

CHEMISTRY (CHEM)

CHEM 1111 Survey of Chemistry Laboratory

ACTS Common Course - CHEM 1214 (taken with CHEM 1113).

Co-requisite: CHEM 1113.

An introduction to laboratory experiences in chemistry. \$40 laboratory fee.

CHEM 1113 A Survey of Chemistry

ACTS Common Course - CHEM 1214 (taken with CHEM 1111).

Co-requisite: CHEM 1111.

Prerequisite: A score of 19 or above on the mathematics section of the ACTE exam, or completion of MATH 0903, Intermediate Algebra, with a grade of C or better.

A survey of selected topics in chemistry for life science majors. A brief introduction to fundamental concepts, atomic structure, chemical bonding, and periodic law as applied in the life sciences and allied areas. May not be taken for credit after completion of CHEM 2124 or 2134.

CHEM 2111 Environmental Seminar

Cross-listed: BIOL 2111, GEOL 2111 A seminar for students pursuing the environmental option of chemistry, biology, or geology and other students interested in environmental sciences.

CHEM 2120 General Chemistry I Lab

Co-requisite for CHEM 2124 General Chemistry I.

CHEM 2124 General Chemistry I

ACTS Common Course - CHEM 1414 Prerequisite: Score of 21 or higher on the math portion of the ACTE; or MATH 1113 or equivalent; or a "C" or better in CHEM 1113 and CHEM 1111; or approval of the instructor.

Co-requisite: CHEM 2120 The first of a two semester sequence designed for science and engineering majors.

Topics include qualitative and quantitative, applied and theoretical analyses of the interactions of matter; atoms, molecules, ions, the mole concept, chemical equations, gases, solutions, intermolecular forces, thermochemistry, quantum theory, periodic law, ionic and covalent bonding, molecular geometry. Lecture three hours, laboratory three hours. \$40 laboratory fee.

CHEM 2130 General Chemistry II Lab

Co-requisite for CHEM 2134, General Chemistry II.

CHEM 2134 General Chemistry II

ACTS Common Course - CHEM 1424 Prerequisite: A grade of C or better in CHEM 2124 or equivalent.

Co-requisite: CHEM 2130 A continuation of CHEM 2124, encompassing chemical kinetics, equilibrium, acid/base systems, atmospheric chemistry, thermodynamics, electrochemistry, descriptive inorganic chemistry and nuclear chemistry.

Lecture three hours, laboratory three hours. \$40 laboratory fee.

CHEM 2204 Organic Physiological Chemistry

ACTS Common Course - CHEM 1224.

Offered: Fall.

Prerequisite: A grade of C or better in CHEM 1113 and CHEM 1111 or CHEM 2124.

For students who desire only one semester of organic/physiologic chemistry, such as wildlife biology and various allied health programs. A brief introduction to organic and physiological chemistry. The structures, reactions and biological aspects of organic compounds will be stressed. Lecture three hours, laboratory three hours. \$40 laboratory fee.

Note: Will not be counted for chemistry credit toward the ACS approved BS in chemistry.

CHEM 2991 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to three credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 2992 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to three credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 2993 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to three credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 3111 Environmental Seminar

Cross-listed: BIOL 3111, ENVS 3111, and GEOL 3111.

A seminar for students pursuing the environmental option of chemistry, biology, or geology and other students interested in environmental sciences.

CHEM 3245 Quantitative Analysis

Offered: Spring.

Prerequisite: A grade of C or better in CHEM 2134.

This is a lab intensive course, that focuses on a variety of experimental techniques that enable the chemist to characterize and quantify many types of samples. Lecture three hours, laboratory six hours. \$40 laboratory fee.

CHEM 3250 Fundamentals of Organic Chemistry Laboratory

Co-requisite: CHEM 3254.

CHEM 3254 Fundamentals of Organic Chemistry

Co-requisite: CHEM 3250.

Prerequisite: CHEM 2134.

An introduction to the chemistry of covalently bonded carbon. Special emphasis will be given to descriptive and structural aspects of Organic Chemistry. Lecture three hours, laboratory three hours. \$40 laboratory fee.

CHEM 3260 Mechanistic Organic Chemistry Laboratory

Co-requisite: CHEM 3264.

CHEM 3264 Mechanistic Organic Chemistry

Co-requisite: CHEM 3260.

Prerequisite: A grade of C or better in CHEM 3254 or equivalent.

A continuation of CHEM 3254 with special emphasis on theory and mechanisms of organic reactions. Lecture three hours, laboratory three hours. \$40 laboratory fee.

CHEM 3301 Chemistry Seminar

Offered: Fall.

Prerequisite: Junior Standing.

Participants will prepare written reviews, present oral reports, and defend their reports. Emphasis will be on the use of the library and current chemical research.

CHEM 3313 Environmental Chemistry

Offered: Spring.

Prerequisite: A grade of C or better in CHEM 3254.

An examination of the chemistry of the environment including the origins, natural processes, and anthropogenic influences.

CHEM 3324 Physical Chemistry I

Offered: Fall.

Prerequisite: A grade of C or better in CHEM 3254, PHYS 2114, and MATH 2924.

A junior-level chemistry course required of all chemistry majors. Course content includes ideal and non-ideal gases, laws of thermodynamics, enthalpy, entropy, heat capacity, free energy, Maxwell's relations, activities, phase and chemical equilibria, electrochemistry, colligative properties, kinetic theory of gases, statistical mechanics, classical kinetics and mechanisms. Lecture 3 hours, laboratory 3 hours. \$40 laboratory fee.

CHEM 3334 Physical Chemistry II

Offered: Spring, alternating years.

Prerequisite: A grade of C or better in CHEM 3324.

Continuation of CHEM 3324. Early and modern quantum theory, wave mechanics and the Schrödinger wave equation, valence bond theory, molecular orbital (MO) theory, computational chemistry, group theory and molecular symmetry, vibrational and rotational spectroscopy. Lecture 3 hours, laboratory 3 hours. \$40 laboratory fee.

CHEM 3340 Principles of Biochemistry Laboratory

Co-requisite: CHEM 3344.

CHEM 3344 Principles of Biochemistry

Co-requisite: CHEM 3340.

Prerequisite: A grade of C or better in CHEM 3264 and BIOL 1014 or 1114.

The chemistry of metabolism of carbohydrates, lipids, and proteins. Basic concepts of the biochemistry of DNA, vitamins, enzymes, biological oxidations, and bioenergetics with introduction to biochemical laboratory techniques. Lecture three hours, laboratory three hours. \$40 laboratory fee.

CHEM 3353 Fundamentals of Toxicology

Cross-listed: BIOL 3353.

Offered: On demand.

Prerequisite: CHEM 3254.

An introduction to the science of poisons. Toxicological principles studied include structures, dose/response relationships, metabolism, mechanism of action, and gross effects of chemicals.

CHEM 3363 Metabolic Biochemistry

Offered: Spring.

Prerequisite: grade of C or better in CHEM 3344.

The study of metabolism of carbohydrates, lipids, proteins, and nucleic acids, and the study of biological information flow in organisms. Metabolic pathways and genetic informational flow in plants and animals will be addressed.

CHEM 3423 Descriptive Inorganic Chemistry

Offered: Fall.

Prerequisite: A grade of C or better in CHEM 2134.

Basic descriptive inorganic chemistry dealing in a systematic way with the elements and the structures, properties and reactions of their inorganic compounds. Topics range from coordination chemistry to organometallic chemistry to bioinorganic chemistry.

CHEM 3991 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to three credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 3992 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to three credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 3993 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to three credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 4111 Environmental Seminar

Cross-listed: BIOL 4111, GEOL 4111.

A seminar for students pursuing the environmental option of chemistry, biology, or geology and other students interested in environmental sciences.

CHEM 4401 Chemistry Seminar

Offered: Spring.

Prerequisite: A grade of C or better in CHEM 3301 and senior status.

Participants will prepare written reviews, present oral reports, and defend their reports. Emphasis will be on the use of the library and current chemical research.

CHEM 4414 Instrumental Analysis

Offered: Fall.

Prerequisite: A grade of C or better in CHEM 3245.

This course is designed for chemistry majors. It will focus on the understanding of the instrumental methods used in analytical chemistry. A variety of spectrometric, chromatographic, and electrometric techniques will be covered in the lecture and laboratory. Lecture three hours, laboratory three hours. \$40 laboratory fee.

CHEM 4424 Advanced Inorganic Chemistry

Offered: Spring, alternating years.

Prerequisite: A grade of C or better in CHEM 3423.

CHEM 4424 is a senior level inorganic chemistry course. The course gives an overview of some of the many advanced areas of study in inorganic chemistry including atomic and molecular structure, acid-base chemistry, symmetry and group theory, coordination chemistry and organometallic chemistry. Lecture three hours, laboratory three hours. \$40 laboratory fee

CHEM 4433 Advanced Topics in Chemistry

Offered: On demand.

Prerequisite: Permission of instructor.

Various advanced topics in any specialty area of chemistry, e.g., polymers, coordination chemistry, and nuclear chemistry.

Note: May be taken for duplicate credit if topic varies.

CHEM 4951 Undergraduate Research in Chemistry

Offered: On demand.

Prerequisite: Departmental approval.

Advanced students carry out independent research activity relating to a significant problem in a major field of study. Supervised by faculty member. Formal report and presentation required. One to four credits depending on problem selected and effort made. \$40 laboratory fee.

CHEM 4952 Undergraduate Research in Chemistry

Offered: On demand.

Prerequisite: Departmental approval.

Advanced students carry out independent research activity relating to a significant problem in a major field of study. Supervised by faculty member. Formal report and presentation required. One to four credits depending on problem selected and effort made. \$40 laboratory fee.

CHEM 4953 Undergraduate Research in Chemistry

Offered: On demand.

Prerequisite: Departmental approval.

Advanced students carry out independent research activity relating to a significant problem in a major field of study. Supervised by faculty member. Formal report and presentation required. One to four credits depending on problem selected and effort made. \$40 laboratory fee.

CHEM 4954 Undergraduate Research in Chemistry

Offered: On demand.

Prerequisite: Departmental approval.

Advanced students carry out independent research activity relating to a significant problem in a major field of study. Supervised by faculty member. Formal report and presentation required. One to four credits depending on problem selected and effort made. \$40 laboratory fee.

CHEM 4991 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to four credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 4992 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to four credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 4993 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to four credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 4994 Special Problems in Chemistry

Prerequisite: Permission of instructor.

One to four credits, depending on the nature and extent of the problem.

This course is designed to encourage creative, independent scientific activity on the part of advanced students. Problems will be designed to fit the future aspirations of individual students and will be supervised by a faculty mentor. \$40 laboratory fee.

CHEM 6881 Workshop

The workshop will require the equivalency of fifteen clock hours of instruction per credit hour.

CHEM 6882 Workshop

The workshop will require the equivalency of fifteen clock hours of instruction per credit hour.

CHEM 6883 Workshop

The workshop will require the equivalency of fifteen clock hours of instruction per credit hour.