CHEMISTRY (CHM)

CHM 100 Chemistry for the Consumer (3 credits)
This course is designed to help students understand the chemistry that affects them throughout their lives. Topics include: nuclear chemistry, home products, food and drugs, acid rain, energy, climate control, and sustainability. May be taken for science or elective credit without previous chemistry courses. Successful completion of this course will fulfill a lecture-only natural science course requirement for the GEP natural science area.

Restrictions: Students cannot enroll who have a major in Biology, Chemistry, Chemical Biology, Food Marketing or Physics.
Attributes: GEP Natural Science, Undergraduate

CHM 112 Food Chemistry (4 credits)
The study of chemistry as it specifically relates to food. Underlying basic chemical principles will allow the study of particular molecules found in food (carbohydrates, proteins, lipids) and the changes these molecules undergo as they are cooked and absorbed. Topics will also include preservation, food safety, and food additives. This laboratory course will introduce students to the use of laboratory techniques to study food, including the measurement of food properties including pH, flavor, color, and texture. Students will learn how chemical and physical changes can alter food quality. The content material of CHM 112 overlaps with the content of IHS 253 Nutrition: Health and Disease. Students may take either CHM 112 or IHS 253 not both. Successful completion of CHM 112/112L fulfills the GEP science requirement for Food Marketing majors only. It will serve as a free-elective for all other majors. CHM 112L is a co-requisite for CHM 112.

Restrictions: Enrollment is limited to students with a major in Food Marketing Co-Op or Food Marketing.
Attributes: GEP Natural Science, Science Course w/Lab (Sci Maj)

CHM 112L Food Chemistry Lab (0 credits)
Students who register for this Chemistry lab must also register for the corresponding lecture. For example, if you register for CHM 112L you must, at the same time, register for CHM 112.

Restrictions: Enrollment is limited to students with a major, minor, or concentration in Food Marketing Co-Op or Food Marketing.
Attributes: GEP Natural Science

CHM 115 Chemistry in Daily Life (4 credits)
This course explains the basic theories and need-to-know facts of scientific events one encounters in daily life from a chemistry perspective. In addition to explaining the fundamental concepts of chemistry, the course will cover topics such as acids and bases, oxidation and reduction, household chemicals, nuclear energy, nuclear medicine, biochemistry, and drugs. This laboratory course will cover a wide range of experiments that require mastering a variety of laboratory skills, which utilize many different types of equipment. The proper use of beakers, flasks, pipets, burets, simple calorimeters, balances, and thermometers, to name a few, is critical to a student’s success in the course. Accurate observations and recording of data is stressed and evaluated. Students will submit data and results forms at the conclusion of each experiment. Both qualitative (observations and descriptions) and quantitative (calculations and graphs) methods will be stressed.
Successful completion of CHM 115/115L fulfills the GEP science requirement.
Attributes: GEP Natural Science, Science Course w/Lab (Sci Maj), Undergraduate

CHM 115L Chemistry in Daily Life (0 credits)
Students who register for this Chemistry lab must also register for the corresponding lecture. For example, if you register for CHM 115L you must, at the same time, register for CHM 115.

CHM 120 General Chemistry I (3 credits)
Topics included are chemical formulas, stoichiometry, balancing reactions, ideal gases, thermodynamics, atomic structure, chemical bonding and molecular structure, kinetics, equilibrium, the chemistry of acids and bases, entropy, free energy, and electrochemistry. CHM 120 is a prerequisite to CHM 125. Successful completion of CHM 120 and CHM 120L fulfills the GEP natural science requirement.
Attributes: GEP Natural Science, Science Course w/Lab (Sci Maj), Undergraduate

CHM 120L General Chemistry Lab I (2 credits)
A lecture-laboratory course to accompany CHM 120-125 with emphasis upon concepts in chemistry, quantitative and qualitative analysis, and introduction to instrumental methods. One four-hour period. Successful completion of CHM 120L is a prerequisite to CHM 125L. CHM 120/121 is a co or prerequisite for CHM 120L. CHM 125/126 is a co or prerequisite for CHM 125L.
Attributes: GEP Natural Science, Undergraduate

CHM 121 General Chemistry Honors I (3 credits)
The material covered in this honors course is the same as CHM 120-125 but more extensive in depth. Additional topics may be added as time permits. The course assumes that the student has had chemistry in high school. The format of the course may differ from the standard lecture model. CHM 120 or 121 is a prerequisite to CHM 126. Successful completion of CHM 121 and CHM 120L fulfills the GEP natural science requirement.
Attributes: GEP Natural Science, Honors Course, Science Course w/Lab (Sci Maj), Undergraduate

CHM 125 General Chemistry II (3 credits)
Topics included are chemical formulas, stoichiometry, balancing reactions, ideal gases, thermodynamics, atomic structure, chemical bonding and molecular structure, kinetics, equilibrium, the chemistry of acids and bases, entropy, free energy, and electrochemistry. CHM 120 is a prerequisite to CHM 125. Successful completion of CHM 120 and CHM 120L fulfills the GEP natural science requirement.
Prerequisites: CHM 120 or CHM 121
Attributes: GEP Natural Science, Science Course w/Lab (Sci Maj), Undergraduate

CHM 125L General Chemistry Lab II (2 credits)
A lecture-laboratory course to accompany CHM 120-125 with emphasis upon concepts in chemistry, quantitative and qualitative analysis, and introduction to instrumental methods. One four-hour period. Successful completion of CHM 120L is a prerequisite to CHM 125L. CHM 120/121 is a co or prerequisite for CHM 120L. CHM 125/126 is a co or prerequisite for CHM 125L.
Prerequisites: CHM 120L or CHM 126 (may be taken concurrently)
Attributes: Undergraduate
CHM 126 General Chemistry Honors II (3 credits)
The material covered in this honors course is the same as CHM 120-125 but more extensive in depth. Additional topics may be added as time permits. The course assumes that the student has had chemistry in high school. The format of the course may differ from the standard lecture model. CHM 120 or 121 is a prerequisite to CHM 126. Successful completion of CHM 121 and CHM 120L fulfills the GEP natural science requirement.
Prerequisites: CHM 120 or CHM 121
Attributes: GEP Natural Science, Honors Course, Science Course w/Lab (Sci Maj), Undergraduate

CHM 150 First-Year Seminar (3 credits)
The First-Year Seminar (FYS) is designed to introduce students to the adventures of learning in a college context. The challenge and excitement of intellectual exploration of a topic of shared interest is its prime purpose. First-Year Seminars focus in depth on a question or topic of disciplinary or interdisciplinary interest. By means of its specific focus, the seminar will explore the thinking, research, and writing practices in a particular field. Discussions based on careful reading of texts, writing assignments, both reflection and research types, and in-class student presentations will be supplemented, as appropriate, with activities including guest lecturers, museum trips, attendance at local cultural events and/or field excursions. Topics vary according to individual instructors. First year seminar.
Attributes: First-Year Seminar, Undergraduate

CHM 210 Organic Chemistry I (3 credits)
Modern organic chemistry in which the treatment of aliphatic and aromatic compounds is integrated as much as possible. Reactions of the functional groups are explained in terms of electronic mechanisms. CHM 125 or CHM 126 is a prerequisite to CHM 210. CHM 210 is a prerequisite to CHM 215.
Prerequisites: CHM 125 or CHM 126 or CHM 1021
Attributes: Undergraduate

CHM 210L Organic Chemistry Lab I (1 credit)
This semester concentrates on experiments designed to introduce students to the various techniques used in the organic laboratory. CHM 210 is a co or prerequisite for CHM 210L.
Attributes: Undergraduate

CHM 215 Organic Chemistry II (3 credits)
Modern organic chemistry in which the treatment of aliphatic and aromatic compounds is integrated as much as possible. Reactions of the functional groups are explained in terms of electronic mechanisms. CHM 125 or CHM 126 is a prerequisite to CHM 210. CHM 210 is a prerequisite to CHM 215.
Prerequisites: CHM 210
Attributes: Undergraduate

CHM 215L Organic Chemistry Lab II (1 credit)
A continuation of CHM 210L utilizing micro scale laboratory techniques in organic chemistry for the preparation, purification and analysis of organic compounds. CHM 210L is a prerequisite to CHM 215L. CHM 215 is a co or prerequisite for CHM 215L.
Prerequisites: CHM 210L and CHM 210
Attributes: Undergraduate

CHM 293 Sophomore Research Studies I (3,6 credits)
Integrated literature and laboratory investigation of an assigned problem under the supervision of a departmental faculty member. Each credit of CHM 293-294 requires four hours each week in the research laboratory. Students need to complete the application form for independent study and have the approval of the Chemistry Department Chair and Associate Dean in order to register.
Attributes: Undergraduate

CHM 294 Sophomore Research Studies II (3,6 credits)
Integrated literature and laboratory investigation of an assigned problem under the supervision of a departmental faculty member. Each credit of CHM 293-294 requires four hours each week in the research laboratory. Students need to complete the application form for independent study and have the approval of the Chemistry Department Chair and Associate Dean in order to register.
Attributes: Undergraduate

CHM 310 Physical Chemistry I (3 credits)
Thermodynamics as applied to gases, liquids, and solutions; thermodynamics of ideal systems; thermochemistry; chemical kinetics; gaseous equilibrium; colligative properties of solutions; quantum mechanics. CHM 215 is a prerequisite to CHM 310. CHM 310 is a prerequisite to CHM 315.
Prerequisites: CHM 215 or CHM 2321
Attributes: Undergraduate

CHM 310L Physical Chemistry Lab I (2 credits)
Experiments are performed to reinforce the concepts learned in CHM 310.
Attributes: Undergraduate

CHM 315 Physical Chemistry II (3 credits)
Thermodynamics as applied to gases, liquids, and solutions; thermodynamics of ideal systems; thermochemistry; chemical kinetics; gaseous equilibrium; colligative properties of solutions; quantum mechanics. CHM 215 is a prerequisite to CHM 310. CHM 310 is a prerequisite to CHM 315.
Prerequisites: CHM 310
Attributes: Undergraduate

CHM 315L Physical Chemistry Lab II (2 credits)
Study of atomic and molecular structure; chemical thermodynamics; states of matter; kinetics and mechanisms of reactions; phase and chemical equilibria; emphasis on applications in biological systems. CHM 215 is a prerequisite to CHM 320.
Prerequisites: CHM 215
Attributes: Undergraduate

CHM 330 Instrumental Analysis (3 credits)
This course covers the theory, methodology, and instrumentation for the study of atomic and molecular species and/or processes. CHM 215, CHM 310, and PHY 106 or permission of the Department of Chemistry chair) are prerequisites to CHM 330.
Prerequisites: CHM 215
Attributes: Undergraduate

CHM 330L Instrumental Analysis Lab (2 credits)
CHM 330 is a co-requisite to CHM 330L.
Prerequisites: CHM 215L
Attributes: Undergraduate
CHM 340 Biochemistry (3 credits)
A basic introduction to the chemistry of living systems emphasizing their major metabolic activities. Structure and function of proteins, lipids, and carbohydrates. Basic principles of intermediary metabolism and photosynthesis. CHM 215 is a prerequisite for CHM 340.
Prerequisites: CHM 215
Attributes: Undergraduate

CHM 340L Biochemistry Lab (1 credit)
Laboratory applications of the topics covered in CHM 340. CHM 215L is a prerequisite to CHM 340L. CHM 340 is a co-requisite to CHM 340L.
Prerequisites: CHM 215L and CHM 340 (may be taken concurrently)
Attributes: Undergraduate

CHM 350 Inorganic Chemistry (3 credits)
This course includes the study of atomic structure, bonding, molecular orbital theory, symmetry and group theory, the chemistry of the main group elements, and the structure and reactivity of transition metal complexes. CHM 215 is a prerequisite to CHM 350.
Prerequisites: CHM 215
Attributes: Undergraduate

CHM 350L Inorganic Chemistry Lab (2 credits)
This course focuses on synthetic inorganic chemistry and emphasizes the use of modern analytical techniques for the characterization of inorganic and organometallic compounds. This course satisfies the GEP Writing Intensive requirement. CHM 215L is a prerequisite to CHM 350L. CHM 350 is a co-requisite for CHM 350L.
Prerequisites: CHM 215L
Attributes: Undergraduate, Writing Intensive Course - GEP

CHM 360 Nanochemistry (3 credits)
This course covers the synthesis, characterization and physical properties of materials chemistry systems on the length scale of individual molecules. Emphasis is placed on the distinction between macro- and nanoscale properties of matter. Course topics to include (but not limited to): quantum confinement in semiconductor nanocrystals; localized surface plasmon resonance (LSPR), superhydrophobicity in self-assembled monolayers; electronic and mechanical properties of 2D materials
Prerequisites: CHM 215 and (MAT 161 or MAT 155) and (PHY 102 (may be taken concurrently) or PHY 106 (may be taken concurrently))

CHM 390 Chemistry Seminar (0 credits)
Lectures by outside and local speakers and discussions of special topics in chemistry. Enrollment is required each semester for junior and senior chemistry majors. Graded on a P/NP basis.
Attributes: Undergraduate

CHM 393 Junior Research I (3,6 credits)
Integrated literature and laboratory investigation of an assigned problem under the supervision of a departmental faculty member. Each credit of CHM 393-394 requires four hours each week in the research laboratory. Students need to complete the application form for independent study (available in the Dean’s Office) and have the approval of the Chemistry Department chair and Associate Dean in order to register.
Attributes: Undergraduate

CHM 394 Junior Research II (3,6 credits)
Integrated literature and laboratory investigation of an assigned problem under the supervision of a departmental faculty member. Each credit of CHM 393-394 requires four hours each week in the research laboratory. Students need to complete the application form for independent study (available in the Dean’s Office) and have the approval of the Chemistry Department chair and Associate Dean in order to register.
Prerequisites: CHM 393 or CHM 293 or CHM 2901
Attributes: Undergraduate

CHM 400 Chemistry of the Earth (3 credits)
This course examines the chemical processes that control the distribution, speciation, and transfer of essential elements and energy in natural systems. Topics include: the concept of the Earth as a biogeochemical system; the use of quantitative methods to model the chemical fluxes of elements on a global scale; dominant chemical reactions in natural environments, evolution of metabolic pathways; the biogeochemical cycling of water, carbon, nitrogen, phosphorus, sulfur, and select heavy metals under natural and anthropogenically-influenced conditions. CHM 340 is a prerequisite or a co-requisite to CHM 400. This prerequisite may be waived with permission of the Chemistry Department Chair.
Prerequisites: CHM 340 (may be taken concurrently)
Attributes: Undergraduate

CHM 410 Biophysical Chemistry (3 credits)
This course utilizes the concepts of physical chemistry to understand the properties of biological systems.
Prerequisites: CHM 310 or CHM 320
Attributes: Undergraduate

CHM 410L Biophysical Chemistry Lab (1 credit)

CHM 420 Environmental Chemistry (3 credits)
Investigation of both pristine and polluted environments using chemistry as a foundation. Topics include: atmospheric chemistry, water quality, soil composition, fate of toxic metals and organic pollutants, and using chemistry as a solution for pollution. CHM 215 is a prerequisite to CHM 420.
Prerequisites: CHM 2321 and CHM 210
Attributes: Undergraduate

CHM 420L Environmental Chemistry Lab (1 credit)

CHM 430 Mechanisms in Organic Chem (3 credits)
Application of the electron pushing formalism for manipulating Lewis structure representations of organic structures. Emphasis is placed on mechanistic rationalization of complex organic transformations. Classes of mechanisms include elimination, substitution, rearrangement, oxidation-reduction, enolate alkylation, and others. CHM 215 is a prerequisite to CHM 430.
Prerequisites: CHM 215
Attributes: Undergraduate

CHM 435 Tech Applications of Chemistry (3 credits)
Course will focus on current and future technologies that utilize fundamental and advanced theories of chemistry. Topics will include, but are not limited to, microwave ovens, liquid crystal displays (LCD), light emitting diode displays (LED), plasma screens, charge coupled devices (CCD), field effect transistors (FET), positron emission tomography (PET), magnetic resonance imaging (MRI), battery systems, data storage devices, and solar panels. CHM 215 is a prerequisite to CHM 435.
Prerequisites: CHM 215
CHM 440 Organometallic Chemistry (3 credits)
This course will focus on the structure and reactivity of organometallic transition metal complexes. Topics include catalysis, reaction mechanisms, applications to organic chemistry, and characterization by spectroscopic methods. CHM 350 is a prerequisite to CHM 440.
Prerequisites: CHM 350
Attributes: Undergraduate

CHM 445 Thermodynamics & Stat Mechanic (3 credits)

CHM 450 Polymer Chemistry (3 credits)

CHM 460 Water Chemistry (3 credits)
This course examines the behavior of chemical species in natural and engineered water systems. Topics include: the chemical composition of surface and subsurface water; geochemical controls on water composition; equilibrium and kinetic processes in aquatic systems; fate and reactions of inorganic and organic constituents in water; acid-base chemistry, complexation chemistry, and redox chemistry in water; the applications of isotopic and other tracers in the study of aquatic systems; and water pollution. CHM 210 is a prerequisite to CHM 460.
Prerequisites: CHM 125 or CHM 126
Attributes: Undergraduate

CHM 470 Special Topics (3 credits)
Advanced study on a topic that is arranged with a chemistry faculty member. Permission of the Department of Chemistry chair is required.
Attributes: Undergraduate

CHM 480 Adv Biochem: Inorganic Chem (3 credits)
Advanced study on a topic that is arranged with a chemistry faculty member. Permission of the Department of Chemistry chair is required.
Prerequisites: CHM 215
Attributes: Undergraduate

CHM 490 Spectroscopy (3 credits)
Advanced study on a topic that is arranged with a chemistry faculty member. Permission of the Department of Chemistry chair is required.
Prerequisites: CHM 330
Attributes: Undergraduate

CHM 491 Chemistry Internship I (3 credits)

CHM 492 Chemistry Internship II (3 credits)

CHM 493 Senior Research I (3,6 credits)
Integrated literature and laboratory investigation of an assigned problem under the supervision of a departmental faculty member. Includes a seminar, a poster presentation, and written reports. Each credit of CHM 493 and CHM 494 requires four hours each week in the research laboratory. CHM 493 is a prerequisite for CHM 494. Students need to complete the application form for independent study (available in the Dean's Office) and have the approval of the Chemistry Department chair and Associate Dean in order to register.
Attributes: Undergraduate

CHM 494 Senior Research II (3,6 credits)
Integrated literature and laboratory investigation of an assigned problem under the supervision of a departmental faculty member. Includes a seminar, a poster presentation, and written reports. Each credit of CHM 493 and CHM 494 requires four hours each week in the research laboratory. CHM 493 is a prerequisite for CHM 494. Students need to complete the application form for independent study (available in the Dean's Office) and have the approval of the Chemistry Department chair and Associate Dean in order to register.
Prerequisites: CHM 493
Attributes: Undergraduate