CHEMISTRY (CHEM)

CHEM 2XX: Advanced Chemistry Elective
Credits: 3
College: Jefferson College of Life Sciences
Schedule Type: Lecture

CHEM 3XX: Advanced Chemistry Elective
Credits: 3
College: Jefferson College of Life Sciences
Schedule Type: Lecture

CHEM 101: General Chemistry
(for non-science majors) This course allows students to pursue further study of chemical issues as they relate to the consumer and to health. Students will become familiar with issues surrounding the use of everyday products such as laundry products, personal-care products, plastics, fibers and food additives. Also included are an introduction to organic chemistry, biochemistry and the chemistry of some health-related issues. Students should complete this course with an awareness of the complexities of the chemical structures in their daily lives and the issues involving their use and abuse, so that they may make more informed decisions.
Credits: 3
College: Jefferson College of Life Sciences
Schedule Type: Lab, Lecture, Lecture/Lab

CHEM 101L: General Chemistry I Lab
Credits: 1
College: Jefferson College of Life Sciences
Schedule Type: Lab

CHEM 103: Chemistry I
(required for Science and Engineering majors) An introduction to the fundamental laws and theories of chemistry, including the properties of matter, chemical reactions and stoichiometry, energy and thermochemistry, atomic structure, and the periodic table. Basic knowledge of algebra, geometry and trigonometry is presumed. Students enrolled in MATH-099 or MATH-100 may not take this course. This course is not recommended for students enrolled in the WRIT-100 fundamentals course.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: MATH 100 or Math Placement (Non-Science) with a score of 10 or Math Placement (Science) with a score of 10 [Min Grade: D]
Corequisites: CHEM 103L
Schedule Type: Lecture, On-Line

CHEM 103L: Chemistry I Lab
required for Science and Engineering majors) This hands-on laboratory-based course highlights concepts covered in Chemistry I Lecture. Emphasis is placed on developing good laboratory and data analysis skills. Experiments include acid/base titrations, heat determination using calorimeters and oxidation/reduction reactions.
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: MATH 100 or Math Placement (Non-Science) with a score of 10 or Math Placement (Science) with a score of 10 [Min Grade: D]
Corequisites: CHEM 103
Schedule Type: By Appointment - 1 student, Lab, On-Line

CHEM 104: Chemistry II
(required for science majors) Continuation of CHEM 103 Chemistry I. that provides an introduction to chemical bonding and molecular geometry, property of gases, intermolecular attractions, solutions, kinetics, chemical equilibrium, acids, bases and thermodynamics.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 103 or CHEM 113) and (CHEM 103L or CHEM 113L) [Min Grade: C-]
Corequisites: CHEM 104L
Schedule Type: Independent Study, Lecture, On-Line

CHEM 104L: Chemistry II Lab
(required for science majors) This hands-on laboratory-based course highlights concepts covered in Chemistry II Lecture. Analytical and data interpretation/ presentation skills are honed through a series of experiments including aspirin synthesis and determination of vitamin C content.
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: CHEM 103 and CHEM 103L [Min Grade: C-]
Corequisites: CHEM 104
Schedule Type: Lab, On-Line

CHEM 105: Intro to Research Methods
Credits: 1
College: Jefferson College of Life Sciences
Schedule Type: Lecture

CHEM 110: General Chemistry I
Credits: 3
College: Jefferson College of Health Professions
Schedule Type: Lab, Lecture, On-Line

CHEM 111: General Chemistry I Lab
Credits: 1
College: Jefferson College of Health Professions
Schedule Type: Lab, On-Line

CHEM 112: General Chemistry II Lab
Credits: 1
College: Jefferson College of Health Professions
Schedule Type: Lab, Online Lab, On-Line

CHEM 113: Chemistry I
An introduction to the fundamental laws and theories of chemistry, including properties of matter, chemical reactions and stoichiometry, energy and thermochemistry, atomic structure and the periodic table.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: MATH 100 or Math Placement (Non-Science) with a score of 10 or Math Placement (Science) with a score of 10 [Min Grade: D]
Corequisites: CHEM 113L
Schedule Type: Lecture

CHEM 113L: Chemistry I Lab
This course provides hands-on experience with topics addressed in lecture, and includes lab exercises illustrating the fundamental laws and theories of chemistry, including properties of matter, chemical reactions and stoichiometry, energy and thermochemistry, atomic structure and the periodic table. Completion of lab exercises/experiments will provide useful reinforcement of topics presented in the lecture course component and provide valuable experience with lab techniques.
Credits: 1
College: Jefferson College of Life Sciences
Corequisites: CHEM 113
Schedule Type: Lab

CHEM 114: Chemistry II
An introduction to chemical bonding and molecular geometry, intermolecular attractions, properties of solutions, kinetics, chemical equilibrium, acids, bases, buffers, and thermodynamics.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 113 and CHEM 113L [Min Grade: C-]
Corequisites: CHEM 114L
Schedule Type: Lecture

CHEM 114L: Chemistry II Lab
This course provides hands-on experience with topics addressed in lecture, and includes lab exercises illustrating the fundamental laws and theories of chemistry, including properties of solutions, equilibrium and kinetics in chemical reactions, and equilibrium conditions of other aqueous solutions. Completion of lab exercises/experiments will provide useful reinforcement of topics presented in the lecture course component and provide valuable experience with lab techniques.
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: CHEM 113 and CHEM 113L [Min Grade: C-]
Corequisites: CHEM 114
Schedule Type: Lab

CHEM 201: Organic Chemistry I
First semester in a 2-semester lecture series on Organic Chemistry. Topics include origin and history of organic chemistry; chemical bonding, structure and properties of organic compounds; structure, properties and nomenclature of the alkanes; stereochemistry, and a comprehensive discussion of the substitution and elimination reactions of alkyl halides.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 104 and CHEM 104L) or (CHEM 114 and CHEM 114L) [Min Grade: C-]
Corequisites: CHEM 201L
Schedule Type: Lecture, On-Line

CHEM 201L: Organic Chemistry I Lab
First semester in a 2-semester companion course to Organic Chemistry Lecture. Topics include practical instruction in basic organic chemistry laboratory techniques such as recrystallization, distillation, extraction, reflux, thin-layer chromatography, gas chromatography, and IR spectroscopy. Utilizing these techniques, the synthesis and characteristic reactions of alkyl halides are explored.
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 104 and CHEM 104L) or (CHEM 114 and CHEM 114L) [Min Grade: C-]
Corequisites: CHEM 201
Schedule Type: Lab

CHEM 202: Organic Chemistry II
Second semester in a 2-semester lecture series on Organic Chemistry. Topics include the structure, nomenclature, synthesis and characteristic reactions of alkenes, alkynes, alcohols, aldehydes, ketones & aromatic compounds.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 201 and CHEM 201L [Min Grade: C-]
Corequisites: CHEM 202L
Schedule Type: Lecture, On-Line

CHEM 202L: Organic Chemistry II Lab
Second semester in a 2-semester companion course to Organic Chemistry Lecture. Utilizing techniques learned in first semester, the synthesis and characteristic reactions of alkenes, alcohols, aromatics and aldehydes/ketones are studied.
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: CHEM 201 and CHEM 201L [Min Grade: C-]
Corequisites: CHEM 202
Schedule Type: Lab

CHEM 206: Forensic Chemistry
Students will become acquainted with the various sub-disciplines of forensic science with emphasis on the chemical principles used to collect, process, identify, quantify and qualify crime scene/victim evidence. Through lectures and case studies, the scientific foundations for the examination of physical, chemical, and biological evidence will be explored. Laboratory sessions will provide hands on experience with modern forensic techniques used to analyze physical evidence such as blood, glass, and fibers. The course will culminate with a mock trial in which students present the results of their analytical investigations to a jury.
Credits: 3
College: Jefferson College of Life Sciences
Corequisites: CHEM 206L
Schedule Type: By Appointment, Lab, Lecture

CHEM 206L: Forensic Chemistry Lab
Credits: 1
College: Jefferson College of Life Sciences
Corequisites: CHEM 206
Schedule Type: Lab

CHEM 214: Bioorganic Chemistry
This course is a one-semester overview of organic chemistry and biochemistry for PA majors and open to those who meet the prerequisites. After introduction to different functional groups, the course provides a systematic study of the biologically important compounds, including amino acids, proteins, nucleic acids, enzymes, carbohydrates and lipids. Emphasis will be placed upon the structure, properties and functions of these compounds. The course will culminate in an overarching discussion of the intricacies of metabolism of some of these biomolecules.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 104 and CHEM 104L) or (CHEM 114 and CHEM 114L) [Min Grade: C-]
Schedule Type: Lecture, On-Line

CHEM 304: Biochemistry
Credits: 3
College: Jefferson College of Health Professions
Schedule Type: Independent Study, Lecture

CHEM 305: Physical Chemistry I
Fundamental topics in thermodynamics are covered, emphasizing the first three laws of thermodynamics. Applications of these principles and chemical equilibrium to ideal gases, real gases, solutions and solids are discussed. Chemical kinetics is covered in detail. A brief examination of the field of chemical dynamics is included. Where appropriate, current research in these areas will be discussed. The laboratory will emphasize using chemistry techniques such as FTIR, UV-Vis, GC and computational programs to examine fundamental physical processes.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 202 and CHEM 202L) or (PHYC 203 and PHYC 203L) and MATH 112 [Min Grade: D]
Corequisites: CHEM 305L
Schedule Type: Lecture, Lecture/Lab

CHEM 305L: Physical Chemistry 1 Lab
Credits: 1
College: Jefferson College of Life Sciences
Corequisites: CHEM 305
Schedule Type: Lab

CHEM 306: Physical Chemistry II
Quantum mechanics is the fundamental theory underlying the description of atoms. It details how atoms can interact on the microscopic level. Quantum mechanics will be used to understand the observed spectroscopic properties of atoms and molecules. Statistical mechanics, which connects the macroscopic world of thermodynamics and kinetics with quantum mechanics, will also be covered. The laboratory is a continuation of CHEM-305 with an emphasis on spectroscopy.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 305 and MATH 331 [Min Grade: D]
Corequisites: CHEM 306L
Schedule Type: Lab, Lecture, Lecture/Lab

CHEM 306L: Physical Chemistry II Lab
Credits: 1
College: Jefferson College of Life Sciences
Corequisites: CHEM 306
Schedule Type: Lab

CHEM 309: Inorganic Chemistry
An advanced course in modern inorganic chemistry that covers structure and bonding, symmetry, thermodynamics and mechanisms; along with a systematic discussion of reactions and properties of representative main group and transition metal elements. This course will also illustrate some of the relationships between inorganic chemistry and other areas of chemistry, including biochemistry. The laboratory covers a variety of synthetic techniques and physical and analytical methodologies that are particularly applicable to inorganic compounds.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 202 and CHEM 202L [Min Grade: D]
Corequisites: CHEM 309L
Schedule Type: Lab, Lecture, Lecture/Lab

CHEM 309L: Inorganic Chemistry Lab
Credits: 1
College: Jefferson College of Life Sciences
Corequisites: CHEM 309
Schedule Type: Lab

CHEM 310: Intro to Pharmaceutic Industry
The goal of this course is to give a broad understanding of Pharmaceutical Industry and the many areas of the business. The course will cover the lifecycle overview of drug development and the organization that support each step of the lifecycle. This course will give an overview of drug development and a career in the pharma industry.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 202 and CHEM 202L [Min Grade: C-]
Schedule Type: Hybrid, Independent Study, Lecture

CHEM 311: Basic Pharmacology
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 201 and CHEM 201L) or CHEM 214 [Min Grade: C-]
Schedule Type: Lecture

CHEM 323: Instrumental Meth of Analysis
WRITING INTENSIVE: This course provides an overview of the variety of analytical and instrumental methods for quantitative and qualitative chemical analysis. Topics include gravimetric and volumetric analysis; ultraviolet, infrared, and visible spectroscopy; gas and liquid chromatography; and mass spectrometry. Laboratory sessions hone students? analytical- and criticalthinking skills. Students are required to work on a group research project and present their findings at a local/regional scientific conference. [Writing Intensive]
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 202 and CHEM 202L [Min Grade: D]
Corequisites: CHEM 323L
Schedule Type: Lab, Lecture, Lecture/Lab

CHEM 323L: Instrmntl Meth of Analysis Lab
Credits: 1
College: Jefferson College of Life Sciences
Corequisites: CHEM 323
Schedule Type: Lab

CHEM 371: Selected Topics in Chemistry
A study of a specialized topic and/or recent developments in one of the fields of chemistry. Sample topics might include theoretical organic chemistry, spectroscopy, photochemistry, stereo-chemistry and computational chemistry.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 202 and CHEM 202L [Min Grade: D]
Schedule Type: By Appointment - 5 students, Independent Study, Lecture

CHEM 371L: Selected Topics in Chem Lab
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: CHEM 371
Schedule Type: Lab

CHEM 391: Research in Chemistry I
Students interested in pursuing independent research in any field of chemistry or biochemistry under faculty supervision must submit a proposal to the dean of the School of Science and Health for approval at least two weeks before pre-registration. The research will include both literature search and experimental work in any current field of chemistry or biochemistry. At the end of the semester, students will be expected to do an oral presentation to the faculty during reading days and prepare a comprehensive written report as mandated by the American Chemical Society.
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 202 and CHEM 202L [Min Grade: D]
Schedule Type: By Appointment - 1 student, By Appointment - 2 students, By Appointment - 3 students, By Appointment - 4 students, By Appointment, Independent Study

CHEM 392: Research in Chemistry II
Continuation of CHEM-391
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 391 [Min Grade: D]
Schedule Type: By Appointment - 1 student, By Appointment - 2 students, Independent Study

CHEM 398: Chemistry Transfer Elective
Credits: 3
College: Jefferson College of Life Sciences
Schedule Type: Lecture

CHEM 405: Advanced Organic Chemistry
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: CHEM 202 and CHEM 202L [Min Grade: D]
Schedule Type: Lecture

CHEM 410: Polymer Chemistry
Credits: 3
College: Jefferson College of Life Sciences
Schedule Type: Lecture

CHEM 417: Environmental Chemistry
Credits: 3
College: Jefferson College of Life Sciences
Prerequisites: (CHEM 104 and CHEM 104L) or (CHEM 114 and CHEM 114L) and CHEM 417L [Min Grade: C-]
Schedule Type: Lab, Lecture, Lecture/Lab

CHEM 417L: Environmental Chem Lab
Credits: 1
College: Jefferson College of Life Sciences
Prerequisites: CHEM 417
Schedule Type: Lab