CHEMISTRY

Chemistry is the science that studies the nature, structure, properties and reactions of matter at both the atomic and molecular level. Since this matter composes all of life and physical universe, chemistry has nearly limitless applications. The department also offers several courses that are part of the General Education pattern. Students majoring in chemistry can complete the lower-division requirements for the major.

The most common career opportunities with a baccalaureate degree in chemistry include chemical lab technician, water purification technician, quality control coordinator, general laboratory work. Additionally, the major prepares students for transfer in any of several majors related to the chemical sciences such as food and drug inspector, industrial hygienist, materials scientist, chemist, geochemist, pharmaceutical sales. Many students also choose chemistry as excellent preparation for health-related fields such as medical doctor, pharmacist, physician's assistant, etc. Please note that many of these careers require a bachelor's degree or higher to meet minimum job requirements.

Transfer requirements in Chemistry are available in the Counseling Department. In all cases, students should consult with a counselor for specific transfer requirements.

Contact Information

Science Division Chair

Joshua Dillard | (559) 730-3852 | joshuad@cos.edu
John Muir: 140 | Visalia Campus

Dean of Science, Mathematics, and Engineering

Francisco Banuelos | (559) 730-3942 | franciscob@cos.edu
John Muir: 133 | Visalia Campus

Associate Degree

- Associate of Science in Chemistry for Transfer (AS-T) (https://catalog.cos.edu/areas-study/chemistry/associate-science-chemistry-transfer-as-t/)

For a complete list of courses and descriptions visit: COURSES (https://catalog.cos.edu/course-descriptions/)

CHEM 001 General Chemistry 1 **5unit(s)**
Hours: 3 Lecture/Discussion Hours:
6 Lab

A course for majors and pre-professionals involving the fundamental theories and laws of chemistry. Topics include stoichiometry, atomic structure, bonding theories, ionic reactions and properties of gases. Chemistry prerequisite may be waived with one year of high school chemistry with a minimum grade of C. (C-ID CHEM110; C-ID CHEM120S includes CHEM 001 and 002)
Prerequisites: CHEM 020 or equivalent college course with a minimum grade of C and Intermediate algebra or higher or eligibility for transfer-level mathematics per COS placement procedures.

CHEM 002 General Chemistry 2 **5unit(s)**
Hours: 3 Lecture/Discussion Hours:
6 Lab

A course for majors and pre-professionals involving the fundamental theories and laws of chemistry. Topics include liquids, solids, solutions, kinetics, acid/base theories, acid/base equilibrium, solubility and complex equilibrium, thermodynamics, electrochemistry, coordination compounds and nuclear chemistry. (C-ID CHEM120S - includes CHEM 001 and 002)
Prerequisites: CHEM 001 or equivalent college course with a minimum grade of C.

CHEM 010 Introduction to Chemistry **4unit(s)**
Hours: 3 Lecture/Discussion Hours:
3 Lab

Equivalent Course: CHEM 110
This is a one-semester elementary class for students who have never taken high school chemistry or for students who feel they need a refresher course. This course is also for students who need a physical lab science to satisfy their general education requirement or for students who want to become better prepared for more advanced chemistry. The course will give students a basic background in matter, energy, chemical reactions, measurements, formula writing, nomenclature and chemical calculations.
Advisory on Recommended Preparation: ENGL 261 or equivalent college course with a minimum grade of C or eligibility for ENGL 001 as determined by COS Placement Procedures (https://catalog.cos.edu/placement-procedures/).

CHEM 012 Organic Chemistry 1 **5unit(s)**
Hours: 3 Lecture/Discussion Hours:
6 Lab

This is the first semester of a comprehensive study of organic chemistry. This course is primarily for chemistry or biochemistry and biology majors, premedical, pre-dental students, pre-pharmacy and medical technicians. Emphasis is on structural and functional group chemistry studied from a synthetic and mechanistic point of view. Topics include: nomenclature, stereochemistry, free radical processes, structure, bonding, hybridization of carbon compounds, basic elimination and substitution reactions, introductory infrared and nuclear magnetic resonance spectroscopy. The course includes a laboratory use of micro/macro methods and techniques, synthesis and instrumentation. Formerly CHEM 12 and 12L. (C-ID CHEM150; C-ID CHEM160S includes CHEM 012 AND 013)
Prerequisites: CHEM 002 or equivalent college course with a minimum grade of C.

CHEM 013 Organic Chemistry 2 **5unit(s)**
Hours: 3 Lecture/Discussion Hours:
6 Lab

This is a continuation of CHEM 12, a comprehensive study of organic chemistry. The course is primarily for chemistry, biochemistry and biology majors, premedical, predental, prepharmacy students and medical technicians. Emphasis is on structural and functional group chemistry studied from a synthetic and mechanistic point of view. Topics include: reactions of aromatic compounds, condensations, natural products chemistry, introductory bio-chemistry, mass spectrometry and ultraviolet/visible spectroscopy. The course includes a laboratory use of micro/macro methods and techniques, synthesis and instrumentation. (C-ID CHEM160S - includes CHEM 012 AND 013)
Prerequisites: CHEM 012 or equivalent college course with a minimum grade of C.

CHEM 020 Introduction to General Chemistry **4unit(s)**
Hours: 3 Lecture/Discussion Hours:
3 Lab

CHEM 020 is a one semester transferable college chemistry course designed to meet the needs of allied-health and non-science majors. The course is a study of the fundamental theories and laws of chemistry. The laboratory portion of the course involves experimentation and drawing conclusions from data. (C-ID CHEM101)
Advisory on Recommended Preparation: CHEM 253 or equivalent college course with a minimum grade of C.
Prerequisites: MATH 200 or equivalent college course with a minimum grade of C.

CHEM 021 Organic/Biological Chemistry **4unit(s)**
Hours: 3 Lecture/Discussion Hours:
3 Lab

CHEM 021 is the second semester of a full year college chemistry course which meets the needs of the science-related major. Content focuses on structural configurations, properties and reactions of organic and biochemical compounds. Both qualitative and quantitative aspects of these are part of lecture and laboratory. (C-ID CHEM102)
Prerequisites: CHEM 020 or equivalent college course with a minimum grade of C.

NSCI 131 Chemistry and Physics for Educators **4unit(s)**
Hours: 3 Lecture/Discussion Hours:
2 Lab

Hours:
1 Other

NSCI 131 is a general principles science course designed exclusively for students transferring into the Liberal Studies program at CSU-Fresno (headed towards being an elementary school teacher). Basic principles of chemistry and physics relevant to elementary education are stressed. Applying these topics to everyday experience is emphasized. Note: This course does not satisfy general education science requirements. (C-ID CHEM 140 or C-ID PHYS 140)

Chemistry

Froese, Ryan
B.S., California Polytechnic State University, San Luis Obispo
M.S., California State University, Fresno

MacPherson, Chiara
B.S., Harvey Mudd College
Ph.D., Stanford University

Mendoza, Teresa
A.S., College Of The Sequoias
B.S., California State University, Long Beach
M.S., California State University, Fresno

Rodriguez, Julie
B.S., California State University, Bakersfield
M.S., California State University, Fresno

Verissimo, Jenny
B.S., California State University, Fresno
M.A., University of Pittsburgh
M.S., University of North Carolina, Wilmington