

General Chemistry CERTIFICATE OF ACHIEVEMENT

Why Study Chemistry? The study of chemistry helps you understand the fundamentals controlling the interactions of elements and molecules which form the basis for our world and the universe. You will learn about the chemical aspects of everyday life enabling you to understand the chemical foundations of the environment, energy, disease (causes and prevention), and the chemical basis of nutrition. Knowledge of the discipline enables you to practice the protocols and techniques for working safely with chemicals. Modern civilization is based on chemistry and its effects upon the environment and ourselves. Some of the consequences are considered better than others, and studying chemistry allows us to search for alternatives that may be practical or feasible.

The Certificate of Achievement in General Chemistry is designed for students who want to complete the requirements for employment in chemical-related fields, as well as for students who want to complete units required for a B.A. in Chemistry at a four-year institution.

Career Opportunities

Community college chemistry lab technicians, university entry-level lab technicians, lab support for commercial enterprises in related fields that require chemical lab technician expertise, such as refineries, environmental assessments, geochemistry, etc.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Demonstrate understanding of chemical processes to solve real-world problems
- Collect and interpret analytical data using techniques in general chemistry.
- Demonstrate the ability to perform basic calculations related to preparation of solutions and quantitative and qualitative analyses commonly used in experiments in chemistry.

Degree Major Requirements

DEPT/NO.	TITLE	UNITS
Required courses: 14 units		
CHEM 30A	Introductory General Chemistry	4
CHEM 1A	General Chemistry	5
CHEM 1B	General Chemistry	5

Select one of the following courses: 5 units

Select three courses from the following for a maximum of 9 units:

PHYS 4A	General Physics with Calculus (5)	5
PHYS 4B	General Physics with Calculus (5)	
MATH 3A	Calculus I (5)	
MATH 3B	Calculus II (5)	

Total units required for certificate: 19

Chemistry (CHEM)

Why Study Chemistry? Chemistry addresses the fundamental nature of substances and the changes that substances undergo. Students learn problem-solving skills rooted in the scientific world view. Specifically, you will learn about the chemical aspects of everyday life enabling you to understand the chemical foundations of the environment, energy, disease (causes and prevention), and the chemical basis of nutrition. The study of chemistry helps you understand the fundamentals controlling the interactions of elements and molecules which form the basis for our world and the universe. Knowledge of the discipline enables you to practice the protocols and techniques for working safely with chemicals. Modern civilization is based on chemistry and its effects upon the environment and ourselves. Some of the consequences are considered better than others and studying chemistry allows us to search for alternatives that may be practical or feasible.

What can you do with Chemistry? Some people are motivated primarily by curiosity about nature and/or about how things work. Questions that might be answered in studying chemistry include: the chemical composition of rocks from this or other planets, the chemical composition of the atmosphere, or the chemical reactions behind technologies such as rocket propulsion and automobile airbag deployment. Chemistry is essential in the practice of medicine in allowing us to understand the chemistry underlying biology, pharmacology, and human physiology.

The COA chemistry program is designed to provide you with a solid grasp of the basics to achieve your long-term goals. **Careers in chemistry include:** analytical chemist, biotechnologist, biochemist, chemical engineer, dietitian, environmental chemist, food and drug inspector, forensic chemist, geochemist, health professional, perfumer, pharmacist, professor, and many others.

CHEM 1A **General Chemistry**

- 5 units, 3 hours lecture, 6 hours laboratory (GR)
- Pre-Requisites: MATH 203; or MATH 211 D & CHEM 30A; or Chemistry Assessment; or Completion of ALEKS chemistry preparation course
- Recommended Preparation: ESOL 52; or ESOL 52A; or ESOL 52B; or ENGL 001A; or ENGL 001AS;
- Acceptable for credit: CSU, UC

General principles of chemistry: Measurements, atomic theory, chemical nomenclature, chemical composition, stoichiometry, reactions in aqueous solution, thermochemistry, electron configurations, periodic properties, chemical bonding, gases, liquids, solids, and solutions. 1905.00

AA/AS area 1; CSU area B1, B3; IGETC area 5A/5C

CHEM 1B **General Chemistry**

- 5 units, 3 hours lecture, 6 hours laboratory (GR)
- Prerequisite: CHEM 1A
- Acceptable for credit: CSU, UC

General principles of chemistry: Kinetics, equilibrium, acid-base equilibria, buffers, solubility equilibria, entropy and free energy, electro-chemistry, nuclear chemistry, coordination chemistry, and an introduction to organic chemistry. 1905.00

AA/AS area 1; CSU area B1, B3; IGETC area 5A/5C

CHEM 30A **Introductory General Chemistry**

- 4 units, 3 hours lecture, 3 hours laboratory (GR)
- Prerequisite: MATH 201
- Acceptable for credit: CSU, UC

Fundamental principles of general chemistry: Metric measurements, matter and energy, atomic structure, chemical nomenclature, chemical bonding, chemical reactions, stoichiometry, gas laws, nuclear chemistry, properties of liquids, solids, solutions, acids and bases. 1905.00

AA/AS area 1; CSU area B1, B3; IGETC area 5A/5C

CHEM 30B **Introductory Organic and Biochemistry**

- 4 units, 3 hours lecture, 3 hours laboratory (GR)
- Prerequisite: CHEM 30A
- Acceptable for credit: CSU, UC

Introduction to basic organic chemistry and biochemistry: Hydrocarbons; organic functional groups, nomenclature, and reactions; polymers, carbohydrates, proteins, enzymes, lipids, nucleic acids, protein synthesis, and metabolic pathways. 1905.00

AA/AS area 1; CSU area B1, B3; IGETC area 5A/5C

CHEM 49 **Independent Study in Chemistry**

- .5-5 units, .5-5 hours lecture (GR)
- Acceptable for credit: CSU

In-depth exploration of an area or problem of the student's choice not covered by regular catalog offerings in Chemistry: Student must obtain approval from an appropriate faculty member. For more details, see the section on independent study in the college catalog. 1905.00