

CHEMISTRY (CHEM)

CHEM 0--. CHEM LOWER DIVISION. (1-10 Credits)

Lower Level Coursework in Chemistry

Level: Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Transfer

Schedule type(s): Lecture

Area(s) of Inquiry: None

CHEM 0--L. CHEM LAB LOWER DIVISION. (0-10 Credits)

Lower Level Coursework in Chemistry

Level: Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Transfer

Schedule type(s): Lab

Area(s) of Inquiry: None

CHEM 001. GENERAL CHEMISTRY I. (0,3 Credits)

Introduction to the important general principles of chemistry. Students look at the twin concepts of structure and bonding in the three main physical states of matter and discover how both structure and bonding determine chemical reactivity. Students learn about the basic organizing principle of chemistry - the Periodic Table - and show both its origins and uses in predicting the properties of matter. The fundamental quantitative concept in chemistry, stoichiometry, is introduced early and emphasized throughout the course. Prereq.: two years of high school mathematics, including algebra, or consent of the instructor. Coreq.: CHEM 003.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 003 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Discussion/Recitation, CR by exam (AP/IB,etc.), Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: Physical Science, Scientific Literacy

CHEM 1--. CHEM UPPER DIVISION. (1-10 Credits)

Upper Level Coursework in Chemistry

Level: Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Transfer

Schedule type(s): Lecture

Area(s) of Inquiry: None

CHEM 002. GENERAL CHEMISTRY II. (0,3 Credits)

Continuation of the exploration of the principles of chemistry introduced in CHEM 1. Topics include thermo- chemistry; rates of chemical reactions; chemical equilibria with an emphasis on solution equilibria; the structures and properties of solutions including intermolecular forces and colligative properties; the oxidation-reduction and coordination chemistry of metals and their compounds; electro chemistry. Prereq.: CHEM 001 and CHEM 003. Coreq.: CHEM 004.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 001 and CHEM 003 and CHEM 004 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Discussion/Recitation, Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 003. GENERAL CHEMISTRY I LAB. (1 Credit)

The laboratory experiments complement and reinforce concepts introduced in General Chemistry I (CHEM 1). Coreq.: CHEM 1.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 001 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Web Instructed

Area(s) of Inquiry: Physical Science, Scientific Literacy

CHEM 004. GENERAL CHEMISTRY II LAB. (1 Credit)

The laboratory experiments complement and reinforce concepts introduced in General Chemistry II (CHEM 2). Prereq.: CHEM 1 and CHEM 3. Coreq.: CHEM 2.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 001 and CHEM 003 and CHEM 002 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Web Instructed

Area(s) of Inquiry: None

CHEM 006. CHEMISTRY FOR THE INFORMED CITIZEN. (3 Credits)

A survey of some principles of chemistry, stressing concepts and qualitative understanding rather than problem solving or technical skills. Application of a core of concepts to chemical aspects of current social political or economic situations.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: Life Science, Physical Science, Scientific Literacy

CHEM 007. CHEMISTRY FOR THE INFORMED CITIZEN LAB. (1 Credit)

An optional laboratory experience to accompany CHEM 6. Experiments illustrate how fundamental and practical chemical information is obtained. Properties of substances are observed and experiments are performed to foster appreciation of the impact of chemistry in a technological society. Prereq.: Concurrent enrollment of previous credit in CHEM 6.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 006 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Web Instructed

Area(s) of Inquiry: Life Science, Physical Science, Scientific Literacy

CHEM 008. INTRODUCTION TO INSTRUMENTS AND RESEARCH METHODS I. (1 Credit)

This is a one-hour course for students interested in studying molecular sciences to inaugurate them into the community of scientists at Drake. It will include readings about the role of science in society, development of demonstrations that correspond with general chemistry, seminar presentations, and introduction to research projects at Drake.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 012. FOOD AND HEALTH. (3 Credits)

Food and Health is a course about personal nutrition and its relationship to health by way of food, food components, and social stratification. There is now a large body of evidence which demonstrates that our diets have a major impact on our health. In this course, we will examine all aspects of this subject. This course has no prerequisites, but an awareness of global public health issues is desired. This course will serve as an all-level elective for the global public health concentration.

Level: Law, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 061. INTERMEDIATE INORGANIC CHEMISTRY. (3 Credits)

A survey of the chemistry of the elements and their compounds, using the Periodic Table as an organizing principle. Special attention will be given to structure, bonding, chemical reactivities, and practical applications in materials science, biological chemistry, medical chemistry, and environmental chemistry. Pre-requisites: CHEM 002 and CHEM 004.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 002 and CHEM 004

Corequisite(s): None

Restrictions:

Students with a classification of Freshman may **not** enroll.

Enrollment is limited to students with an major in Chemistry.

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 070. ART AND CHEMISTRY. (3 Credits)

This course examines the intersections of art and chemistry, with specific focus on the medium of painting. It is grounded in the questions of what art history can learn from chemical studies of artworks, and how knowledge of art history can guide chemical inquiries. Topics include the materials and processes of art making; the authentication, restoration, and conservation of art and their ethical implications; and the historical circumstances in which specific artworks were created. The course will include lecture, discussion, laboratory experiments, and field trips.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: Artistic Literacy

CHEM 081. ANALYTICAL METHODS. (0-4 Credits)

The principles and applications of volumetric, spectrometric and electrometric measurement in the determination of quantities of organic, biological and inorganic chemicals. With laboratory. Prereq.: CHEM 002 and 004.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 002

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 097. ORGANIC CHEMISTRY I. (3 Credits)

A study of the chemistry of aliphatic, alicyclic, and aromatic compounds including structure and nomenclature, stereochemistry, properties and reactions, reaction mechanisms, and spectroscopy.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 002 and CHEM 004 and CHEM 098 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: Life Science, Physical Science, Scientific Literacy

CHEM 098. ORGANIC CHEMISTRY I LAB. (1 Credit)

The laboratory experiments complement and reinforce concepts introduced in Organic Chemistry I (CHEM 097). They include purification techniques, synthesis and characterization of organic compounds.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 002 and CHEM 004 and CHEM 097 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Web Instructed

Area(s) of Inquiry: Life Science, Physical Science, Scientific Literacy

CHEM 108. ORGANIC CHEMISTRY II. (3 Credits)

Continuation of Chemistry 97 with further study of the chemistry of aliphatic, alicyclic, aromatic, and heterocyclic compounds with an emphasis on the compound classes containing oxygen and nitrogen. The study includes structure and nomenclature, stereochemistry, properties and reactions, reaction mechanisms, and spectroscopy. Prereq.: Chem 097, 098.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): (CHEM 107 or CHEM 097) and (CHEM 109 or CHEM 098) and CHEM 110 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: Life Science, Physical Science, Scientific Literacy

CHEM 110. ORGANIC CHEMISTRY II LAB. (1 Credit)

The laboratory experiments complement and reinforce concepts introduced in Organic Chemistry II (CHEM 108). They include purification techniques, synthesis and characterization of organic compounds.

Prereq.: CHEM 097 and CHEM 098.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): (CHEM 107 or CHEM 097) and (CHEM 109 or CHEM 098) and CHEM 108 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Web Instructed

Area(s) of Inquiry: Life Science, Physical Science, Scientific Literacy

CHEM 130. BIOCHEMISTRY I: FUNDAMENTALS. (3 Credits)

A study of the nature of the chemical constituents of living matter, the functions and transformation of these chemical entities in biological systems, and the chemical changes associated with these transformations in the course of the activity of living matter. Prereq.: CHEM 108, CHEM 110.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 108 (may be taken concurrently) and CHEM 110 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 131. BIOCHEMISTRY I: FUNDAMENTALS LAB. (1 Credit)

Introduction to biochemical laboratory techniques. Provides practical experiences with techniques for separation and characterization of biomolecules and methods of examining biochemical reactions including kinetics. Prereq.: CHEM 108 and CHEM 110.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 108 (may be taken concurrently) and CHEM 110 (may be taken concurrently)

Corequisite(s): CHEM 130

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 132. BIOCHEMISTRY II: METABOLISM. (3 Credits)

Continuation of CHEM 130 with further emphasis on protein and nucleotide metabolism, biochemical genetics, enzyme mechanisms and kinetics, biochemistry of membrane transport, vision, immunology, hormone action, and virology. Prereq.: CHEM 130 or BIO 131, or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 130 or BIO 131

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 133. BIOCHEMISTRY II: METABOLISM LAB. (1 Credit)

Continuation of CHEM 131. Further applications of basic biochemical laboratory techniques with emphasis on more advanced techniques in instrumental methods, protein characterization and molecular genetics. Prereq.: CHEM 131 or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 131 or BIO 131

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 134. MOLECULAR BIO. (3 Credits)

Introduction to the principles, practices and applications of modern molecular biology. The chemistry of informational macromolecules; mechanism, regulation and integration of informational processes in the cell; application to basic biology and medicine; implications for society. Prereq.: Chem 130 or BIO 165 or consent of instructor.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 130 or BIO 165

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 135. MOLECULAR BIOLOGY LAB. (1 Credit)

Introduction to the methods of molecular biology with an emphasis on the development of critical thinking and problem solving skills. Laboratory provides practical experience with cell culture, the characterization of proteins and nucleic acids, and molecular cloning techniques, including the application of the polymerase chain reaction method. Prereq.: BIO 165 or consent of instructor; concurrent enrollment in CHEM 134 is encouraged.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): BIO 165 and CHEM 134 (may be taken concurrently)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 136. STRUCTURAL BIO. (3 Credits)

Introduction to the principles, methods and applications of structural biology, a discipline that seeks to relate molecular form to biological function. An analysis of molecular structure and biological function in relation to the molecular biology of the cell, and an exploration of the applications of this understanding. Practical experience in the use of sequence analysis and molecular graphics computer programs as applied to structural problems in cellular and molecular biology. Prereq.: BIO 165, CHEM 130, or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): BIO 165 and CHEM 130

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 137. ADVANCED MOLECULAR LS LAB. (3 Credits)

Advanced Molecular Life Sciences Laboratory is a capstone interdisciplinary course that involves students in a laboratory research problem. The course is structured to model the process used by practicing scientists as they conduct research. Accordingly, as students approach their research problem, they will learn to develop both effective experimentation skills (techniques, data evaluation, experimental design) and effective communication skills (writing proposals, reports and notebooks; speaking at seminars and professional meetings; listening to experts and colleagues). Prereq.: Any one of the following: CHEM 130, CHEM 137, BIO 12, BIO 165, or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 130 or BIO 122 or BIO 165

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Web Instructed

Area(s) of Inquiry: None

CHEM 148. UNDERGRADUATE RESEARCH. (1-3 Credits)

Participation in and contribution to research programs in collaboration with individual faculty members. The research will be the basis for a formal written report. Prereq.: Consent of the instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter with IP

Schedule type(s): Independent Study, Web Instructed

Area(s) of Inquiry: None

CHEM 155. ORGANIC REACTIONS AND APPLICATIONS. (0,4 Credits)

The lecture component of this course covers the important concepts of synthetic and mechanistic organic chemistry including the chemistry of enolates and enamines, functional group interconversions, oxidations and reductions, cycloadditions, unimolecular rearrangements, highly reactive intermediates, and multistep synthesis. The laboratory component focuses on microscale syntheses and special analysis using spectroscopic and chromatographic techniques including IR, NMR, GC, UV-Vis, HPLC and GC-MS. Several of the laboratory experiments are open-ended projects. With laboratory. Prereq.: CHEM 108, CHEM 110, and CHEM 165, or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 108 and CHEM 110 and CHEM 165

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 161. BIOPHYSICAL CHEMISTRY. (0-4 Credits)

Intended for students majoring in biochemistry, cell and molecular biology (BCMB), pharmaceutical sciences (BSPS) and biology. The course will explore how living systems create in a disorderly world, drive equilibria in directions dictated by immediate needs of the organisms, make reactions occur so efficiently, specifically and effectively. They will explore how we observe chemical and physical properties of life's molecules and discuss all these topics in the context of some examples that include photobiology, transport, and macromolecular folding. The laboratory component will expose students to physical chemistry concepts from a biochemical and pharmaceutical perspective. Prerequisites: at least one semester of calculus, 2 semester of physics, or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 165. THERMODYNAMICS AND KINETICS. (0-4 Credits)

Intended for students in chemistry and the health sciences who desire a knowledge of the physical chemical concepts that apply in their fields. The course includes topics in chemical thermodynamics, chemical kinetics and related areas. With laboratory. Prereq.: CHEM 81, PHY 2 or 12, MATH 70 or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 081 and (PHY 002 or PHY 012) and MATH 070

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 166. QUANTUM-MECHANICAL EXPLORATION. (0-4 Credits)

Continuation of the study of physical chemical principles. Topics include quantum mechanics, molecular dynamics, chemical equilibria and statistical thermodynamics. With laboratory. Prereq.: CHEM 165. (MATH 100 is highly recommended).

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 165 and MATH 100

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 170. EXPLORATIONS IN COMPUTATIONAL CHEMISTRY. (3-4 Credits)

Computer modeling has risen rapidly from the esoteric realm of experts to a place of central prominence and utility in many, if not all, natural sciences. In CHEM 170, we use computer models to explore how chemical behavior arises from the electronic structure of atoms and molecules. Potential applications include molecular structure and bonding, the absorption and emission of light, reaction mechanisms, and solvent effects on chemical reactivity. This course is suitable for (among others) a wide range of natural science majors, and computer programming experience is not required.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 001 and CHEM 002 and CHEM 097 and (MATH 050 or MATH 070 or MATH 080 or MATH 100)

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 180. EXPLORATIONS IN INORGANIC CHEMISTRY. (0-4 Credits)

A study of modern inorganic chemistry, with emphasis on areas of active research. Topics include structure and symmetry, coordination chemistry of the transition metals, organometallic and bioinorganic chemistry. In laboratory, representative compounds are synthesized and characterized. With laboratory. Prereq.: CHEM 165 or consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 165

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 182. INSTRUMENTAL METHODS OF ANALYSIS. (0-4 Credits)

This course, grounded in the principles of analytical chemistry, is aimed at understanding the physical phenomena underlying modern chemical instrumentation as well as the design of instrumentation. The application of instrumentation to the solution of quantitative and qualitative chemical, biochemical, and pharmaceutical problems is also emphasized. In the laboratory, students use a wide variety of spectroscopic, chromatographic and electrochemical techniques including UV-Vic, IR, NMR, ICP, CE, GC, GC-MS, HPLC and CV. With laboratory.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 081

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lab, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 190. INTEGRATED CHEMISTRY TOPICS. (0.5-4 Credits)

Specialized study of a chosen topic in chemistry. Prereq.: Consent of instructor.

Level: Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions: None

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Internship, Lecture/Lab Combo, Web Instructed

Area(s) of Inquiry: None

CHEM 195. SEMINAR I. (1 Credit)

This course is designed to prepare chemistry majors for presentation of original chemical research. This course features presentations and discussions of chemical research by visiting scientists, Drake faculty, and senior chemistry majors. Required for Chem B.S., optional for Chem B.A.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): None

Corequisite(s): None

Restrictions:

Enrollment limited to students with a classification of Junior.

Enrollment is limited to students with an area(s) of study in Chemistry.

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None

CHEM 198. SEMINAR II. (1 Credit)

Continuation of CHEM 195. Required for all Chem majors.

Level: Non Degree Coursework, Professional Health Care, Undergraduate

Prerequisite(s): CHEM 195

Corequisite(s): None

Restrictions:

Enrollment limited to students with a classification of Senior.

Enrollment is limited to students with an area(s) of study in Chemistry.

Primary grade mode: Standard Letter

Schedule type(s): Independent Study, Lecture, Web Instructed

Area(s) of Inquiry: None