:

Chemistry CHE

CHE 102 Introduction to Chemistry (3,0,3) Selected essential topics in chemistry, including solutions, reactions, stoichiometry, and properties of gases, liquids, and solids. Prerequisite for CHE 115 and CHE 120 for those who did not study chemistry in high school or are not prepared for CHE 115 or CHE 120. NOT a general education course. (Formerly CHE 110) PREREQ: A minimum score of 18 on the ACT math section or equivalent.

CHE 105 Discovering Chemistry with Laboratory (3,2,4) Integrated lecture and laboratory; basic principles of chemistry and their applications in daily life; promotion of reasoning and problem solving skills by utilizing computer based technologies and hands on, discovery/inquiry, and cooperative learning approaches. For all non-science students and students majoring in education. Cannot be taken for credit by students who have passed CHE 112. *A general education course (natural sciences).*

CHE 112 Chemistry and Society (3,0,3) Basic principles of chemistry and their applications in society. For students not majoring in science. Enrollment in CHE 112L is recommended but not required. Cannot be taken for credit by students who have passed CHE 105. (Formerly CHE 100) *A general education course (natural sciences).*

CHE 112L Chemistry and Society Laboratory (0,2,1) Simple laboratory techniques in experiments designed to study the properties of model compounds and consumer products; synthesis and analysis of common materials. (Formerly CHE 100L) *A general education course (natural sciences).* PREREQ or COREQ: CHE 112.

CHE 115 Physiological Chemistry (3,0,3) General, organic, and biological chemistry of the body; metabolism, pharmacology, toxicology, and nutrition. Not applicable toward a major or minor in the natural sciences. *A general education course (natural sciences).* PREREQ: high school chemistry and a minimum score of 18 on ACT math section or equivalent; or a C or better in CHE 102. COREQ: CHE 115L.

CHE 115L Physiological Chemistry Laboratory (0,2,1) Laboratory elucidation of chemical and biochemical principles. *A general education course (natural sciences).* COREQ: CHE 115.

CHE 120 General Chemistry I (3,0,3) Principles of chemistry; physical and chemical properties of elements and compounds. PREREQ: high school chemistry and either a minimum score of 20 on the ACT math section or equivalent; OR a C or better in CHE 102, OR placement. *A general education course (natural sciences).* COREQ: CHE 120L.

CHE 120L General Chemistry Laboratory I (0,3,1) Experiments describing principles of chemistry as well as those describing physical and chemical properties of elements and compounds. *A general education course (natural sciences).* COREQ: CHE 120.

CHE 121 General Chemistry II (3,0,3) Continuation of CHE 120. Enrollment in CHE 121L is strongly encouraged but is not required. *A general education course (natural sciences).* PREREQ: C or better in CHE 120.

CHE 121L General Chemistry Laboratory II (0,3,1) Continuation of CHE 120L. PREREQ: C or better in CHE 120L. PREREQ or COREQ: CHE 121. *general education course (natural sciences).*

CHE 292 Introductory Chemical Research (0,0,0) Introduction to chemical research by participating in a special project or original research directed by a member of the chemistry faculty. Course intended for science majors interested in chemistry research but not ready or able to enroll in CHE 492. May only be taken once; pass/fail grade only. PREREQ: consent of instructor.

CHE 305 Main Group Chemistry (1,0,1) Detailed study of the elements found in groups 1,2, 13-18; sources, reactions, representative compounds. PREREQ: C or better in CHE 121.

CHE 310 Organic Chemistry I (3,0,3) Introduction to the chemistry of carbon compounds; bonding, structure, and introductory analysis and synthesis. PREREQ: C or better in CHE 121.

CHE 310L Organic Chemistry Laboratory I (0,3,1) Introduction to the laboratory practice of organic chemistry; techniques and separations. PREREQ C or better in CHE 121L. PREREQ: or COREQ: CHE 310.

CHE 311 Organic Chemistry II (3,0,3) Chemistry and properties of organic substances; reactions of functional groups, synthesis, and spectroscopic analysis. PREREQ: C or better in CHE 310.

CHE 311L Organic Chemistry Laboratory II (0,3,1) Reactions of organic compounds; identification of unknowns; synthesis. PREREQ: 310L. PREREQ or COREQ: CHE 311.

CHE 320 Inorganic Chemistry (3,0,3) Chemistry of the elements and their compounds; coordination, bioinorganic and materials chemistry. Selected other topics. PREREQ: C or better in CHE 310. COREQ: CHE 320L.

- CHE 320L Inorganic Chemistry Laboratory** (0,6,2) Advanced laboratory synthesis, purification, and characterization of inorganic compounds; application of techniques in primary literature. COREQ: CHE 320.
- CHE 330 Chemistry of Materials** (1,2,1) Introduction to the chemistry of materials. Structure-property relations, including self-organization, magnetic properties, and nanostructures. Introduction to characterization methods used in the chemistry of materials. PREREQ: C or better in CHE 121.
- CHE 340 Analytical Chemistry** (2,0,2) Chemical and stoichiometric principles; gravimetric, volumetric, and spectrophotometric analysis. PREREQ: C or better in CHE 121. COREQ: CHE 340L.
- CHE 340L Analytical Chemistry Laboratory** (0,6,2) Quantitative determination of the elements; traditional chemical methods and some instrumental methods of analysis. PREREQ: CHE 121L. COREQ: CHE 340.
- CHE 350 Instrumental Analysis** (2,0,2) Analytical techniques involving modern chemical instruments. PREREQ: CHE 340-340L. COREQ: CHE 350L.
- CHE 350L Instrumental Analysis Laboratory** (0,6,2) Experiments designed to familiarize students with modern analytical instruments. COREQ: CHE 350.
- CHE 360 Physical Chemistry I** (3,0,3) Classical thermodynamics, reaction equilibria, phase equilibria, and electrochemical systems. PREREQ: C or better in CHE 121 and MAT 220 or equivalent. PREREQ: or COREQ: PHY 222 or 213.
- CHE 361 Physical Chemistry II** (3,0,3) Kinetic molecular theory of gases, chemical kinetics, transport processes, elementary quantum chemistry, and spectroscopy. PREREQ: CHE 360 and PHY 222 or 213.
- CHE 362L Physical Chemistry Laboratory** (0,6,2) Experiments in thermodynamics, chemical kinetics, transport properties, spectroscopy, and elementary quantum chemistry. PREREQ or COREQ: CHE 361.
- CHE 391W Chemical Writing and Information** (3,0,3) Use and analysis of chemical information sources. Emphasis on specific writing methods used in chemistry such as abstracts, reports, grants and grant reviews. *A general education course (natural sciences)*. PREREQ: Chemistry major and one upper division CHE course.
- CHE 392 Advanced Laboratory Projects** (1-3 sem. hrs.) The study of published syntheses and other chemical reactions and experiments to develop usable protocols, procedures, or laboratory experiments. Directed by a member of the chemistry faculty. May be repeated for different lab courses for a total of no more than three credit hours. May not be used for the chemistry minor. PREREQ: consent of instructor.
- CHE 394 Topics in Chemistry** (1-3 sem. hrs.) Various topics of interest in chemistry. Can be repeated for up to 6 hours as topics vary. . PREREQ: C or better in CHE 310 or consent of instructor.
- CHE 396 Practicum: Chemistry Lab** (1,0,1) Participation in planning, teaching, and testing in a designated undergraduate chemistry laboratory course. Designed especially for students majoring in chemistry and in science education. Up to 2 semester hours may be earned in this course. Does not count toward a minor in chemistry. PREREQ: consent of instructor and completion of the designated laboratory course with a grade of B or better.
- CHE 399 Independent Study: Readings in Chemistry** (1-3 sem. hrs.) Independent survey of literature; written reports on selected topics. Repeatable for a maximum of 4 semester hours. PREREQ: 20 semester hours of chemistry and consent of instructor.
- CHE 400 Chemistry Seminar** (1,0,1) Use of chemical literature searching and analysis techniques to prepare and present seminars and written reports. PREREQ: CHE 391W and an additional 20 semester hours of chemistry.
- CHE 410 Spectrometric Identification of Compounds** (2,0,2) Interpretation of data obtained by mass spectrometric analysis and by infrared, ultraviolet/visible, and nuclear magnetic resonance spectroscopic analyses as applied to the establishment of structure. PREREQ: C or better in CHE 310.
- CHE 420 Organometallic Chemistry** (1,2,1) Properties and uses of organometallic compounds; synthesis, purification, and characterization of organometallic compounds using current methods. PREREQ: C or better in CHE 311 and CHE 311L.
- CHE 430 Molecular Modeling** (1,2,1) Introduction to computer-based molecular modeling using molecular mechanics, molecular orbital theory, and density functional theory. Calculation of equilibrium and transition-state geometries, spectroscopic properties, and reaction energies. Modeling of structures of biopolymers and docking of ligands into protein binding sites. PREREQ: C or better in CHE 310.
- CHE 440 Environmental Chemistry** (3,0,3) Chemistry as it applies to environmental problems and their solutions; analytical methods, energy needs, and biochemical application. PREREQ: C or better in CHE 311 and CHE 340.

CHE 482 Biochemistry I (3,0,3) Introduction to the chemistry of the molecules of life: carbohydrates, proteins, lipids; protein structure and function; enzyme mechanism; membrane structure and function; introduction to metabolism. Same as BIO 482. PREREQ: C or better in CHE 311.

CHE 482L Biochemistry Laboratory I (0,3,1) Introduction to basic laboratory techniques and concepts in biochemistry, such as the preparation of buffers, spectroscopic determination of protein concentration, gel electrophoresis, column chromatography, and enzyme kinetics. Same as BIO 482L. PREREQ or COREQ: CHE 482 or BIO 482.

CHE 483 Biochemistry II (3,0,3) Metabolism, biosynthesis of cell components, nucleic acid replication, protein synthesis, DNA recombination, hormone action. Same as BIO 483. PREREQ: C or better in CHE 482 or BIO 482.

CHE 483L Biochemistry Laboratory II (0,3,1) Application of modern biochemical techniques in a research setting. Students will conduct experiments on various topics from defined categories, prepare a detailed plan using the scientific literature, perform experiments independently, and present their findings in a formal report and poster session.

CHE 492 Research: Chemistry (1-3 sem. hrs.) Special project or original research directed by a member of the chemistry faculty. Most projects require at least two semesters of work. Upon agreement of student, instructor, and chair, some of the work may be completed outside of the normal semester calendar. Repeatable for a combined maximum of 12 semester hours. PREREQ: Consent of both instructor and chair of chemistry. Does not apply toward a minor in chemistry .

CHE 505 The History of Chemistry (2-3,0,2-3) Survey of chemistry's significance in ancient and modern times. Investigation of key individuals and concepts in chemistry of the past and present. PREREQ: CHE 310.

CHE 511 Advanced Organic Synthesis (3,0,3) Analysis and design of complex syntheses, including total synthesis of natural products; stereochemical aspects of synthesis; asymmetric synthesis; spectroscopy in structure elucidation. PREREQ: C or better in CHE 311.

CHE 512 Physical Organic Chemistry (3,0,3) Current topics in spectroscopy, reaction mechanisms, and structure function correlations. PREREQ: CHE 360 and a C or better in CHE 311.

CHE 540 Electrochemistry (3,0,3) Theory and experimental applications of electro- analytical methods. PREREQ: CHE 350 and CHE 361.

CHE 560 Quantum Mechanics (3,0,3) Principles of quantum mechanics, the hydrogen atom, variational methods, and simple perturbation theory. Same as PHY 460. PREREQ: CHE 361 or PHY 361.

CHE 594 Topics in Chemistry (1-3 sem. hrs.) Discussion of topics in analytical, environmental, inorganic, nuclear, organic, and physical chemistry; chemistry related topics: laboratory experience with operation and application of instruments and the computer. May be repeated as topics vary. PREREQ: consent of instructor.