

CHEMISTRY (CH)

CH-213 Chemistry of Bioorganic Molecules (3 credits)

The student analyzes the structures of organic and biological molecules. She learns to interpret the physical and chemical properties of these molecules, explaining observed properties in relation to a molecule's shape and electronic nature. She also investigates the thermodynamic and kinetic basis of chemical transformation with particular emphasis on enzymes and metabolic pathways. In the laboratory, she examines some of the molecules, properties, and reactions discussed in class. She also conducts two investigations in which variables are tested, and an independent investigation in which she modifies the design of an experiment to answer a question she raises. Through this investigative process, she develops laboratory writing and research skills.

Prerequisite(s): SC-119 completed. Students must register for lecture and one lab section. Other Information Summer 2018: no class July 4

CH-213L Chemistry of Bioorganic Molecules Lab (1 credit)

Concurrent registration in CH-213

Prerequisite(s): Concurrent with CH-213.

CH-221 Organic Chemistry 1 (3 credits)

Offered Fall Term only. The student applies the structure-property framework in the analysis of organic molecules. In particular, she learns to interpret physical and chemical properties of organic molecules, explaining the observed properties in relation to a molecule's structural and electronic features. The thermodynamic and kinetic basis of chemical transformation is also studied. In the laboratory she applies structure-property analysis in solving problems related to physical and chemical separation methods. She analyzes the structure of organic molecules with spectroscopic methods. In understanding and designing separation methods, she uses microscale scale techniques to investigate intermolecular forces.

Prerequisite(s): CH-213 & CH-213L completed.

CH-221L Organic Chemistry 1 - Lab (1 credit)

Offered Fall Term only. The student applies structure-property analysis in solving problems related to physical and chemical separation methods. She analyzes the structure of organic molecules with spectroscopic methods. In understanding and designing separation methods, she uses microscale scale techniques to investigate intermolecular forces.

CH-234 Analytical Chemistry/Quantitative Analysis (3 credits)

Offered Spring Term only. The student studies basic concepts of titrimetric, gravimetric, and colorimetric analysis. She learns to use basic analytical techniques in the laboratory and to evaluate the accuracy and precision of her data.

Prerequisite(s): CH-213 completed & MT-123 or higher completed. Students must register for lecture and lab. Offered in Spring Term only., Take CH-234L

CH-234L Analytical Chem-Quant Analysis Lab (1 credit)

Offered Spring Term only. The student learns to use basic analytical techniques and to evaluate the accuracy and precision of her data.

Prerequisite(s): Concurrent registration with CH-234. Offered in Spring Term , Take CH-234

CH-260 Chemistry of Inorganic Materials (3 credits)

Offered Spring Term only. The student investigates relationships between the properties of elements and their position on the Periodic Table. She uses the oxidation reduction model and models for various types of chemical bonds as she predicts and explains properties of inorganic materials. In the laboratory, she designs and carries out an investigation of an oxidation-reduction reaction such as corrosion or bleaching.

Prerequisite(s): CH-213 & QL-120 completed. Students must register for lecture and lab section. Offered in Spring Term only., Take CH-260L

CH-260L Chemistry/Inorganic Materials - Lab (1 credit)

Offered Spring Term only. The student designs and carries out investigations of the corrosion of metal.

Prerequisite(s): Concurrent registration with CH-260. Offered in Spring Term , Take CH-260

CH-297 Independent Study (0 credits)

Under the approval and direction of a faculty member, independent study is available to students.

CH-322 Organic Chemistry 2 (4 credits)

The student applies the structure-property framework in the analysis of chemical transformation. In particular, she learns to predict chemical changes by analyzing the electronic, structural, and stereochemical features of a molecule. She applies an understanding of reactions and reaction mechanisms in designing multistep syntheses. In the lab, she works collaboratively to investigate factors that affect reaction rates and reaction mechanisms. Computational methods are used to study the chemical and physical properties of organic molecules. Finally, she applies problem-solving skills as she modifies published procedures for the synthesis of organic molecules and as she verifies product structures using spectroscopic methods.

Prerequisite(s): CH-221, CH-221L and CH-234, CH-234L completed or permission from instructor. Students must register for lecture and lab., Take CH-322L

CH-322L Organic Chemistry 2 Lab (0 credits)

The student applies the structure-property framework in the analysis of chemical transformation. In particular, she learns to predict chemical changes by analyzing the electronic and structural features of a molecule. She applies an understanding of reactions and reaction mechanisms in designing multistep syntheses. In the lab, she works collaboratively to investigate factors that affect reaction rates and reaction mechanisms. Computational methods are used to study the chemical and physical properties of organic molecules and as she verifies product structures using spectroscopic methods.

Prerequisite(s): Concurrent registration in CH-322, Take CH-322

CH-328 Biochemistry (4 credits)

The student analyzes the structure and function of biomolecules with an emphasis on proteins and particularly enzymes. She also studies the function, regulation, and integration of metabolic pathways. In her laboratory work, she learns some basic biochemistry techniques and employs them in determining the molecular weight of a protein, purifying an enzyme, and conducting enzyme kinetic studies.

Prerequisite(s): CH-221, CH-221L and MT-123 or MP-2 or higher completed. Students register for lecture and lab., Take CH-328L

CH-328L Biochemistry - Lab (0 credits)

The student analyzes the structure and function of biomolecules with an emphasis on proteins and particularly enzymes. She also studies the function, regulation, and integration of metabolic pathways. In her laboratory work, she learns some basic biochemistry techniques and employs them in determining the molecular weight of a protein, purifying an enzyme, and conducting enzyme kinetic studies.

Prerequisite(s): Take concurrent with CH-328

CH-337 Instrumental Methods of Analysis Lab (3 credits)

The student studies the advantages and limitations of different instrumental methods for analyzing chemical samples, and applies them in the analysis of various real-life samples.

Prerequisite(s): CH-234 & CH-234L completed.

CH-374 CH Assessment in Effective Citizenship (0 credits)

The student identifies a community organization through which she can address an issue. She sets a goal for her volunteer work with the organization, and designs and carries out a strategy for achieving her goal. She summarizes her work in her log and addresses its effectiveness in a written reflection.

Prerequisite(s): CH Majors: Effective Citizenship Level 3 completed.

CH-395 Biochemistry of Micronutrients (3 credits)

The goal of this course is to provide an increased understanding of the biochemical and physiological mechanisms involved in micronutrient action and metabolism and the regulation of micronutrient homeostasis in the body. This course will provide an in-depth understanding of the basis of the body's need for fat-soluble vitamins, water-soluble vitamins, and minerals and the molecular functions of these nutrients. The student will increase conceptual knowledge concerning the application of laboratory techniques that are commonly used in modern biological science research through analysis of primary research papers in a journal club format. Offered in spring terms every other year.

Prerequisite(s): SC-120 completed; CH-213 or CH-221 completed; Analysis Level 3 completed.

CH-397 Independent Study (1-4 credits)

The student selects a topic in chemistry related to their career goals and, under the direction of a chemistry faculty member, investigates that topic in depth.

CH-399 Formal Introduction to Advanced Work (0 credits)

The Advanced-Level Event marks a significant accomplishment for each student as she proceeds into the work of her major department. When a department determines that a student is ready for advanced work within a discipline, the student is invited to participate in a ceremony that is both a celebration and an explanation of future requirements of the major and support areas. She registers for this experience at a point determined by her major department: for most majors the registration is connected to the taking of a particular course. Students and faculty gather for an afternoon during Mid-semester Assessment Days. Following a general program, students meet in departmental sessions with their faculty to discuss advanced outcomes, department courses, advising procedures, and so on.

Prerequisite(s): Completion of 1 of the following courses: CH-221, CH-234 or CH-260.

CH-414 Chemistry Professional Portfolio (0 credits)

This assessment offers students with a major or a support area in chemistry the opportunity to show that they can effectively use and communicate chemical information. The student assembles a portfolio of her communications, including laboratory notebooks, written reports and papers, videotapes of speeches, and abstracts. She describes the research strategies she employed in her portfolio work. She assesses her portfolio, describing her own strengths and weaknesses.

CH-425 Molecular Biology (4 credits)

Offered Spring Term only. In this course, the student integrates and applies knowledge from a breadth of fields in biology, chemistry, and physics to the analysis of molecular mechanisms and control of nucleic acids in living organisms. The course focuses on the theoretical and technical mechanisms of nucleic acid (DNA and RNA) function, including replication and gene expression. There is a strong emphasis on current laboratory techniques for manipulating the genome, and laboratory work is closely integrated with the lecture/discussion component.

Prerequisite(s): BI-325 or BI-361 completed. Concurrent registration in CH-425L. Offered in Spring Term only., Take CH-425L

CH-425L Molecular Biology Lab (0 credits)

Offered Spring Term only. In this course, the student integrates and applies knowledge from a breadth of fields in biology, chemistry, and physics to the analysis of molecular mechanisms and control of nucleic acids in living organisms. The course focuses on the theoretical and technical mechanisms of nucleic acid (DNA and RNA) function, including replication and gene expression. There is a strong emphasis on current laboratory techniques for manipulating the genome, and laboratory work is closely integrated with the lecture/discussion component.

Prerequisite(s): Take CH-425 concurrently

CH-441 Physical Chemistry 1 (3 credits)

The student uses models and equations to predict the behavior of chemical systems and learns how the models and equations were developed from experimental data and the principles of chemistry, physics, and mathematics. The emphasis is on gases and thermodynamics.

Prerequisite(s): CH-234, MT-253 completed & PH-232 or PH-242 completed

CH-442 Physical Chemistry 2 (3 credits)

Offered Spring Term only. The student continues her study of physical chemistry, with an emphasis on kinetics.

Prerequisite(s): CH-441 completed. Offered in Spring Term.

CH-450L Physical Chemistry Lab (2 credits)

Student works relatively independently on laboratory projects related to physical chemistry and her career goals.

Prerequisite(s): CH-441 completed; CH-442 completed or concurrent registration.

CH-483 Advanced Internship Seminar (2 credits)

Based on her personal, academic, and professional goals and interests, the student does individual fieldwork at a job setting related to art and art applications. Her placement may involve planning and mounting exhibitions at an art museum, helping to maintain the permanent collection at a public museum, or learning the casting process in a foundry. An on-campus interdisciplinary seminar accompanies the internship, and helps her develop her professional abilities and effectively transfer classroom skills to the working world.

Prerequisite(s): Departmental consent; confer with advisor. Preplacement workshop required. See Internship Registration Procedures page for workshop schedule and required internship procedures.

CH-497 Independent Study (4 credits)

Under the approval and direction of a faculty member, independent study is available to students.