CHEMISTRY: BIOCHEMISTRY CONCENTRATION, BACHELOR OF SCIENCE

The major in Chemistry with emphasis in Biochemistry leads to a Bachelor of Science (BS) degree. The major is a rigorous, experimental science degree at the interface of biology and chemistry, and includes a strong background in the other core areas of chemistry: analytical, inorganic, organic, and physical. The major prepares students for careers in various areas of chemistry, especially biological chemistry, biomedical and pharmaceutical research, forensic chemistry, agrochemistry, and food science, as well as for professional schools (Medical, Dental, Veterinary, Pharmacy, etc.) and graduate school in the biological, biochemical, and biomedical sciences.

Program Goals

- To prepare graduates in the discipline of chemistry to become productive members of the profession whether they go on to industry, post-graduate education or other areas.
- To prepare students in the verbal, written and quantitative skills that are prerequisites to advanced study or careers in chemistry.
- To prepare students in the theoretical principals of chemistry as well as in the laboratory approach to problem solving.
- To maintain approval of the chemistry curriculum as defined by the American Chemical Society, Committee on Professional Training.
- To provide the opportunity for a variety of educational programs through the following:
  a. Basic Chemistry
  b. ACS Certified Curriculum
  c. Biochemistry
  d. Environmental Chemistry
  e. Chemistry/Teacher Certification
  f. Double Major
  g. Chemistry Minor

Expected Student Outcomes

Chemistry graduates are expected to:

- Understand the concept of and be able to apply the scientific method to problem solution;
- Understand classifications of chemical compounds, general reaction types and quantitative aspects of stoichiometry as applied to chemical reactions;
- Apply basic knowledge of related fields such as mathematics and physics to problem solving, methods of analysis and use of numerical data in the chemical sciences;
- Demonstrate a knowledge of basic laboratory skills, methods and equipment used in chemistry for observation and analysis of chemical systems;
- Read, think and write critically and review current literature in the chemical sciences; and
- Exhibit a comprehensive knowledge of the fundamental theories, concepts and skills necessary in the chemical sciences.

Outcomes Assessment Activities

- Assessment of chemistry majors occurs through examination of GPA in required courses. Majors are required to maintain a 2.000 GPA in major and minor courses as well as in other required courses.
- Students are required to complete American Chemical Society national standard exams when given during the course of the chemistry degree curriculum. Scores are compared to national averages to determine if students exhibit a comprehensive knowledge of the fundamental theories and concepts necessary in the chemical sciences disciplinary areas.
- Students are required to take an exit examination during the senior year. The ETS Major Field Achievement Test (MFAT) covers the undergraduate chemistry curriculum. Scores are compared to national averages to determine if students exhibit a comprehensive knowledge of the fundamental theories and concepts necessary in the chemical sciences overall.

Specific Program Requirements

- Students majoring or minoring in chemistry are required to have a cumulative GPA of 2.000 or better in their chemistry courses. In addition, students majoring or minoring in chemistry must receive a grade of “C” or better in all core chemistry courses. Students minoring in chemistry are required to earn a grade of “C” or better in all of the chemistry courses applying to the minor.
- Proficiency in physics, math and computer science is essential for understanding and applying chemical principles; therefore, graduates must complete approved math and physics courses with an overall GPA of 2.000 or better.
- Transfer students are required to earn a minimum of 20 semester credit hours in approved chemistry courses from CSU-Pueblo for graduation with a BS degree in chemistry. Transfer students wishing to minor in chemistry must earn a minimum of 10 of the 20 credit hours required at CSU-Pueblo.
- Students will be required to take an exit examination during the senior year, covering the undergraduate chemistry curriculum.

Specific Core Requirements

Course	Title	Credits
CHEM 121 & 121L	General Chemistry I (GT-SC2) and General Chemistry Lab I (GT-SC1)	5
CHEM 122 & 122L	General Chemistry II (GT-SC2) and General Chemistry Lab II (GT-SC1)	5
CHEM 170	Academic Orientation	0.5
CHEM 301 & 301L	Organic Chemistry I and Organic Chemistry Lab I	5
CHEM 302 & 302L	Organic Chemistry II and Organic Chemistry Lab II	5
CHEM 317 & 317L	Quantitative Analysis and Quantitative Analysis Lab	5
CHEM 321	Physical Chemistry I	3
CHEM 322	Physical Chemistry II	3
CHEM 370	Academic Enrichment	0.5
CHEM 419 & 419L	Instrumental Analysis and Instrumental Analysis Lab	5
CHEM 420 & 420L	Inorganic Chemistry and Inorganic Chemistry Lab	4

CHEM 493	Seminar	1
Total Credits		**42**

Specific Concentration Requirements

Course	Title	Credits
Required Chemistry Core		
Chemistry Core		42
Required Concenration Courses		
CHEM 411	Biochemistry I	3
CHEM 412 & 412L	Biochemistry II and Biochemistry II Lab	5
Approved Chemistry Electives		
Select 3 credits, one of the following is strongly suggested:		3
CHEM 492	Research	3
CHEM 495	Independent Study	3
Other Required Courses		
BIOL 181 & 181L	College Biology I/Organismal Bio (GT-SC2) and College Biology I/Organismal Bio Lab (GT-SC1)	4
BIOL 182 & 182L	College Biology II/Cellular Biology (GT-SC2) and College Biology II/Cellular Bio Lab (GT-SC1)	4
BIOL 301 & 301L	General Microbiology and General Microbiology Lab	5
BIOL 350	Mendelian and Population Genetics	2
BIOL 351 & 351L	Molecular Biology and Genetics and Molecular Biology & Genetics Laboratory	4
BIOL 412 & 412L	Cellular Biology and Cellular Biology Lab	4
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	5
MATH 224	Calculus and Analytic Geometry II	5
PHYS 221 & 221L	General Physics I and General Physics I Lab	5
PHYS 222 & 222L	General Physics II and General Physics II Lab (GT-SC1)	5
Institutional and General Education		
Select 24 credits		24
Total Credits		**120**

Planning Sheet

Disclaimer: The Planning Sheet is designed as a guide for student's planning their course selections. The information on this page provides only a suggested schedule. Actual course selections should be made with the advice and consent of an academic advisor. While accurately portraying the information contained in the college catalog, this form is not considered a legal substitute for that document. Students should become familiar with the catalog in effect at the time in which they entered the institution.

Course	Title	Credits
Year 1		
Fall		
CHEM 121 & 121L	General Chemistry I (GT-SC2) and General Chemistry Lab I (GT-SC1)	5
ENG 101	Rhetoric & Writing I (GT-CO1)	3
General Education		6
	Credits	**14**
Spring		
CHEM 122 & 122L	General Chemistry II (GT-SC2) and General Chemistry Lab II (GT-SC1)	5
CHEM 170	Academic Orientation	0.5
ENG 102	Rhetoric & Writing II (GT-CO2)	3
General Education		6
	Credits	**14.5**
Year 2		
Fall		
BIOL 181 & 181L	College Biology I/Organismal Bio (GT-SC2) and College Biology I/Organismal Bio Lab (GT-SC1)	4
CHEM 301 & 301L	Organic Chemistry I and Organic Chemistry Lab I	5
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	5
	Credits	**14**
Spring		
BIOL 182 & 182L	College Biology II/Cellular Biology (GT-SC2) and College Biology II/Cellular Bio Lab (GT-SC1)	4
CHEM 302 & 302L	Organic Chemistry II and Organic Chemistry Lab II	5
CHEM 370	Academic Enrichment	0.5
MATH 224	Calculus and Analytic Geometry II	5
	Credits	**14.5**
Year 3		
Fall		
BIOL 301 & 301L	General Microbiology and General Microbiology Lab	5
CHEM 317 & 317L	Quantitative Analysis and Quantitative Analysis Lab	5
CHEM 411	Biochemistry I	3
CHEM 420 & 420L	Inorganic Chemistry and Inorganic Chemistry Lab	4
	Credits	**17**
Spring		
BIOL 350	Mendelian and Population Genetics	2
CHEM 412 & 412L	Biochemistry II and Biochemistry II Lab	5
PHYS 221 & 221L	General Physics I and General Physics I Lab	5
General Education		3
	Credits	**15**
Year 4		
Fall		
BIOL 351 & 351L	Molecular Biology and Genetics and Molecular Biology & Genetics Laboratory	4
CHEM 322	Physical Chemistry II	3
PHYS 222 & 222L	General Physics II and General Physics II Lab (GT-SC1)	5
General Education		3
	Credits	**15**
Spring		
BIOL 412 & 412L	Cellular Biology and Cellular Biology Lab	4
CHEM 321	Physical Chemistry I	3
CHEM 419 & 419L	Instrumental Analysis and Instrumental Analysis Lab	5
CHEM 492	Research [Or other Chemistry course.]	1-3
CHEM 493	Seminar	1
	Credits	**14-16**
	Total Credits	**118-120**