

# CHEMISTRY (CHEM)

## CHEM 103

### College Chemistry I

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**72 lecture hours, 72 lab hours**

**Grade Mode: Pass/No Pass, Standard Letter**

*Prerequisite(s): Elementary algebra or higher or direct placement based on multiple measures.*

The first semester of a year program includes chemistry of inorganic compounds; covers topics of nomenclature, stoichiometry, bonding, chemical equations, gas laws, solutions, acids and bases, nuclear processes and chemical equilibrium. Required for students transferring to four-year college nursing programs and students majoring in physical therapy, occupational therapy, and home economics.

## CHEM 104

### College Chemistry II

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**72 lecture hours, 72 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): CHEM 103 or CHEM 110.*

The second semester of a year program includes chemistry of organic compounds; covers topics in biochemistry including carbohydrates, fats, proteins, metabolism, nucleic acids, and nutrition. Required for students transferring to four-year college nursing programs and students majoring in physical therapy, occupational therapy and home economics.

## CHEM 110

### Beginning General Chemistry

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**54 lecture hours, 126 lab hours**

**Grade Mode: Pass/No Pass, Standard Letter**

*Prerequisite(s): Intermediate algebra or higher or direct placement based on multiple measures.*

*Strongly recommended: ENGL 101.*

An introductory course in the fundamental principles of chemistry. Topics covered are those necessary for understanding chemical structure and reactivity, and for scientific calculations. There is an emphasis on laboratory work and communication skills. The course is designed for science and engineering majors, pre-medical students, and as a general education class.

## CHEM 111

### General Chemistry I

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**54 lecture hours, 126 lab hours**

**Grade Mode: Pass/No Pass, Standard Letter**

*Prerequisite(s): Intermediate algebra or higher or direct placement based on multiple measures; CHEM 110 or passing score on Chemistry Placement Test.*

A general course in the fundamental principles of chemistry.

Topics covered include periodicity, stoichiometry, nomenclature, atomic structure, bonding, chemical calculations, thermodynamics, intermolecular forces, gases, materials and nanotechnology, and organic chemistry. The course is designed for all science and engineering majors and pre-medical students.

## CHEM 112

### General Chemistry II

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**54 lecture hours, 126 lab hours**

**Grade Mode: Pass/No Pass, Standard Letter**

*Prerequisite(s): CHEM 111.*

A general course in the fundamental principles of chemistry. CHEM 112 is a continuation of CHEM 111 and includes topics of equilibrium, kinetics, acid-base chemistry, electrochemistry, nuclear processes, coordination chemistry and thermodynamics.

## CHEM 210

### Organic Chemistry A

**3 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; CSUGE B1)**

**54 lecture hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): CHEM 112.*

A course in organic chemistry including the properties and reactions of alkanes, alkenes, alkynes, alcohols, ethers, thiols, emphasizing fundamental principles and reaction mechanism, stereochemistry and IR spectroscopy. First semester of a one-year course, required for students enrolled in pre-professional programs in medicine, dentistry, pharmacy, veterinary science, biology, and chemistry. CHEM 211L required concurrently for most stated majors.

## CHEM 211L

### Organic Chemistry A Laboratory

**1 Unit (AA/AS; Citrus B2; Citrus B3; CSU; UC)**

**54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): CHEM 210 (or concurrent enrollment) and CHEM 112.*

Introduction to organic laboratory techniques such as melting point, crystallization, distillation, thin layer chromatography, extraction. Synthesis of an ether and an alkene.

## CHEM 220

### Organic Chemistry B

**3 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; CSUGE B1)**

**54 lecture hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): CHEM 210.*

A course in organic chemistry including the properties and reactions of aromatic compounds, aldehydes, ketones, carboxylic acid derivatives, enols, enolates, amines, NMR. Second semester course required for students in pre-professional programs in medicine, dentistry, pharmacy, veterinary science, biology, and chemistry. CHEM 221L is required concurrently for most of the stated majors.

## CHEM 221L

### Organic Chemistry B Laboratory

**1 Unit (AA/AS; Citrus B2; Citrus B3; CSU; UC)**

**54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): CHEM 210 and CHEM 211L; CHEM 220 (or concurrent enrollment).*

Synthesis of selected organic compounds, including multi-step processes, techniques of column chromatography, IR spectroscopy.

**CHEM 698A**

**Cooperative Education**

**1 Unit (AA/AS)**

**60 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of volunteer employment or training sites.

**CHEM 698B**

**Cooperative Education**

**2 Units (AA/AS)**

**120 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of volunteer employment or training sites.

**CHEM 698C**

**Cooperative Education**

**3 Units (AA/AS)**

**180 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of volunteer employment or training sites.

**CHEM 698D**

**Cooperative Education**

**4 Units (AA/AS)**

**240 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of volunteer employment or training sites.

**CHEM 699A**

**Cooperative Education**

**1 Unit (AA/AS)**

**75 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of paid employment or training sites.

**CHEM 699B**

**Cooperative Education**

**2 Units (AA/AS)**

**150 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of paid employment or training sites.

**CHEM 699C**

**Cooperative Education**

**3 Units (AA/AS)**

**225 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of paid employment or training sites.

**CHEM 699D**

**Cooperative Education**

**4 Units (AA/AS)**

**300 lab hours arranged**

**Grade Mode: Pass/No Pass, Standard Letter**

The student must be simultaneously enrolled in a class that relates to the Cooperative Education class. A course designed to assist students in planning and accomplishing meaningful learning objectives related to Chemistry at their place of paid employment or training sites.