

# CHEMISTRY (CHEM)

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## Courses

CHEM 5511 Laboratory Safety And Health I Credit: 1

An introduction to laboratory safety and health. Topics to be discussed include good laboratory practice; laboratory hazards; safe chemical handling; storage and disposal; first aid; protective equipment; and federal regulations.

CHEM 5520R Survey Of Organic Chemistry Credits: 3

An intensive advanced survey of the structure, synthesis and reactions of organic compounds.

CHEM 5521R Mechanisms Of Organic Reactions Credits: 3

A comprehensive course in which the mechanisms of organic reactions are discussed in light of modern chemical principles.

**Prerequisites:** CHEM 322R and CHEM 432.

CHEM 5522 Synthetic Organic Chemistry Credits: 3

A critical approach to the synthesis and modification of organic molecules; newer methods will be emphasized.

**Prerequisites:** CHEM 322R and CHEM 432.

CHEM 5529 Selected Topics In Organic Chemistry Credits: 3

Selected topics from the chemistry and theories of organic structures with particular attention to recent developments.

CHEM 5530 Systematic Physical Chemistry Credits: 3

An intensive and comprehensive review of the principles of physical chemistry. This course may either emphasize thermodynamics with an introduction to principles of quantum mechanics or emphasize quantum mechanical description of atoms and molecules, molecular spectroscopy, statistical mechanics and kinetics.

CHEM 5530A Physical Chemistry I Credits: 3

This graduate course reviews principles of physical chemistry, focusing on thermodynamics, equilibria and electrochemistry.

CHEM 5530B Physical Chemistry II Credits: 3

This graduate course reviews principles of physical chemistry, focusing on quantum chemistry, molecular spectroscopy and structure, and kinetics.

CHEM 5531 Classical Thermodynamics Credits: 3

A rigorous treatment of the laws of thermodynamics and their application to ideal and non-ideal equilibrium systems.

CHEM 5532 Chemical Kinetics Credits: 3

Empirical analysis of chemical reaction rates. Theories of unimolecular and bimolecular reactions, reactions in solution and complex reactions. Review of modern and classical techniques used to study chemical kinetics.

CHEM 5533 Quantum Chemistry Credits: 3

Application of quantum mechanical methods to the study of systems of chemical interest. Exact solutions and approximate methods will be discussed.

CHEM 5534 Molecular Spectroscopy Credits: 3

A theoretical introduction to molecular spectroscopy and its relation to structure. Electronic, vibrational and rotational spectra of chemical systems will be discussed.

CHEM 5535 Statistical Thermodynamics Credits: 3

A rigorous treatment of the fundamental concepts of statistical thermodynamics, with applications to specific systems that reflect the interests of students participating in the course.

CHEM 5539 Selected Topics In Physical Chemistry Credits: 3

Selected topics and recent developments in physical chemistry.

**Prerequisites:** CHEM 5530.

CHEM 5541R Advanced Analytical Chemistry Credits: 3

An intensive review of modern concepts of analytical chemistry.

**Prerequisites:** CHEM 432.

CHEM 5551R Advanced Inorganic Chemistry I Credits: 3

A systematic treatment of bonding, structure, reactions and reaction mechanisms of inorganic compounds, with emphasis on classical transition metal compounds and organometallic compounds.

**Prerequisites:** CHEM 451R.

CHEM 5559 Selected Topics In Inorganic Chemistry Credits: 3

Various special topics in the inorganic area to be offered in different semesters.

**Prerequisites:** CHEM 5551R.

**CHEM 5567 Advanced Bioorganic Chemistry Credits: 3**

This course examines the organic chemistry and laboratory synthesis of the major biopolymers and organic chemistry related to biological systems. Emphasis is on literature and library research and natural product and solid phase organic synthesis, combinatorial synthesis, bioconjugates and applied bioorganic chemistry.

**CHEM 5571R Introduction To Polymer Chemistry Credits: 3**

Survey of organic and inorganic monomers and polymers; the occurrence, synthesis, structures and properties of natural and synthetic polymers; discussion of general properties of plastics, elastomers, fibers, resins and plasticizers.

**Prerequisites:** CHEM 432.

**CHEM 5580R Computer Applications To Chemical Problems Credits: 3**

The purpose of this course is to survey the field of computational chemistry, concentrating on methods, programs and general utility to the research chemist. The student will learn the principles of the theory underlying the methods and will use selected software to carry out chemical calculations.

**Prerequisites:** CHEM 320 / CHEM 320L or CHEM 322R / CHEM 322L with C- or better.

**CHEM 5587 Environmental Chemistry I Credits: 3**

A survey of how chemical principles can be applied to the environment. Included will be topics in aquatic chemistry, atmospheric chemistry and chemistry of the geosphere and soil.

**CHEM 5588 Environmental Chemistry II Credits: 3**

Discussion of selected topics in advanced environmental chemistry, such as environmental toxicology, environmental risk, the chemistry of hazardous wastes and their treatment, and environmental analytical chemistry.

**CHEM 5590 Directed Studies Credits: 1-3**

Intensive readings and/or research in an area selected by the graduate student in consultation with the instructor.

**CHEM 5598 Research Methodology Conference Credits: 3**

Student will meet on an individual basis with two faculty members who are involved in research. The student's adviser will coordinate this course.

**CHEM 5599 Research And Thesis Credits: 1-9**

Research for thesis.

**CHEM 5611 Chemistry Seminar Credit: 1**

Presentation and discussion of topics currently appearing in United States and foreign literature.

**CHEM 5699 Research And Dissertation Credits: 1-16**

Research for dissertation.

**CHEM 5899 Required Graduate Enrollment Credit: 1**