CHEMISTRY (CHEM)

CHEM-112 General Chemistry II (4 Credits)
The second course in a one year sequence covering solids and liquids, solutions, kinetics, chemical equilibria, acid base equilibria, electrochemistry nuclear chemistry, qualitative and quantitative analysis. For students who plan to take further chemistry courses. 3 hour lecture, 2 hour laboratory.
Prerequisite(s): INCHEM-111 or permission of instructor
Offered: Spring, Every Year

CHEM-220 Fundamental Organic Chemistry (4 Credits)
Fundamental introduction to the functional aspects of organic compounds, with emphasis on the biochemical relevance of structural and chemical properties. Designed for those for whom one semester of organic chemistry is sufficient. 3 hour lecture and 1 hour team-based learning session.
Prerequisite(s): INCHEM-111, or permission of instructor
Offered: Spring, Every Year

CHEM-221 Organic Chemistry I (4 Credits)
The first of a two course sequence in organic chemistry, emphasizing modern concepts and problem solving in structure, synthesis and mechanism, based on a functional group approach. Theoretical and practical aspects of modern spectroscopy supports its use in the laboratory course. 3 hour lecture, 3 hour laboratory.
Prerequisite(s): Grade of C or higher in INCHEM-111 or permission of instructor
Offered: Fall, Every Year

CHEM-222 Organic Chemistry II (4 Credits)
The second of a two course sequence in organic chemistry, emphasizing modern concepts and problem solving in structure, synthesis and mechanism, based on a functional group approach. Theoretical and practical aspects of modern spectroscopy supports its use in the laboratory course. 3 hour lecture, 3 hour laboratory.
Prerequisite(s): Grade of C or higher in CHEM-221 or permission of instructor
Offered: Spring, Every Year

CHEM-294 Cooperative Education (1-4 Credits)
Introductory work learning experience related to career interests, for which compensation may be received. Positions arranged by students with sponsorship, approval and evaluation by full time faculty. Elective credit only (normally 40 hours /credit) to maximum of 8 credits per degree program. Graded Pass/Fail.
Prerequisite(s): 24 total credits earned, 2.0 cumulative GPA, and permission of instructor
Offered: All, Every Year

CHEM-298 Independent Study (1-4 Credits)
An opportunity for a qualified student to explore work in an area of individual interest, selected and pursued in consultation with a faculty member. Consent required of the instructor who will supervise the independent study. May be repeated for a maximum of 4 credits.
Offered: All, Every Year

CHEM-325 Synthesis and Characterization (4 Credits)
A project-oriented course focusing on multistep inorganic and organic synthesis and characterization techniques using modern instrumentation.
Prerequisite(s): CHEM-222

CHEM-340 Physical Chemistry (4 Credits)
An exploration of major topics in the field of physical chemistry including chemical thermodynamics, chemical kinetics, and quantum chemistry. Following an overview of theoretical foundations, emphasis is placed on the study of chemical properties and phenomena such as equilibrium, reaction rates, spectroscopy, and chemical structure.
Prerequisite(s): MATH-211, INPHYS-141 or INPHYS-241, and PHYS-142 or PHYS-242, and Grade of C or higher in CHEM-112; MATH-212 is strongly encouraged
Offered: Fall, Every Year

CHEM-345 Empirical Physical Chemistry (4 Credits)
An introduction to the theory and practice of measuring physical chemical properties using standard laboratory equipment, modern instrumentation, and classical techniques. Large emphasis is placed on using computers and available software for data acquisition, management, and processing, as well as written communication of results.
Prerequisite(s): MATH-211, INPHYS-141 or INPHYS-241, and PHYS-142 or PHYS-242, and Grade of C or higher in CHEM-112, MATH-212 is strongly encouraged

CHEM-350 Analytical Chemistry (4 Credits)
An overview of chemical analysis with a focus on foundational principles. Topics include: qualitative vs. quantitative methods, sampling, statistics, uncertainty and error, calibration, speciation, gravimetric analysis, titrations, spectrophotometry, chromatography, and basic theory of instruments.
Prerequisite(s): Grade of C or higher in CHEM-112; MATH-141 is strongly encouraged

CHEM-355 Experimental Chemical Analysis (4 Credits)
A hands-on exploration of chemical analysis using a mix of classical techniques and modern instrumentation. Student work includes comparative evaluations of different analytical methods for identifying and quantifying the presence of various chemicals in real-world samples. Communication of results in written and/or oral formats is emphasized. MATH-141 is strongly encouraged.
Prerequisite(s): Grade of C or higher in CHEM-112

CHEM-360 Inorganic Chemistry (4 Credits)
An introduction to modern inorganic chemistry including: atomic structure and bonding; a description of transition metal complexes and their role as catalysts, and a survey of the reactivity of selected elements of the main group.
Prerequisite(s): CHEM-221, or permission of instructor
Offered: Spring, Every Year

CHEM-370 Biochemistry (4 Credits)
In-depth survey of biochemical topics including the structure and function of proteins, enzyme action and kinetics, carbohydrates, lipids, and an introduction to major metabolic pathways and their regulation. Cross-listed as: BIO-370.
Prerequisite(s): CHEM-221 and INBIO-110, or permission of instructor
Offered: Fall, Every Year

CHEM-490 Advanced Special Topics (2-4 Credits)
Advanced topics in chemistry such as atmospheric chemistry, polymer chemistry, organometallic chemistry, or others. May be repeated for credit as topics change.
Prerequisite(s): CHEM-222 or permission of instructor

CHEM-494 Advanced Cooperative Education (1-4 Credits)
Sequential work learning experience for which compensation may be received. Positions arranged by students with sponsorship, approval and evaluation by full time faculty. Elective credit (normally 40 hours/credit) to maximum of 8 credits per degree program. Graded Pass/Fail. May be repeated for credit.
Prerequisite(s): CHEM-294, 2.0 cumulative GPA, Declaration of Major, and permission of instructor
Offered: All, Every Year

CHEM-498 Independent Study (1-4 Credits)
Advanced study of various fields of chemistry through individual reading, writing, or laboratory work. Requires a research project conducted under the supervision of Chemistry faculty and a written report. 1 hour conference. May be repeated as desired.
Offered: All, Every Year

INCHEM-100 Introduction to Chemistry (4 Credits)
An introductory course providing a survey of general chemical principles and their application to current environmental and social issues. Topics include atomic and molecular structure, chemical bonding, energy, reaction chemistry, solutions and nuclear power. (Not open toward a major program in Biology, Chemistry, Geology, or Chemistry/Physics.)
Offered: All, Every Year

INCHEM-111 General Chemistry (4 Credits)
Lecture-lab course that introduces fundamental chemical principles and concepts, including atomic structure, periodicity, molecular structure, bonding, stoichiometry, types of chemical reactions, and thermochemistry. Knowledge of algebra, exponentials and logarithms is expected. Math assessment exam required. Includes two-hour laboratory.
Offered: Fall, Every Year