

Chemistry (CHEM)

Courses

CHEM 5500 Practicum in Physical Science: 2 semester hours.

Practical problems associated with equipping, setting up, and operating laboratories in chemistry. PREREQ: Permission of the instructor.

CHEM 5501 Chemistry TA Seminar: 1 semester hour.

This course is designed to prepare teaching assistants for their responsibilities in the chemical laboratory. Topics include experimental procedures, safety considerations, proper chemical hygiene, grading protocols, ethics, and classroom management. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. Required for all teaching assistants.

Instructor approval required. F, S

CHEM 5507 Inorganic Chemistry II: 2 semester hours.

Structure and reactivity of inorganic compounds including coordination compounds; acid-base chemistry and nonaqueous solvent systems; organometallic chemistry and other special topics of current interest. PREREQ: CHEM 2211 and CHEM 3352 or permission of instructor.

CHEM 5521 Topics in Laboratory Safety: 1 semester hour.

This course will cover a variety of safety topics such as chemical, physical, biological, and radiological hazards. Students will also learn how to identify and communicate risks related to these hazards. Specific evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: CHEM 3303

CHEM 5533 Environmental Chemistry: 2 semester hours.

This course applies chemical principles and calculation to investigate environmental issues. Natural systems, environmental degradation and protection, and the methodology of chemical detection and monitoring. COREQ: CHEM 5537. PREREQ: CHEM 2232 and CHEM 2234 or permission of instructor.

CHEM 5537 Environmental Chemistry Laboratory: 1 semester hour.

This laboratory course utilizes both structured and self-designed field and classroom experiments to emphasize principles of environmental chemistry. COREQ: CHEM 5533 or permission of instructor.

CHEM 5538 Experimental Biochemistry: 1 semester hour.

Laboratory course including both qualitative and quantitative experiments. Equivalent to BIOL 5537. PREREQ or COREQ: BIOL 5532 or BIOL/CHEM 5545.

CHEM 5545 Biochemistry I: 3 semester hours.

Introduction to basic aspects of biochemical systems, including fundamental chemical and physical properties of biomolecules. Enzymology, including allosterism, metabolic regulation, bioenergetics, and carbohydrate metabolism. Equivalent to BIOL 5545. PREREQ: Introductory Biology and Organic Chemistry or permission of instructor.

CHEM 5547 Biochemistry II: 3 semester hours.

Functional continuation of CHEM 5545. Lipid, amino acid, and nucleotide metabolism. Emphasis is on regulation of metabolism, metabolic dysfunctions, biochemical mechanisms of hormone action, biochemical genetics, protein synthesis, and metabolic consequences of genetic defects. Equivalent to BIOL 5547. PREREQ: BIOL/CHEM 5545.

CHEM 5548 Advanced Experimental Biochemistry: 2 semester hours.

Advanced laboratory projects designed to emphasize techniques of qualitative and quantitative biochemical analysis. Equivalent to BIOL 5548. PREREQ: BIOL 5537/CHEM 5538. COREQ: BIOL/CHEM 5547.

CHEM 5565 Synthetic Methods: 2 semester hours.

Practical aspects of chemical synthesis: Preparation, purification, and spectral interpretation for organic and inorganic molecules. Specific evaluated graduate-level activities and/or performances are identified in the course syllabus. It is recommended that students take CHEM 5566 concurrently with CHEM 5565. PREREQ: CHEM 2211, CHEM 3302, and CHEM 3304.

CHEM 5566 Synthetic Methods Laboratory: 2 semester hours.

Advanced laboratory methods for preparation of organic and inorganic molecules: synthetic techniques, air-sensitive methods, purification techniques, and characterization methods. Specific evaluated graduate-level activities and/or performances are identified in the course syllabus. COREQ: CHEM 4465 or CHEM 5565.

CHEM 5570 Bioorganic Chemistry: 3 semester hours.

Overview of basic principles of organic mechanisms, and overview of biochemistry principles, fundamentals of proteins and protein synthesis, enzymes and enzyme reaction mechanisms including group transfer, hydrolysis, animations, phosphorylation, reductions and oxidation, mono- and d-oxygenation, substitutions, carboxylations, and decarboxylations, isomerizations, and eliminations and addition reactions. Specific evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: CHEM 3302 and CHEM 4445 or BIOL 4445.

CHEM 5581 Independent Problems in Chemistry: 1-4 semester hours.

Directed library and laboratory research. Courses may be repeated to a maximum of 6 credits. PREREQ: CHEM 3352.

CHEM 5582 Independent Problems in Chemistry: 1-4 semester hours.

Directed library and laboratory research. Courses may be repeated to a maximum of 6 credits. PREREQ: CHEM 3352.

CHEM 5591 Seminar: 1 semester hour.

A formal introduction to the chemical literature including electronic methods of literature searching. A detailed treatment of methods for presenting scientific seminars including a full-length student presentation on selected library or laboratory research. COREQ: CHEM 5581 or CHEM 5582 or CHEM 4485 or permission of instructor.

CHEM 5599 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

CHEM 6601 Seminar: 1 semester hour.

Oral reports of current literature and research in chemistry. This course may be taken multiple times as determined by degree requirements. Graded S/U.

CHEM 6609 Advanced Inorganic Chemistry: 3 semester hours.

Synthesis, reactions, spectroscopic characterization methods, and application of transition metal complexes. Foci will vary and may include metal carbon bond transformations, bioinorganic chemistry, or materials chemistry. PREREQ: CHEM 4407 or CHEM 5507 or permission of instructor.

CHEM 6610 Special Topics in Chemistry: 1-3 semester hours.

Detailed consideration of a limited phase of chemistry; course content will vary with current demand and with the instructor; may be repeated with departmental approval for non-repetitive course content.

CHEM 6615 Neutron Activation Analysis: 4 semester hours.

Theory and use of neutron activation methods for quantitative chemical analysis of natural and synthetic materials. Applications in geologic systems will be emphasized. Equivalent to GEOL 6615 and PHYS 6615. PREREQ: Permission of instructor.

CHEM 6617 Environmental Geochemistry: 3 semester hours.

Geochemistry of environmental systems. Emphasis given to low-temperature water-rock interactions, including sorption processes, retardation, reaction kinetics and reaction-mass transport modeling. Equivalent to GEOL 6617. PREREQ: GEOL 5520 or CHEM 3351.

CHEM 6621 Organic Reactions: 3 semester hours.

Advanced study of organic chemical reactions with emphasis on synthetic applications. PREREQ: CHEM 3302.

CHEM 6625 Quantitative Geochemistry Lab: 3 semester hours.

Applications of instrumental methods for geochemical analysis. Equivalent to GEOL 6625.

CHEM 6630 Advanced Analytical Chemistry: 3 semester hours.

Advanced treatment of standards, sampling, special methods of analysis, and methods of separation. PREREQ: CHEM 3302, CHEM 3304, CHEM 3334 and CHEM 3352 or permission of instructor.

CHEM 6635 Masters Research: 2-6 semester hours.

A continuation of CHEM 4435 to improve ability of students to solve chemical problems independently and pursue research at an advanced level. 2-6 credits. May be repeated for up to 12 credits. PREREQ: CHEM 4485 or permission of instructor.

CHEM 6640 Research Techniques in Chemistry: 2-6 semester hours.

Designed to improve the ability of students to solve chemical problems independently in the laboratory; special emphasis on development of manipulative skills, instrumental methods and supporting library research; nature of the projects dictated by students' needs; may be repeated with departmental approval for non-repetitive course content. Limit 12 credits.

CHEM 6650 Thesis: 1-10 semester hours.

Thesis. 1-10 credits. May be repeated. Graded S/U.

CHEM 6655 Advanced Physical Chemistry: 3 semester hours.

Introductory material from quantum chemistry and statistical mechanics with applications in chemical thermodynamics. PREREQ: CHEM 3302 and CHEM 3352 or permission of instructor.

CHEM 6671 Advanced Organic Chemistry: 3 semester hours.

Kinetics and mechanisms in organic reactions. PREREQ: CHEM 3302 and CHEM 3352 or permission of instructor.

CHEM 6699 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

CHEM 8850 Doctoral Dissertation: 1-12 semester hours.

Research toward and completion of the dissertation. May be repeated. Graded S/U.