

# CHEMISTRY

The Chemistry Department offers courses for both Chemistry majors and non-Chemistry majors. An Associate in Arts Degree may be earned. In addition, the department offers chemistry courses required by other departments.

There is virtually no area of science that is unaffected by discoveries in the field of chemistry. The exploration of our solar system is made possible by the development of exotic fuels for rockets, special ceramics to dissipate the enormous heat generated by re-entry into the atmosphere, and light-weight, high-strength alloys for the space vehicles themselves. A coalition of chemists and biologists is attempting to correct defects in living organisms through genetic engineering, while other chemists work with doctors to create synthetic body parts and to alleviate suffering through the design of new or more effective drugs. Additionally, chemists are helping to increase the world's food supply, to develop synthetic fuels, and to produce extremely pure chemicals for use in computers and energy-conversion devices.

Because chemistry touches so many areas of human activity, it is essential that each individual have some understanding of basic chemical principles. Only in this way can citizens make intelligent decisions concerning applications of technology.

## Preparation for Transfer

Course requirements for transfer vary depending upon the college or university a student wishes to attend. Therefore, it is *most important* for a student to consult a counselor before planning an academic program for transfer. Articulation agreements for majors outlining transfer requirements are available on the ASSIST website at [www.assist.org](http://www.assist.org) (<http://www.assist.org>).

## Planning a Program of Study

Since many Chemistry courses have mathematics classes as prerequisites, it is important for students majoring in Chemistry to complete these courses prior to beginning the program.

General Chemistry (CHEM 155 General Chemistry I and CHEM 156 General Chemistry II) is offered every semester, including the summer. The one-year organic sequence begins in the Fall Semester with CHEM 211 Organic Chemistry I and CHEM 221 Organic Chemistry Laboratory I, and is completed in the Spring Semester with CHEM 212 Organic Chemistry II and CHEM 222 Organic Chemistry Laboratory II. Students must complete CHEM 156 General Chemistry II before being able to enroll in CHEM 211 Organic Chemistry I and CHEM 221 Organic Chemistry Laboratory I.

## Programs of Study

### Associate Degree

- Chemistry, Associate of Arts (AA) (<https://catalog.sbccc.edu/academic-departments/chemistry/chemistry-aa/>)

## Credit Courses Chemistry (CHEM)

### CHEM 101 Introductory Chemistry (4 Units)

Hours: 108 (54 lecture, 54 lab)

Introduction to Chemistry, with laboratory. Topics include atomic structure; matter and energy; the Periodic Table; chemical properties and reactions; nomenclature; behavior of gases, liquids, and solids; intermolecular forces; acid-base chemistry; and nuclear chemistry. Recommended for non-science majors as a science with a laboratory course or as a preparatory course for CHEM 155.

SBCC General Education: SBCCGE Area A

Transfer Information: CSUGE Area B1, CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 101, CHEM 104 and CHEM 110 combined: maximum credit, one course. No credit for CHEM 101 or CHEM 104 or CHEM 110 if taken after CHEM 155.

### CHEM 101W Workshop for Introductory Chemistry (1 Unit)

Corequisites: CHEM 101.

Hours: 54 (54 lab)

Study skill development and supplementary problem-solving for CHEM 101.

### CHEM 104 Fundamentals Of General, Organic And Biological Chemistry (4 Units)

Hours: 108 (54 lecture, 54 lab)

Introduction to chemistry, with emphasis on chemical principles and their application to biological systems and processes. Approximately half of the semester covers general chemistry topics, with the remainder covering an introduction to organic chemistry topics and biochemistry topics. Recommended for non-science majors, especially those in the fields of allied health, nursing (ADN), and physical education.

SBCC General Education: SBCCGE Area A

Transfer Information: CSUGE Area B1, CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 101, CHEM 104 and CHEM 110 combined: maximum credit, one course. No credit for CHEM 101 or CHEM 104 or CHEM 110 if taken after CHEM 155.

### CHEM 110 Survey of Chemistry (3 Units)

Hours: 54 (54 lecture)

Introduction to atoms, molecules, chemical reactions, and a survey of general chemistry, organic chemistry, biochemistry and applications for the sciences.

Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 101, CHEM 104 and CHEM 110 combined: maximum credit, one course. No credit for CHEM 101 or CHEM 104 or CHEM 110 if taken after CHEM 155.

**CHEM 155 General Chemistry I (5 Units)**

Prerequisites: CHEM 101 or CHEM 104 or One year of high school chemistry, MATH 107 or MATH 110C or MATH 137C or SS 110C or or equivalent based on SBCC's Assessment Center placement via multiple measures.

Course Advisories: ENG 110 or ENG 110H.

Hours: 126 (72 lecture, 54 lab)

First semester of a two-semester General Chemistry course sequence. Includes laboratory. Topics include the structure of atoms and molecules, stoichiometry, types of chemical bonding and chemical reactions, gas laws, molecular structure, acid-base chemistry, and thermodynamics. Laboratory focuses on collection and interpretation of data, and includes spectroscopy. Required for science, engineering and pre-dental and pre-medical majors.

SBCC General Education: SBCCGE Area A

Transfer Information: CSUGE Area B1, CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable

C-ID: CHEM 110, CHEM 120S.

**CHEM 155W Workshop for General Chemistry I (1 Unit)**

Hours: 54 (54 lab)

Concurrent: CHEM 155. Study skill development and supplementary problem-solving for CHEM 155.

**CHEM 156 General Chemistry II (5 Units)**

Prerequisites: CHEM 155.

Hours: 126 (72 lecture, 54 lab)

Second semester of a two-semester General Chemistry course sequence. Includes laboratory. Topics include thermodynamics, chemical equilibrium, chemical kinetics, electrochemistry, and chemical applications. Laboratory focuses on collection and interpretation of data, and includes quantitative analysis and spectroscopy. Required for science, engineering and pre-dental and pre-medical majors. (CAN CHEM 4 or CAN CHEM SEQ A [with CHEM 155])

Transfer Information: CSUGE Area B1, CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable

C-ID: CHEM 120S.

**CHEM 156W Workshop for General Chemistry II (1 Unit)**

Hours: 54 (54 lab)

Concurrent: CHEM 156. Study skill development and supplementary problem-solving for CHEM 155.

**CHEM 211 Organic Chemistry I (3 Units)**

Prerequisites: CHEM 156.

Hours: 54 (54 lecture)

First semester of a two-semester Organic Chemistry course sequence. Topics cover the study of fundamental principles of organic chemistry and includes structure, functional groups, nomenclature, stereochemistry, organic reactions, syntheses and mechanisms, as well as spectroscopic methods. Intended for students in chemistry, chemical engineering, biology, pre-med, pre-dental, and related programs. Concurrent enrollment in CHEM 221 recommended.

Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 211 and 221 combined: maximum credit, 5 units.

C-ID: CHEM 150, CHEM 160S.

**CHEM 212 Organic Chemistry II (3 Units)**

Prerequisites: CHEM 211.

Hours: 54 (54 lecture)

Second semester of a two-semester Organic Chemistry course sequence. Topics further study the fundamental principles of organic chemistry, with emphasis on organic syntheses and reaction mechanisms, as well as spectroscopic methods. Intended for students in chemistry, chemical engineering, biology, pre-med, pre-dental, and related programs. Concurrent enrollment in CHEM 222 recommended.

Transfer Information: CSUGE Area B1, IGETC Area 5A, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 212 and 222 combined: maximum credit, 5 units.

C-ID: CHEM 160S.

**CHEM 221 Organic Chemistry Laboratory I (2.3 Units)**

Corequisites: CHEM 211.

Hours: 90 (18 lecture, 72 lab)

First-semester Organic Chemistry laboratory. Focuses on organic chemistry laboratory techniques, including techniques of separation, purification, and identification of organic compounds. Includes IR spectroscopy, distillation, crystallization, extraction, determination of physical properties, and microscale techniques.

Transfer Information: CSUGE Area B3, IGETC Area 5A, IGETC Area 5C, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 221 and 221 combined: maximum credit, 5 units.

C-ID: CHEM 150, CHEM 160S.

**CHEM 222 Organic Chemistry Laboratory II (2.5 Units)**

Prerequisites: CHEM 221.

Corequisites: CHEM 212.

Hours: 135 (135 lab)

Second-semester Organic Chemistry laboratory. Focuses on organic syntheses and corresponding organic chemistry laboratory techniques, including techniques of separation, purification, and identification of organic compounds. Includes IR spectroscopy, NMR, distillation, crystallization, extraction, determination of physical properties, and microscale techniques.

Transfer Information: CSUGE Area B3, IGETC Area 5C, CSU Transferable, UC Transferable

UC Transfer Limit: CHEM 212 and 222 combined: maximum credit, 5 units.

C-ID: CHEM 160S.

**CHEM 299 Independent Study in Chemistry (1-4 Units)**

Limitations on Enrollment: To be eligible for independent study, a student must have completed 12 units at SBCC with a GPA of 2.5 and a minimum of 6 units with a GPA of 3.0 in the Chemistry Department.

Hours: 192 (192 lab)

Independent, systematic research investigation of a problem in chemistry. A final report on research conducted is required. For chemistry students who are capable and interested in pursuing studies in chemistry at a level beyond that covered in regular classes. Course restricted to 3 repetitions

Transfer Information: CSU Transferable