Chemistry

Mission Statement

Chemistry is the study of matter — matter in the form of energy and in the form of mass. Conversion of matter from one form to another provides the basis for changing substances into other substances. The study of chemistry provides the knowledge and tools necessary for a greater understanding of the physical universe The major in chemistry is intended to prepare graduating chemists for employment in industrial and government laboratories, teaching at the high school level, study in the medical profession, and advanced study in analytical, clinical, environmental, forensic, inorganic, organic and physical chemistry, and biochemistry. The program is designed to provide theory and practical experience in many areas of chemistry while allowing the student to select the courses that meet his or her needs. The student has the option of graduating with a Bachelor of Science degree or with a Bachelor of Arts degree. The required courses are the same for both degrees.

CMU's Chemistry students may join three organizations related to this major:

Student Affiliates of the American Chemical Society is a national professional organization in chemistry (advisor: Dr. James Gordon).

Gamma Sigma Epsilon, Upsilon Beta Chapter of the National Chemistry Honor Society (advisors: Drs. John Bellefeuille and James Gordon).

Alpha Epsilon Delta is a national pre-health professions fraternity (advisor: Dr. Ania Slusarz).

Programmatic Learning Outcomes

As a chemistry student at CMU, your classes will further cultivate skills in three fundamental areas:

1. developing a deeper knowledge of chemistry
2. having the ability to execute well-designed chemical experiments
3. having the confidence to communicate the experiment’s knowledge

Chemistry Minor

A minor in Chemistry consists of any 20 hours of Chemistry course work.

Chemistry Courses

CH107 Chemistry/Allied Health. 3 hours. A survey of concepts for General Chemistry, Organic Chemistry and Biochemistry. The course includes an introduction to atomic theory, structure and nomenclature for organic and inorganic molecules, and reactions and properties of inorganic, organic, and biochemical systems. Fall.

CH111 General Chemistry. 3 hours. An introduction to general chemistry and elementary physical chemistry, including atomic theory and structure, periodic table, reactions and properties of elements and compounds. Those lacking college preparation Chemistry need permission of instructor and division chair. 3 lectures. Prerequisite: Meet or exceed University policy for College Algebra (3hr course); or MA103 with grade of C or better; or by permission of the Chair.

CH111L General Chemistry Lab. 1 hour. Lab exercises that accompany CH111. Must be taken concurrently with CH111. 2 lab hours. Fall.

CH114 General Chemistry with Qualitative Analysis. 3 hours. A continuation of the topics in CH111 with emphasis on reactions, equilibria of elements, compounds and solutions, including the techniques of qualitative analysis. 3 lectures. Prerequisite: CH111 or permission of instructor and division chair and ACT Math subscore # 20 or MA101/102 or MA103. Spring.

CH114L General Chemistry with Qualitative Analysis Lab. 1 hour. Lab exercises that accompany CH114. Must be taken concurrently with CH114. 2 lab hours. Spring.

CH202 Environmental Chemistry. 3 hours. Introduction to the principles of chemistry and physics in the environment. Topics will include air, water, and soil chemistry; environmental pollution including air, water, chemical, nuclear, noise, and energy; and waste problems. Cross-listed with ES202. 3 lectures. Prerequisite: CH111. Even-numbered Springs.

CH202L Environmental Chemistry Lab. 1 hour. Lab exercises that accompany CH202. Must be taken concurrently with CH111. Cross-listed with ES202L. 2 lab hours. Even-numbered Springs.

CH221 Quantitative Analysis. 3 hours. The basic principles of gravimetric and volumetric analyses, and the application of certain classical and modern techniques to these analyses. 3 lectures. Prerequisite: CH114. Even-numbered Falls.

CH221L Quantitative Analysis Lab. 1 hour. Lab exercises that accompany CH221. Must be taken concurrently with CH221. 4 lab hours. Even-numbered Falls.

CH317 Biochemistry and Cellular Physiology. 3 hours. The chemistry of biological systems, with emphasis on the biosynthesis, catalysis, and the metabolic role and degradation of proteins, carbohydrates, lipids, nucleic acids, vitamins, hormones and other substances related to life processes. 3 lectures. Prerequisites: Two semesters of Biology and CH341 or the permission of instructor and division chair. Fall.

CH317L Biochemistry and Cellular Physiology Lab. 2 hour. Lab exercises that accompany CH317. Must be taken concurrently with CH317. 4 lab hours. Fall.

CH322 Scientific Instrumentation. 3 hours. An introduction to modern electronics, optical instrumentation, and other scientific instrumentation including computer based equipment. 3 lectures. Cross-listed with PH322. Prerequisite: PH112 or PH206. Odd-numbered Falls.

CH322L Scientific Instrumentation Lab. 1 hour. Lab exercises that accompany CH322. Must be taken concurrently with CH322. Cross-listed with PH322L. 3 lab hours. Odd-numbered Falls.

CH341 Organic Chemistry I. 3 hours. A study of the important classes of aliphatic and aromatic compounds including nomenclature, properties, reactions, mechanisms and methods of identification. The methods of identification include infrared, mass and nuclear magnetic resonance spectroscopy. 3 lectures. Prerequisite: CH114. Fall.

CH341L Organic Chemistry I Lab. 1 hour. Lab exercises that accompany CH341. Must be taken concurrently with CH341. 4 lab hours. Fall.

CH342 Organic Chemistry II. 3 hours. A continuation of CH341 providing an in-depth study of the preparation, reactions, and analysis of organic functional groups with an emphasis on mechanisms and structure/property relationships. 3 lectures. Prerequisite: CH341. Spring.

CH342L Organic Chemistry II Lab. 1 hour. Lab exercises that accompany CH342. Must be taken concurrently with CH342. 4 lab hours. Spring.

CH354 Thermodynamics and Physical Chemistry. 3 hours. State of matter, chemical thermodynamics, solutions, equilibria, phase rule, and electrochemistry. 3 lectures. Cross-listed with PH354. Prerequisites: CH114, MA209 and PH206, or permission of instructor and division chair. Even-numbered Falls (alternates with CH355).

CH354L Thermodynamics and Physical Chemistry Lab. 1 hour. Lab exercises that accompany CH354. Must be taken concurrently with CH354. Cross-listed with PH354L. 3 lab hours. Even-numbered Falls (alternates with CH355).

CH355 Quantum Mechanics and Solid State Physics. 3 hours. Topics include quantum mechanics, spectroscopy, group theory and solid state. 3 lectures. Cross-listed with PH355. Prerequisites: CH114, MA209 and PH206, or permission of instructor and division chair. Even-numbered Falls (alternates with CH354).

CH355L Quantum Mechanics and Solid State Physics Lab. 1 hour. Lab exercises that accompany CH355. Must be taken concurrently with CH355. Cross-listed with PH355L. 3 lab hours. Even-numbered Falls (alternates with CH355).

CH360 Inorganic Chemistry. 3 hours. Introduction to structural concepts and development of reaction chemistry. 3 lectures. Prerequisite: CH354 or permission of instructor and division chair. Odd-numbered Springs.

CH362L Inorganic Chemistry Lab. 1 hour. Lab exercises that accompany CH362. Must be taken concurrently with CH362. 3 lab hours. Odd-numbered Springs.