

CHEMISTRY (CHEM)

CHEM 413 - ADVANCED ORGANIC CHEMISTRY

Spectrometric methods for determining the structures of organic compounds. Mass spectrometry, proton and carbon FT-NMR, infrared, ultraviolet, and visible spectroscopy. Laboratory includes synthesis of organic compounds and applied spectroscopic methods.

Credits: 2,3

Attributes: Lab Course

Course Notes: Lecture and Lab course., Should have the equivalent of CHEM 202 with a min, of C- and CHEM 212 with a min grade of C-.

CHEM 418 - SYNTHETIC ORGANIC CHEMISTRY

Advanced methods in the synthesis of organic compounds, especially those of biological or pharmaceutical interest. Topics include stereo- and regiospecific reagents for organic transformations, including enzyme mediated synthesis, polypeptide and polynucleotide synthesis, and natural product synthesis.

Credits: 3

Course Notes: Must have CHEM 202 and CHEM 212 both with a min grade of C-.

CHEM 419 - ORGANOMETALLIC CHEMISTRY

Structure, bonding, and reactions of compounds formed between the metallic elements (primarily d block) and carbon (organic groups). Classes of compounds to be discussed include metal alkyls, aryls, hydrides, carbonyl, alkenes, and arenes. The application of organometallic compound in organic synthesis and homogeneous catalysis.

Credits: 3

Course Notes: Should have the equivalent of CHEM 202 and 212 with a min, grade of C-.

CHEM 421 - PHYSICAL CHEMISTRY- THERMODYNAMICS

First, second, third law of thermodynamics, chemical equilibrium, phase equilibrium and kinetic theory of gases.

Credits: 2,3

Attributes: Lab Course

Course Notes: Should have equivalent of CHEM 202 with a min, grade of C- and CHEM 212 with a min grade of C-, and Math 232 with a min grade of C- and PHYS, 202 and PHYS 234 with a min grade of C-.

CHEM 422 - PHYSICAL CHEMISTRY II - QUANTUM MECHANICS

Fundamentals of quantum mechanics, angular momentum, electronic structure of atoms and molecules, and introduction to spectroscopy.

Credits: 2,3

Attributes: Lab Course

Course Notes: CHEM 202, CHEM 212, and PHYS 232 required.

CHEM 423 - ATOMIC & MOLECULAR SPECTROSCOPY

Introduction to quantum theory followed by atomic spectroscopy, molecular rotational, vibrational and electronic spectroscopy, and group theory.

Credits: 2,3

Attributes: Lab Course

Course Notes: Must have equivalent of CHEM 202 and CHEM 212 and PHYS 201, and PHYS 233 and PHYS 202 and PHYS 234 all with min grade of, C-

CHEM 437 - INSTRUMENTAL ANALYSIS

Basic theories and experimental techniques in instrumental methods of analysis including spectrophotometry, chromatography, and electrochemistry.

Credits: 2,3

Attributes: Lab Course

Course Notes: Lecture and Lab course., Must have equivalent of CHEM 202 with a min grade of C-, and CHEM 212 with a min grade of C- and CHEM 237 with a, min grade of C-.

CHEM 441 - INORGANIC CHEMISTRY

Survey of theoretical and synthetic inorganic chemistry. Atomic theory, bonding theory, crystal structure, chemical periodicity, coordination compounds, acid-base systems, and molecular symmetry.

Credits: 3

Course Notes: CHEM 202 with a min grade of C- and CHEM 212 with a min, grade of C and CHEM 237 with a min grade of C-

CHEM 444 - BIOINORGANIC CHEMISTRY

Survey of biological molecules that involve metal ions and/or metal-containing cofactors; the interaction and biological significance of metal ions including medicinal applications.

Credits: 3

Course Notes: CHEM 212 with a min grade of C-; BIOL 301 recommended.

CHEM 447 - ADVANCED INORGANIC CHEMISTRY LAB

Synthesis and characterization of compounds of the p block (main group) and d block (transition metal) elements, including inorganic compounds of biological interest and air-sensitive complexes. Spectroscopic characterization methods include vibrational (IR and Raman), electronic absorption (UV-Vis-NIR) and emission, and multinuclear NMR. The lecture covers theoretical and practical background for physical methods in experimental inorganic chemistry, including group theory.

Credits: 2,3

Attributes: Lab Course

Course Notes: Chem 202 with a min grade of C- and CHEM 212 with a min, grade of C-.

CHEM 452 - MEDICINAL CHEMISTRY

Chemistry and pharmacology of the principal classes of drugs; history of the development of medicinal chemistry; mechanisms of drug action; relationships between molecular structure and biological activity; the literature of medicinal chemistry; evaluation of potential drugs; perspective on the design of new drugs.

Credits: 3

Course Notes: Graduate standing

CHEM 465 - AQUATIC TOXICOLOGY

This course will explore the world of anthropogenic toxicants: harmful elements or compounds whose level in the environment is increased by human activities. The course will take a look at toxicants as they are released by human activities, enter and move through the aquatic system, chemically react with natural measures of water quality, interact and are taken up by living organisms and ultimately cause some kind of harmful effect at the cellular, individual, population and community levels. Students will be expected to research and present information on major topics in aquatic toxicology to the class, expanding the class base of knowledge and contributing to a "living textbook" of toxicological information.

Credits: 3

Course Notes: Graduate status.

CHEM 481 - POLYMER CHEMISTRY

Synthesis, physical and analytical characterization, and use of polymers, including fibers, plastics, coatings, and resins. Morphology and rheology of polymers.

Credits: 3

Course Notes: CHEM 202 and CHEM 212 both with a min grade C-.

CHEM 485 - THESIS

Independent laboratory research culminating in a written thesis under supervision of a faculty sponsor and thesis committee.

Credits: 1-6

CHEM 492 - RESEARCH IN CHEMISTRY

Independent field- or laboratory-based research experience under the supervision of a faculty sponsor. A minimum of 3 completed semester hours will fulfill the research requirement for the MS degree. Up to 3 semester hours may be applied toward thesis requirements. Students may register in consecutive semesters.

Credits: 1-4

Course Notes: Consent of instructor. \$100 per semester hour., Students must arrange for independent laboratory, research experience with a science, faculty member prior to registration.

CHEM 493 - CHEMISTRY SEMINAR

Reading and critiquing chemical literature. Experience in technical presentations and library research. Outside seminar speakers. (1)

Credits: 1

CHEM 495 - INDEPENDENT STUDY

Credits: 1-6

Course Notes: Consent of instructor