

CHEMISTRY (CHEM)

CHEM 131 INTRODUCTION TO CHEMISTRY (3 Hours)

Co-Requisite Mathematics 004 or higher. A study of scientific measurements, mathematic concepts, and basic principles of chemistry to prepare students for General Chemistry (CHEM 141) classes. (F, S, Sum)

CHEM 141 GENERAL CHEMISTRY I (3 Hours)

Prerequisite: A score of 16 or above on the Chemistry Placement Test: MATH 111 or a higher level mathematics course.

A study of the types and properties of matter, measurement, qualitative and quantitative descriptions of chemical reactions, atomic structure, bonding and thermochemistry. (F, S, Sum)

CHEM 142 GENERAL CHEMISTRY II (3 Hours)

Prerequisite: A passing grade in CHEM 141 and CHML 141.

A study of solutions, chemical equilibria, kinetics, thermodynamics, descriptive chemistry. (F, S, Sum)

CHEM 231 INTRO TO ORGANIC CHEMISTRY (3 Hours)

General Chemistry II. A study of scientific measurements, mathematic concepts, nonmenclature, chemical bonding, structure and properties of compounds to prepare students for Organic Chemistry.

CHEM 241 ORGANIC CHEMISTRY I (3 Hours)

Prerequisite: CHEM 142 and CHML 142.

Chemistry of carbon compounds, with emphasis on structure, stereochemistry, spectroscopy, and an introduction to synthesis. (F, S, Sum)

CHEM 242 ORGANIC CHEMISTRY II (3 Hours)

Prerequisite: CHEM 241, CHML 241.

Chemistry of carbon compounds, with emphasis on synthesis, and an introduction to biochemistry. (F, S, Sum)

CHEM 310 INTRO TO SCIENTIFIC RESEARCH (2 Hours)

Prerequisite: Consent by advisors.

The course serves as an introduction to scientific research for chemistry students and it is especially important for students entering graduate studies. The course covers scientific literature, scientific writing, scientific presentation, research ethics, and introduction to federal agencies (NSF, NIH, DoD, etc.) and their research focuses, trends, and funding opportunities.

CHEM 320 ANALYTICAL CHEMISTRY (3 Hours)

Prerequisite: CHEM 142, CHML 142, and CHEM 242.

A quantitative study of the equilibrium in aqueous and non-aqueous systems and the application to analytical methods. The application of modern instrumentals techniques is emphasized. (F)

CHEM 340 INORGANIC CHEMISTRY I (3 Hours)

Prerequisite: CHEM 142 and CHML 142.

This course is the first part of a series of two courses. Basic principles, such as chemical equilibrium and reaction kinetics, of inorganic reactions are emphasized in this course. The construction and application of the periodic table of the elements will be discussed. A descriptive discussion of the chemistry of elements will also be included in this course. (S)

CHEM 341 PHYSICAL CHEMISTRY I (3 Hours)

Prerequisite: MATH 231, 232; corequisite prerequisite: PHY 201 or 211.

A study of fundamental concepts; includes structure, properties of gases and thermodynamics. (F)

CHEM 342 PHYSICAL CHEMISTRY II (3 Hours)

Prerequisite: CHEM 341, and CHML 341.

A study of physical chemistry, theory and practice; includes structure of matter, quantum mechanics, electrochemistry and kinetics., (S)

CHEM 371 FORENSIC CHEMISTRY (3 Hours)

This course covers the major forensic sub-disciplines such as firearms and tool mark examination, forensic biology, arson and explosives, questioned documents, and trace evidence. Evidence categories include glass, soil, hairs, fibers, paint (surface coating), and impressions resulting from friction ridge skin, tools, foot wear, etc. (S)

CHEM 380 INDEPENDENT STUDY (1-3 Hours)

Prerequisite: Permission of instructor.

Laboratory investigation on literature research of a topic selected by the student in consultation with the staff. (F, S, Sum)

CHEM 381 CHEMISTRY SEMINAR (0.5 Hours)

Prerequisite: Permission of instructor.

Presentation and discussion of current chemical topics and research by students, faculty and visiting speakers. (F, S)

CHEM 382 CHEMISTRY SEMINAR (0.5 Hours)

Prerequisite: Permission of instructor.

Presentation and discussion of current chemical topics and research by students, faculty and visiting speakers. (F, S)

CHEM 410 ENVIRONMENTAL CHEMISTRY (3 Hours)

Prerequisite: CHEM 320.

Environmental Chemistry is to study of the sources, reactions, transport, effects, and fates of chemical species in water, soil, air, and living environments, and the effects of technology thereon. This course will cover three major areas of environmental chemistry: aquatic chemistry, atmospheric chemistry, and geochemistry. Each one includes organic, inorganic, analytical chemistry and biochemistry for pollutants in the environment, their fates, and analysis. The objectives in the course are to understand how environmental system will behave for the chemical species and to learn how to analyze the pollutants in the system. (F)

CHEM 421 CHEMICAL INSTRUMENTATION (3 Hours)

Prerequisite: CHEM 320, CHML 320 or permission of the instructor.

A lecture course covering the theory and applications of spectroscopic chromatographic and electroanalytical methods. (S)

CHEM 429 Organic Structure Determination by Spectroscopy (3 Hours)

Prerequisite: A passing grade of "C" or higher in Organic Chemistry (CHEM 242)

Using of modern spectroscopic methods, mainly Nuclear Magnetic Resonance, Mass Spectrometry, X-Ray Crystallography, and Infrared Spectroscopy, for elucidation of simple to complex structures of organic compounds. Topics on new developments in modern NMR, X-Ray, MS, and IR will be updated and included.

CHEM 431 BIOCHEMISTRY I (3 Hours)

Prerequisite: CHEM 242.

A study of the chemical composition of living matter and the chemical mechanics of life processes. (S)

CHEM 432 BIOCHEMISTRY II (3 Hours)

Prerequisite: CHEM 431.

A study of the chemical composition of living matter and the chemical mechanics of life processes. (F)

CHEM 436 PHYSICAL ORGANIC CHEMISTRY (3 Hours)

Prerequisite: CHEM 342.

Structure, bonding, and properties of organic compounds.

CHEM 437 ORGANIC SYNTHESIS (2 Hours)

Prerequisite: CHEM 242.

The use of practical organic research techniques in the preparation of organic compounds. (S)

CHEM 439 Introduction to Polymer Chemistry (3 Hours)

Prerequisite: A passing grade of "C" or higher in Organic Chemistry (CHEM 242)

Polymer chemistry is for studying the macromolecules, natural or synthetic polymers, which can be found in everywhere in our life. Understanding the structure and the properties of these polymers with its chemical preparation is imperative for students majoring chemical science. The course will cover the types, properties, how-to synthesize, and application of polymers.

CHEM 441 INORGANIC CHEMISTRY II (3 Hours)

Prerequisite: CHEM 341.

This course is a continuation of the first part of the series. With the knowledge introduced in CHEM 341, a thorough discussion of the atomic properties, the nature of chemical bonds and the symmetry properties of compounds will be included in this course. The chemistry and application of transition metals will be the main theme of this course. The mechanisms of catalysis processes will also be covered. In addition, the function of inorganic elements in living systems will be briefly introduced to keep students updated to the current trends in inorganic research. (F)

CHEM 452 ATOMIC & MOLECULAR STRUCTURE (3 Hours)

Prerequisite: CHEM 342.

An introduction to the concepts and methods of modern molecular spectroscopy. (S)

CHEM 458 QUANTUM MECHANICS (3 Hours)

Prerequisite: CHEM 342.

Principles and applications of quantum theory. (F)

CHEM 471 FORENSIC TOXICOLOGY (3 Hours)

Pre-Requisites: CHEM 320 and CHEM 371. This course covers the major concepts of toxicology that include drug or toxin absorption, distribution, and excretion as well as binding to receptors. The processes and reactions, which transform a drug or toxin into a water soluble substance, also will be discussed. (S)

CHEM 475 FORENSIC PRACTICUM (3 Hours)

Prerequisite: Departmental approval and CHEM 371 and CHML 371.

Students will have an internship at a local or regional crime laboratory to satisfy the practice component of the program and spend a minimum of 8 hours per week at the laboratory for 14 weeks. (S)

CHEM 481 CHEMISTRY SEMINAR (0.5 Hours)

Prerequisite: Permission of instructor.

Presentation and discussion of current chemical topics and research by students, faculty and visiting speakers. (F, S)

CHEM 482 CHEMISTRY SEMINAR (0.5 Hours)

Prerequisite: Permission of instructor.

Presentation and discussion of current chemical topics and research by students, faculty and visiting speakers. (F, S)