

CHEMISTRY (CHEM)

CHEM 420G Inorganic Chemistry 3 Hours

Atomic and molecular structure, bonding theory, ionic substances, electron deficient compounds, acid-base theory and coordination chemistry.

Recent Term(s) Offered: spring 2022; spring 2023; spring 2024

CHEM 421G Inorganic Chemistry Laboratory 1 Hour

A laboratory course emphasizing the synthesis and characterization of inorganic compounds of main group and transition metals. Laboratory meets once a week for three hours.

Corequisite(s): CHEM 420G

Recent Term(s) Offered: spring 2022

CHEM 425G Polymer Chemistry 4 Hours

The principles of polymer chemistry. Lecture topics include molecular weights, morphology, mechanisms, kinetics, characterization, and uses of polymers by free radical and ionic methods in their characterization by thermal analysis, spectroscopy, viscometry, and chromatography.

Recent Term(s) Offered: None

CHEM 430G Forensic Chemistry 3 Hours

Methods and instrumentation used in the crime laboratory and in the medical technology laboratory. Topics include drugs, blood enzymes, organic and inorganic analysis, etc.

Recent Term(s) Offered: spring 2023

CHEM 435G Instrumental Analysis 3 Hours

Modern instrumental methods of analysis including spectroscopic, electroanalytical and chromatographic techniques.

Recent Term(s) Offered: fall 2022; fall 2023; fall 2024

CHEM 446G Biochemistry 3 Hours

A study of biochemical compounds and their role in intermediary metabolism. Special topics include biochemical energetics and coenzyme mechanisms.

Recent Term(s) Offered: spring 2022; fall 2022; spring 2023; summer 2023; spring 2024; fall 2024

CHEM 447G Lab Biochemistry 2 Hours

A basic laboratory study involving selected experiments which illustrate biochemical principles including separation, identification and chemical properties of carbohydrates, lipids, proteins and enzymes.

Corequisite(s): CHEM 446G

Recent Term(s) Offered: None

CHEM 450G Physical Chemistry I 3 Hours

A study of theoretical chemistry, including such as gaseous state, solid state, liquid state, thermodynamics, thermochemistry and phase and chemical equilibria.

Recent Term(s) Offered: fall 2022; spring 2023; fall 2023; fall 2024

CHEM 451G Lab Physical Chemistry I 2 Hours

A laboratory to accompany CHEM 450G and includes experiments on state of matter, surface phenomena, macromolecules, thermochemistry, thermodynamics and equilibria. Pre-lab lecture and laboratory meets four and one-half hours per week.

Corequisite(s): CHEM 450G

Recent Term(s) Offered: None

CHEM 452G Physical Chemistry II 3 Hours

A continuation of CHEM 450G including studies of kinetics, atomic and molecular structure, theory of chemical bonding, electromotive force and selected topics.

Recent Term(s) Offered: spring 2022; spring 2023; spring 2024

CHEM 453G Lab Physical Chemistry II 2 Hours

A laboratory to accompany CHEM 452G and includes experiments on chemical kinetics, spectroscopy, molecular structure, electrochemistry and mass spectroscopy. Pre-lab lecture and laboratory meets four and one-half hours per week.

Corequisite(s): CHEM 452G

Recent Term(s) Offered: None

CHEM 462G Bioinorganic Chemistry 3 Hours

This course is a study of the coordinating properties and reactivity of metal ions in living organisms. Metal ion toxicity and detoxification systems and functions of various metalloenzymes will be discussed.

Recent Term(s) Offered: None

CHEM 467G Biochemistry 3 Hours

A study of the reactions of living systems and an introduction to the mechanisms and energetics of metabolism.

Recent Term(s) Offered: spring 2024

CHEM 470G Chemistry/Middle School 2-4 Hours

Chemical theories and principles in the middle school science curricula. (elective credit only)

Recent Term(s) Offered: None

CHEM 475G Selected Topics in Chemistry 1-3 Hours (repeatable max of 6 hrs)

Topics in analytical, biochemical, coal, inorganic, organic, physical and polymer chemistry.

Recent Term(s) Offered: fall 2024

CHEM 476G Advanced Laboratory Investigations in Chemistry 2 Hours

A course for advanced students involving assigned laboratory work in the field of inorganic chemistry. Typical procedures and experiments are those involving the synthesis, characterization, and identification of various chemical compounds, using a variety of handling techniques, and the application of various physical methods.

Recent Term(s) Offered: None

CHEM 490G Materials Chemistry 3 Hours

A study of the three major classes of materials, metals, polymers, and ceramics. Topics discussed will include chemical composition, bonding, common chemical and physical properties, microstructures, and how processing and uses are affected by chemical and physical properties.

Recent Term(s) Offered: None

CHEM 491G Materials Chemistry Laboratory 3 Hours

A laboratory course in materials that includes experiments on liquid flow, solid deformation, thermal properties, electrical conductivity of materials, microscopy, diffraction techniques, processing and testing of shaped articles.

Recent Term(s) Offered: None

CHEM 516 Chemical Literature Review 1-3 Hours

Review of chemical literature on topics of individual interest. Includes reports and proposals for further research.

Recent Term(s) Offered: spring 2022; fall 2022; spring 2023; fall 2023; spring 2024; fall 2024

CHEM 520 Advanced Inorganic Chemistry 3 Hours

Various aspects of coordination chemistry.

Recent Term(s) Offered: fall 2022; fall 2024

CHEM 531 Advanced Analytical Chemistry 3 Hours

Survey of selected topics in modern instrumental methods of chemical analysis. Includes instrumental techniques not covered in CHEM 435.

Recent Term(s) Offered: spring 2022

CHEM 535 Analytical Biochemistry 3 Hours

An overview of the science of modern analytical and instrumental techniques with particular emphasis on techniques relevant to measurements in biochemistry and biology.

Prerequisite(s): (CHEM 446G or CHEM 446) or (BIOL 446G or BIOL 446) or permission of instructor

Equivalent(s): BIOL 535

Recent Term(s) Offered: spring 2023; winter 2024

CHEM 540 Organic Reactions 3 Hours

An advanced discussion of organic synthesis, including modern synthetic methods used to make targeted compounds in systematic ways.

Recent Term(s) Offered: fall 2023

CHEM 541 Advanced Organic Chemistry 3 Hours

Modern physical-organic chemistry including bonding, stereochemistry, reaction mechanisms, concerted reactions, photo-chemistry, and free-radical reactions.

Recent Term(s) Offered: spring 2023

CHEM 550 Advanced Physical Chemistry 3 Hours

Covers thermodynamics, kinetics and molecular structure in preparation for graduate study or research.

Recent Term(s) Offered: fall 2022

CHEM 560 Chemical Agents and Explosives 3 Hours

A study of the fundamental principles of chemical agents and explosives. Review of chemical reactions associated with these chemicals including detection methods, effects on targets, modes of delivery, and methods for protecting people.

Recent Term(s) Offered: fall 2023

CHEM 562 Advanced Biochemistry 3 Hours

Survey of biochemical research areas where significant advances have been made in recent years. Textbook readings, review articles and current research papers will be incorporated into lectures and discussions.

Equivalent(s): BIOL 562

Recent Term(s) Offered: fall 2023

CHEM 569 Internship in Chemistry 3 Hours

Practical experience in a supervised work situation with a cooperating business, industry, or governmental agency. Emphasizes application of knowledge and skills in chemistry.

Recent Term(s) Offered: None

CHEM 588 Research Proposal 2 Hours

This course is to provide a practical graduate-level overview of research design and proposal writing in chemistry. Students will learn to identify problems/needs, review chemical literature, formulate hypotheses, and design research methodology for their thesis projects.

Recent Term(s) Offered: spring 2022; fall 2022; spring 2023; fall 2023; spring 2024; fall 2024

CHEM 590 Material Chemistry 3 Hours

A class describes the various materials, including metals, semiconductors and polymers. The class is focusing on understanding the relationships between the arrangement of atoms, ions, or molecules comprising materials, and its bulk structural/physical properties, as well as thermochemical properties, kinetic rates and spectroscopic properties of materials.

Recent Term(s) Offered: spring 2024

CHEM 591 Material Chemistry Laboratory 3 Hours

Laboratory course focusing on the properties of materials and how they relate to the structure of the materials. Materials studies will include metals, polymers, ceramics, composites and energetic materials, and a variety of applications will be discussed including high energy, industrial, and pharmaceutical materials. Techniques including thermal analysis, X-ray diffraction, microscopy, and mechanical testing will be employed.

Recent Term(s) Offered: None

CHEM 595 Scientific Writing in Chemistry 1-6 Hours

A course to build and enhance students' writing skills when preparing lab reports, scientific articles and other professional communications.

Prerequisite(s): CHEM 596 (may be taken concurrently) or permission of instructor

Recent Term(s) Offered: spring 2022; fall 2022; spring 2023

CHEM 596 Practicum Research Experience in Chemistry 1-10 Hours

A student will work under the direction of a faculty advisor on a project proposed by the student or a project of mutual scientific interest. This research will lead to a thesis in chemistry.

Prerequisite(s): permission of instructor

Recent Term(s) Offered: spring 2022; fall 2022; spring 2023

CHEM 598 Graduate Seminar 0.5 Hours (repeatable max of 2 hrs)

Required each semester for all MS Chemistry students. Attendance is required of all full-time graduate students.

Recent Term(s) Offered: spring 2022; fall 2022; spring 2023; fall 2023; spring 2024; fall 2024

CHEM 599 Thesis Research/Writing 1-6 Hours (repeatable max of 6 hrs)

Thesis research and writing directed by faculty committee.

Recent Term(s) Offered: spring 2022; summer 2022; fall 2022; spring 2023; summer 2023; fall 2023; spring 2024; summer 2024; fall 2024

CHEM 600 Maintaining Matriculation 1-6 Hours (repeatable max of 6 hrs)

Continued enrollment for thesis completion.

Recent Term(s) Offered: spring 2024