

Undergraduate Chemistry Courses

CHEM 1302. Essential Elements of Chemistry. 3 Credit Hours (Lecture: 2 Hours, Lab: 3 Hours).

An introduction to the science of chemistry with a broad overview of the essential elements of chemistry and real-life applications. Enrollment in this course is restricted to Interdisciplinary Studies majors. Lab Fee \$2.

CHEM 1407. Fundamentals of Chemistry. 4 Credit Hours (Lecture: 3 Hours, Lab: 2 Hours).

A beginning chemistry course for students in applied sciences who need only one semester of general chemistry. The course includes the structure, properties and changes in matter, quantitative relationships in reactions, solutions, equilibrium, pH, buffers and nuclear chemistry. Not recommended for science majors or pre-professional students in health related fields. Does not meet prerequisite for CHEM 1412 or 2423. Lab fee \$2.

CHEM 1409. College Chemistry for Engineers. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).

Introduction to important concepts and principles of chemistry with an emphasis on areas considered most relevant in an engineering context. Registration will be restricted to engineering majors only. Engineering students may not receive credit for both CHEM 1408 and CHEM 1411. Prerequisites: MATH 1314, or MATH 2412, or MATH 2413, or concurrent enrollment. Lab fee: \$2.

CHEM 1411. College Chemistry I. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).

Topics to be covered include an introduction to fundamental chemical laws, atomic structure and its relationship to chemical bonding and the periodic properties of elements and compounds, stoichiometry, states of matter, and solutions. Suggested for science majors and pre-professional students. Prerequisite: Choose one of the following: MATH 1314, MATH 1316, MATH 2412, MATH 2413, or concurrent enrollment. Lab fee: \$2.

CHEM 1412. College Chemistry II. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).

Topics to be covered include a study of the chemical and physical properties of selected families of elements, an introduction to energy changes in chemical reactions, chemical equilibria, electrochemistry, rates of chemical reactions, nuclear chemistry, and semi-micro qualitative analysis. This course is a prerequisite for Organic Chemistry I (CHEM 2323 & CHEM 2123). Prerequisite: CHEM 1411. Lab fee: \$2.

CHEM 2123. Organic Chemistry I Laboratory. 1 Credit Hour (Lecture: 0 Hours, Lab: 4 Hours).

Laboratory portion associated with lecture CHEM 2323 Prerequisite: CHEM 1412 or CHEM 1409(for Engineering Majors only) prerequisite or co-enrollment in CHEM 2323 Lab fee: \$2.

CHEM 2125. Organic Chemistry II Laboratory. 1 Credit Hour (Lecture: 0 Hours, Lab: 4 Hours).

Laboratory portion associated with lecture CHEM 2325 Prerequisite: CHEM 2123; CHEM 2323; prerequisite or co-enrollment in CHEM 2325 Lab fee: \$2.

CHEM 2323. Organic Chemistry I. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

The first semester of a year sequence in the chemistry of carbon compounds involving their synthesis, reaction mechanisms, nomenclature, physical and spectral properties. Includes compounds of theoretical, biological, agricultural, and industrial importance. Prerequisite: CHEM 1412 or CHEM 1409(for Engineering Majors only).

CHEM 2325. Organic Chemistry II. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

A continuation of CHEM 2323. The laboratory includes an introduction to qualitative organic analysis. This course is a prerequisite to all organic chemistry courses at the junior or higher level. Prerequisite: CHEM 2323 (2423).

CHEM 2423. Organic Chemistry I. 4 Credit Hours (Lecture: 3 Hours, Lab: 4 Hours).

The first semester of a year sequence in the chemistry of carbon compounds involving their synthesis, reaction mechanisms, nomenclature, physical and spectral properties. Includes compounds of theoretical, biological, agricultural, and industrial importance. Prerequisite: CHEM 1412 or CHEM 1409(for Engineering Majors only) Lab fee: \$2.

CHEM 2425. Organic Chemistry II. 4 Credit Hours (Lecture: 3 Hours, Lab: 4 Hours).

A continuation of Organic Chemistry I (CHEM 2323 and CHEM 2123). The laboratory includes an introduction to qualitative organic analysis. This course is a prerequisite to all organic chemistry courses at the junior or higher level. Prerequisites: CHEM 2423 or both CHEM 2323 and CHEM 2123. Lab fee: \$2.

CHEM 3314. Geochemistry. 3 Credit Hours (Lecture: 2 Hours, Lab: 3 Hours).

A survey of the application of chemical principles to problems of geology. Topics include the origin and distribution of the elements in addition to exploring the behavior and distribution of various elements in igneous, metamorphic, and sedimentary rocks. Basic concepts of thermodynamics, solution chemistry, and isotope geochemistry will be discussed. Credit for both CHEM 3314 and GEOL 3314 will not be awarded. Prerequisite: CHEM 1412. Lab fee \$10.

CHEM 3407. Quantitative Analysis. 4 Credit Hours (Lecture: 2 Hours, Lab: 6 Hours).

A study of the experimental and theoretical principles concerning gravimetric and volumetric analysis. Topics include data treatment, equilibrium, precipitation, neutralization, oxidation, reduction, potentiometry, and introduction to spectroscopy. Prerequisites: A grade of C or better in 8 hours of freshman CHEM; junior classification or approval of department head. Lab fee \$10.

CHEM 3423. Physical Chemistry I. 4 Credit Hours (Lecture: 3 Hours, Lab: 4 Hours). [WI (<http://catalog.tarleton.edu/academicaffairs/>)]

A study of chemical thermodynamics and its application to chemical equilibrium; the macroscopic properties of matter including real gases, solutions, and phase changes; chemical kinetics. Prerequisites: MATH 2414; PHYS 1402 or 2426 or approval of department head. Lab fee \$10.

CHEM 4086. Chemistry Problems: Undergraduate Research. 1-4 Credit Hours (Lecture: 0 Hours, Lab: 1-4 Hours).

Conducting an undergraduate research project in Chemistry. May be repeated for credit. A maximum of four hours may be applied toward degree requirements in chemistry. Prerequisite: Approval of department head.

CHEM 4160. Professional Lab Safety Techniques and Ethics in Chemistry. 1 Credit Hour (Lecture: 1 Hour, Lab: 1 Hour).

A capstone course intended for a chemistry major to take during their senior year. Lectures will cover the issues of ethics and lab safety in chemistry as well as the societal impacts of chemistry. The lab portion will be devoted to analyzing case studies, doing literature research, and giving professional style presentations. Prerequisite: Student must be within one year of graduation.

CHEM 4327. Structural Organic Analysis. 3 Credit Hours (Lecture: 1 Hour, Lab: 6 Hours).

The identification of the principal classes of organic compounds. Prerequisites: CHEM 2425 or both CHEM 2325 and CHEM 2125. Lab fee: \$2.

CHEM 4328. Inorganic Chemistry. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

Discussion of the models of inorganic chemistry including atomic structure, chemical bonding, periodic properties, stereochemistry, reaction mechanisms, and coordination chemistry. Properties of specific elements and families are also presented Prerequisites: CHEM 2425 or both CHEM 2325 and CHEM 2125, and junior classification or approval of department head.

CHEM 4329. Polymers. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

A basic study of polymer chemistry, with special emphasis on the effect of the structure of monomers upon the structure of the polymers, is presented. Prerequisites: CHEM 2425 or both CHEM 2325 and CHEM 2125.

CHEM 4345. Medicinal Chemistry. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

An examination of the principles of drug action including receptor-effector theories and the effects of physico-chemical properties on biological activity. The principles of drug design, synthesis, and metabolism will be presented. Prerequisites: CHEM 2425 or CHEM 2325 and CHEM 2125, and BIOL 1407.

CHEM 4374. Biochemistry I. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

An introduction to the basic principles of biological chemistry and to fundamental processes of plants, animals, and microorganisms. Credit for both BIOL 4374 and CHEM 4374 will not be awarded. Prerequisites: One semester of organic chemistry (2 semesters recommended), and 8 hours of biological science or approval of department head.

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CHEM 4375. Biochemistry II. 3 Credit Hours (Lecture: 3 Hours, Lab: 0 Hours).

A detailed survey of intermediary metabolism. The metabolism of carbohydrates, lipids, proteins and nucleic acids, and the regulation of metabolism are emphasized. Credit for both BIOL 4375 and CHEM 4375 will not be awarded. Prerequisites: BIOL/CHEM 4374, or approval of department head.

CHEM 4378. Biochemistry Lab. 3 Credit Hours (Lecture: 1 Hour, Lab: 6 Hours).

Principles and applications of basic methodology for the isolation, purification, characterization, and quantitative determination of biologically important compounds. Credit for both BIOL 4378 and CHEM 4378 will not be awarded. Prerequisite: BIOL 4374 or CHEM 4374 or concurrent enrollment, or approval of the department head. Lab fee \$15.

CHEM 4408. Instrumental Analysis. 4 Credit Hours (Lecture: 2 Hours, Lab: 6 Hours).

A study of the theory and use of instruments for chemical analysis. Techniques include absorption spectroscopy, nuclear magnetic resonance, atomic absorption, flame emission, mass spectroscopy, chromatography, potentiometry, and polarography. Prerequisites: CHEM 3407 and 1 semester of organic chemistry or approval of department head. Lab fee \$10.

CHEM 4477. Environmental Chemistry. 4 Credit Hours (Lecture: 3 Hours, Lab: 3 Hours).

This is an undergraduate course intended for any student who has completed College chemistry 1 and college chemistry II with an interest towards Environmental Science. This course includes both lecture and laboratory components. Lectures will cover topics which provide the understanding of interactions between chemical compounds whether anthropogenic or natural with the ecosystem. This course will provide qualitative and quantitative knowledge on effects of changes in water, soil, air and its effects on the environment. The lab portion includes bench scale and field scale experiments to put theory to practice. Water and soil samples will be collected from different sources and lab made samples will be used to detect and analyze the various types of pollutants and their mitigation methods will be discussed. Prerequisite: CHEM 1412. Lab fee: \$2.