

CHEMISTRY (CHEM)

CHEM 1101 Supplemental Laboratory

This course allows a transfer student to make up a laboratory deficiency at the introductory level. May be taken only for introductory courses. Laboratory fee applicable.

Prerequisites: Permission of Department Chair.

CHEM 1111 General Chemistry I-Lab

Laboratory course to accompany CHEM 1311. Practical exercises reinforce CHEM 1311. Topics include the basic principles of nomenclature, atomic structure, bonding, thermodynamics, chemical reaction, and stoichiometry. Must be taken concurrently with CHEM 1311. Laboratory fee applicable.

Prerequisites: Placement in College Algebra or higher.

TCCN: CHEM 1111

CHEM 1170 Survey of Chemistry Lab

Laboratory to accompany Survey of Chemistry, CHEM 1370. Not for students majoring or minoring in chemistry or biology. Fulfills the laboratory science core curriculum requirement. Must be taken concurrently with CHEM 1370. Laboratory fee applicable.

TCCN: CHEM 1105

CHEM 1311 General Chemistry I

Covers the basic principles of nomenclature, atomic structure, bonding, thermodynamics, chemical reaction, and stoichiometry. The first half of a two-semester course. Must be taken concurrently with CHEM 1111.

Prerequisites: Placement in College Algebra or higher.

TCCN: CHEM 1311

CHEM 1370 Survey of Chemistry

An introduction to Chemistry and its relationship to society and the environment. Molecules that control daily life are explored via a conceptual approach. Not for students majoring or minoring in chemistry or biology. Fulfills the laboratory science core curriculum requirement. Must be taken concurrently with CHEM 1170.

TCCN: CHEM 1305

CHEM 1412 General Chemistry II

Covers gas laws, thermodynamics, kinetics and electrochemistry. The second half of a two-semester course. Three hours of laboratory per week. Laboratory fee applicable.

Prerequisites: CHEM 1411 or CHEM 1311/1111.

TCCN: CHEM 1412

CHEM 2423 Organic Chemistry I

Offers an introduction to organic chemistry. Covers basic nomenclature, spectroscopy, structure and functional groups of organic molecules. A variety of organic reactions are discussed in terms of basic thermodynamics, structure, kinetics, and resonance theory. The first half of a two semester course. Three hours of laboratory per week. Laboratory fee applicable.

Prerequisites: CHEM 1412.

TCCN: CHEM 2423

CHEM 2425 Organic Chemistry II

Emphasizes the importance of functional groups in organic molecules, particularly in relation to their reaction mechanisms. Covers structure, reactivity and nomenclature of important organic compounds such as aldehydes, ketones, carboxylic acids, esters, amines, amides, phenols, heterocycles, carbohydrates, proteins, and nucleic acids. Second half of a two-semester course. Three hours of laboratory per week. Laboratory fee applicable.

Prerequisites: CHEM 2423.

TCCN: CHEM 2425

CHEM 3400 Environmental Chemistry

A course that develops quantitative analytical techniques for monitoring and assessing toxins and pollutants in the environment. Three hours of laboratory per week. Laboratory fee applicable.

Prerequisites: CHEM 1311, 1111 and CHEM 2423.

CHEM 3405 Analytical Chemistry

Laboratory fee applicable. The principles and theories of modern instrumentation examined through topics selected from electrochemistry, spectroscopy, and chromatography. Three hours of laboratory per week. Laboratory fee applicable.

Prerequisites: CHEM 1412.

CHEM 3406 Analytical Chemistry II

A study of theory and application of modern instrumental methods of analysis, including UV-VIS, FT-IR, GC, NMR and potentiometric methods of titrimetric. Environmental analysis will be included. Laboratory fee applicable.

Prerequisites: CHEM 1411, CHEM 1412.

CHEM 3431 Physical Chemistry I

An understanding of chemical thermodynamics, equilibrium and electrochemistry will be developed. The first half of a two-semester course. Three hours of laboratory per week. Lab fee applicable.

Prerequisites: MATH 2413, CHEM 1412, and PHYS 1302 and PHYS 1102 or PHYS 2326 and PHYS 2126.

CHEM 3432 Physical Chemistry II

An understanding of chemical kinetics, quantum mechanics, statistical mechanics and photochemistry will be examined. The second half of a two-semester course. Three hours of laboratory per week. Laboratory fee applicable.

Prerequisites: CHEM 3431.

CHEM 3451 Biochemistry I

An introduction to modern biochemistry using fundamental chemical principles. Topics covered include proteins, carbohydrates, lipids, nucleic acids, bioenergetics, enzymology, and metabolism, with an emphasis on interrelationships between metabolic pathways and regulation. Cross-listed with BIOL 3451. Credit cannot be given for both BIOL 3451 and CHEM 3451. Laboratory fee applicable.

Prerequisites: BIOL 1306, 1106 and CHEM 2423 or permission of instructor.

CHEM 4120 Chemistry Seminar

A study of the current chemical literature and the discussion of research in progress. May be repeated when topic changes. Required for all chemistry majors in their junior or senior year.

CHEM 4198 Investigations in Chemistry

Independent experimental research in any accredited chemical field performed in affiliation with a faculty member. Course may be repeated but not to exceed five semester hours for chemistry majors and not to exceed four hours for all other students. Laboratory fee applicable.

Prerequisites: Junior or senior standing and permission of instructor.

CHEM 4199 Special Topics in Chemistry

A course involving instruction, laboratory, and/or literature searches in one of the traditional chemistry fields depending on student interest and specialty of instructor. The following topics may be chosen/offered Bioinorganic Chemistry, Transition Metal Chemistry, Solid State Chemistry, Advanced Topics in Organic Chemistry, Statistical Mechanics, and Advanced Topics in Analytical Chemistry. May be repeated for credit when topic changes. (Formerly CHEM 4399). Prerequisites: Senior standing and permission of instructor.

CHEM 4298 Investigations in Chemistry

Independent experimental research in any accredited chemical field performed in affiliation with a faculty member. Course may be repeated but not to exceed five semester hours for chemistry majors and not to exceed four hours for all other students. Laboratory fee applicable. Prerequisites: Junior or senior standing and permission of instructor.

CHEM 4299 Special Topics in Chemistry

A course involving instruction, laboratory, and/or literature searches in one of the traditional chemistry fields depending on student interest and specialty of instructor. The following topics may be chosen/offered Bioinorganic Chemistry, Transition Metal Chemistry, Solid State Chemistry, Advanced Topics in Organic Chemistry, Statistical Mechanics, and Advanced Topics in Analytical Chemistry. May be repeated for credit when topic changes. (Formerly CHEM 4399). Prerequisites: Senior standing and permission of instructor.

CHEM 4398 Investigations in Chemistry

Independent experimental research in any accredited chemical field performed in affiliation with a faculty member. Course may be repeated but not to exceed five semester hours for chemistry majors and not to exceed four hours for all other students. Laboratory fee applicable. Prerequisites: Junior or senior standing and permission of instructor.

CHEM 4399 Special Topics in Chemistry

A course involving instruction, laboratory, and/or literature searches in one of the traditional chemistry fields depending on student interest and specialty of instructor. The following topics may be chosen/offered Bioinorganic Chemistry, Transition Metal Chemistry, Solid State Chemistry, Advanced Topics in Organic Chemistry, Statistical Mechanics, and Advanced Topics in Analytical Chemistry. May be repeated for credit when topic changes. (Formerly CHEM 4399). Prerequisites: Senior standing and permission of instructor.

CHEM 4409 Molecular Sys Biol&Chem Gens

A course dedicated to the discussion of current approaches to study "Omics" or systems biology, and the impact of chemical genetics in understanding how to activate or inactivate gene products as a way to determine the cellular function of proteins. The course covers topics at the molecular level, including research in the evolving areas of genomics, proteomics, metabolomics, bioinformatics, microbial systems, and the integration of cell signaling and regulatory networks. Laboratory fee applicable. (Cross-listed with BIOL 4409 and BIOL 5409) Prerequisites: Permission of instructor.

CHEM 4410 Advanced Environmental Chem

A course that develops quantitative analytical techniques and methods for monitoring and assessing atmospheric chemical phenomena. Geochemical, atmospheric, hydrosphere and biosphere phenomena in the form of toxins and pollutants will be studied. Environmental cleanup technologies and environmental health management will be investigated. Laboratory fee applicable. Prerequisites: Senior standing.

CHEM 4411 Inorganic Chemistry

This course covers the periodic table and trends within it, focusing on metals, ionic compounds, molecular compounds, organometallic complexes, and coordination complexes. Models of chemical bonding will be compared for each class of substance. Special topics such as bioorganic chemistry, nanotechnology and superconductors will be included. Three hours of laboratory per week. Laboratory fee applicable. Prerequisites: CHEM 1412.

CHEM 4420 Instrumental Analysis

This is an applied chemistry course designed to provide an in-depth review of general instrumental methods of chemical analysis including atomic and molecular spectroscopy, nuclear magnetic spectroscopy, mass spectroscopy, gas and liquid chromatographic methods, gas and liquid chromatography, capillary electrophoresis, and several hyphenated techniques. This course is designed to provide students with the theoretical background and principles of operation of modern analytical instrumentation and hands-on experience. This is therefore designed to have a lecture and a laboratory component. The lecture component will emphasize the chemical and physical principles behind the instrumentation, the property measured, how the instrument measures that property and ways to increase accuracy, precision and sensitivity. The laboratory component allows students to put these principles learnt in class into practice. The goal is to offer students a broader working knowledge of instruments. Theoretical and practical knowledge of the use these instruments include knowing the appropriate control experiments to conduct. Laboratory fee applicable. Prerequisites: CHEM 1412. Corequisites: CHEM 4020.

CHEM 4431 Advanced Organic Chemistry I

A course that develops the understanding of organic chemistry through mechanistic theory, chemical synthesis and spectroscopic methods. An emphasis on specific reactions, synthetic methods, and mechanisms of reactions will be investigated. Laboratory fee applicable. Prerequisites: Senior standing.

CHEM 4445 Medicinal Chemistry

This is a lecture/lab course that addresses the role of organic chemistry in the design and action of drugs. The principles of drug discovery, drug development, drug/receptor interactions and structure/activity relationships will be covered in the class. Aspects of biochemistry and physical organic chemistry will also be covered as necessary to understand the chemistry of drug action and metabolism in the body. Examples from the major classes of drugs will be used to facilitate discussion and examine the role of medicinal chemistry as witnessed today. Laboratory fees applicable. This course is interchangeable with BIOL 4445. Prerequisites: CHEM 2423. Corequisites: CHEM 4045.

CHEM 4451 Polymer Chemistry

A course that develops the understanding of kinetic, synthetic structural and applied aspects of modern polymer chemistry. The course also develops the understanding of polymeric science in industry and materials science and technology. An understanding of mechanistic theory, synthesis using specific reactions and spectroscopic methods of polymers and macromolecules will also be emphasized. Laboratory fee applicable. Prerequisites: CHEM 2425.

CHEM 4452 Biochemistry II

A detailed study, using primary literature sources, of carbohydrates, amino acids, nucleic acids, and lipid metabolic pathways. Special attention is given to human metabolism in health and disease. Cross-listed with BIOL 4452.

Prerequisites: BIOL 3451 or CHEM 3451 with C or better, or permission of instructor.

CHEM 4498 Investigations in Chemistry

Independent experimental research in any accredited chemical field performed in affiliation with a faculty member. Course may be repeated but not to exceed five semester hours for chemistry majors and not to exceed four hours for all other students. Laboratory fee applicable.

Prerequisites: Junior or senior standing and permission of instructor.

CHEM 4499 Special Topics in Chemistry

A course involving instruction, laboratory, and/or literature searches in one of the traditional chemistry fields depending on student interest and specialty of instructor. The following topics may be chosen/offered Bioinorganic Chemistry, Transition Metal Chemistry, Solid State Chemistry, Advanced Topics in Organic Chemistry, Statistical Mechanics, and Advanced Topics in Analytical Chemistry. May be repeated for credit when topic changes. (Formerly CHEM 4399).

Prerequisites: Senior standing and permission of instructor.

CHEM 5451 Adv Surv of Chem&Bio Proc

This course focuses on new trends in the elimination of pollutants involving recently developed methodologies. The course requires extensive knowledge on general and organic chemistry as well as biochemistry.

Prerequisites: Graduate standing and permission of instructor.