ANALYTICAL CHEMISTRY

Analytical Chemistry

Associate in Science Degree and Certificate of Achievement*

Chemistry technicians preform very important roles in analytical laboratories in academic, research and industrial institutions. They perform duties such as assisting instructors prepare materials for laboratory classes, assisting researchers collect and analyze scientific data, or gathering data for product quality control in industries. At Berkeley City College we offer a two-year (four-semester) Analytical Chemistry program designed to provide individuals with the analytical skills needed for entry-level employment as laboratory technicians in those institutions. At the same time, the Analytical Chemistry program at BCC also prepares students for transfer to four-year colleges or universities.

Career Opportunities

Entry level technicians in State and Federal laboratories, academic research laboratories, industrial, pharmaceutical and environmental health laboratories.

Required Courses		*Units*
CHEM 1A	General Chemistry	5
CHEM 1B	General Chemistry	5
CHEM 12A	Organic Chemistry	5
CHEM 12B	Organic Chemistry	5
CHEM 18	Analytical Instrumentation	3
CIS 1	Introduction to Computer Information Systems	4
Select 9–10 units from the following:		
BIOL 1A	General Biology	5
BIOL 1B	General Biology	5
MATH 3A	Calculus I	5
MATH 3B	Calculus II	5
MATH 13	Introduction to Statistics	4
PHYS 3A	General Physics	5
PHYS 3B	General Physics	5
PHYS 4A	General Physics with Calculus	5
PHYS 4B	General Physics with Calculus	5
	Major Requirements	36–37
	General Education and Electives	23–24
	Total Units	**60**

**For the Certificate of Achievement, students must complete the 36–37 units of core courses. For the Associate Degree, students must complete the 36–37 units of core courses plus 23–24 units of General Education requirements and elective courses.*

Recommended Course Sequence

Students can use the following pattern to complete an Associate in Science degree or Certificate of Achievement in Analytical Chemistry. This is only one possible pattern. If you wish to earn an associate degree or certificate, you must participate in the Student Success Program (Matriculation), which includes assessing academic skills and developing a Student Education Plan (SEP) with a Counselor. This plan will map your sequence of courses to help you complete your degree regardless of the semester you begin classes.

Courses		*Units*
1st Semester/Fall		
CHEM 1A	General Chemistry	5
CIS 1	Introduction to Computer Information Systems	4
	General Education and Electives	6
	Total Units	**15**
2nd Semester/Spring		
CHEM 1B	General Chemistry	5
	General Education and Electives	10
	Total Units	**15**
3rd Semester/Fall		
CHEM 12A	Organic Chemistry	5
	General Education and Electives	10
	Total Units	**15**
4th Semester/Spring		
CHEM 12B	Organic Chemistry	5
CHEM 18	Analytical Instrumentation	3
	General Education and Electives	7
	Total Units	**15**

Program Learning Outcomes

Students who complete the program will be able to:

- Demonstrate an understanding of and ability to follow protocols and use of standard and analytical equipment, materials, and techniques employed in general, organic and analytical chemistry laboratory.
- Demonstrate the ability to perform basic calculations related to preparation of solutions and quantitative and qualitative analyses commonly used in experiments in chemistry.
- Demonstrate the ability to work individually or with a team on any assignments.

CHEM 1A, General Chemistry

5 Units

6 hrs lecture, 3 hrs lab (GR).

Prerequisite: MATH 203 or MATH 211A-D and CHEM 30A or 50, or satisfactory score on the chemistry assessment or satisfactory score on the math assessment.

Acceptable for credit: UC/CSU

AA/AS area 1; CSU area B1, B3;
IGETC area 5A, 5C;
(C-ID CHEM 110; CHEM 1A+1B C-ID CHEM 120S)

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

CHEM 1B, General Chemistry

5 Units

6 hrs lecture, 3 hrs lab (GR).

Prerequisite: CHEM 1A.

Acceptable for credit: UC/CSU

AA/AS area 1; CSU area B1, B3;
IGETC area 5A, 5C;
(CHEM 1A+1B, C-ID CHEM 120S)

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

CHEM 12A, Organic Chemistry

5 Units
3 hrs lecture, 6 hrs lab (GR).

Prerequisite: CHEM 1B.

Acceptable for credit: UC/CSU

AA/AS area 1; CSU areas B1, B3;
IGETC areas 5A, 5C ;
(C-ID CHEM 150; CHEM 12A+12B
C-ID CHEM 160S)

Introduction to structures, nomenclature, properties, and reactions of carbon compounds: Hydrocarbons, monofunctional and polyfunctional compounds, emphasis on structures and mechanisms, spectroscopy and other analytical techniques. Lab work: Reactions, purification techniques, measurements, qualitative analysis, use of instrumentation. 1905.00

CHEM 12B, Organic Chemistry

5 Units

3 hrs lecture, 6 hrs lab (GR).

Prerequisite: CHEM 12A.

Acceptable for credit: UC/CSU

AA/AS area 1; CSU areas B1, B3;
IGETC areas 5A, 5C;
(CHEM 12A+12B C-ID CHEM 160S)

Continuation of CHEM 12A: Reactions of functional groups and interactions of polyfunctional compounds, infrared spectroscopy, nuclear magnetic resonance, mass spectrometry, ultraviolet-visible spectroscopy. Introduction to biochemistry: Lipids, carbohydrates, proteins, nucleic acids. Lab work: Reactions, purification methods, measurements, multi-step syntheses, qualitative analysis, use of instrumentation. 1905.00

CHEM 18, Analytical Instrumentation

3 Units

2 hrs lecture, 3 hrs lab (GR).

Prerequisite: CHEM 1B.

Acceptable for credit: UC/CSU

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

Fundamentals of quantitative analysis: Solubility, acid-base, redox, complex formation and chemical equilibrium, and their applications in volumetric, gravimetric, colorimetric, chromatographic and spectroscopic analyses. This course emphasizes familiarity and skills in lab techniques and instrumental analysis.0955.00

CHEM 30A, Introductory General Chemistry

4 Units
3 hrs lecture, 3 hrs lab (GR).

Prerequisite: MATH 201 or 210D or 208.

Acceptable for credit: UC/CSU

AA/AS area 1; CSU area B1, B3;
IGETC area 5A, 5C;
(CHEM 30A+PHYS 10 C-ID PHYS 140)

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

CHEM 30B, Introductory Organic and Biochemistry

4 Units

3 hrs lecture, 3 hrs lab (GR).

Prerequisite: CHEM 30A.

Acceptable for credit: UC/CSU

AA/AS area 1; CSU area B1, B3;

IGETC area 5A, 5C

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

CHEM 49, Independent Study in Chemistry

0.5–5 Units

1.5–15.0 hrs lab (GR or P/NP).

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

CHILD DEVELOPMENT

CHDEV 51, Child Growth and Development

3 Units

3 hrs lecture (GR or P/NP).

Acceptable for credit: UC/CSU

AA/AS Area 2; CSU area D, E;
IGETC area 4;
(C-ID CDEV 100)

Prenatal through adolescence typical and atypical human growth and development: Interrelationship of physical, social, emotional, and intellectual growth and the adult role in fostering optimal development with emphasis on interactions between nature and nurture, developmental theory and investigative research, child observations and assessment, developmental milestones and individual differences. 1305.00