

CHEMISTRY: ENVIRONMENTAL CHEMISTRY CONCENTRATION, BACHELOR OF SCIENCE

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

The following common core is required for all of the chemistry emphasis areas for the Bachelor of Science Degree:

| Course | Title | Credits |
|-----------------|---|---------|
| CHEM 121 & 121L | General Chemistry I and General Chemistry Lab I | 5 |
| CHEM 122 & 122L | General Chemistry II and General Chemistry Lab II | 5 |
| CHEM 170 | Academic Orientation | 0.5 |
| CHEM 221 & 221L | Inorganic Chemistry and Inorganic Chemistry Lab | 4 |
| 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 493 | Seminar | 1 |
| Total Credits | | 42 |

All emphasis areas for the chemistry major also require completion of the following institutional and general education requirements.

Specific Concentration Requirements

| Course | Title | Credits |
|--|---|---------|
| Required Chemistry Core | | |
| Chemistry Core | | 42 |
| Required Concentration Courses | | |
| CHEM 125 & 125L | ENVIRONMENTAL SCIENCE and ENVIRONMENTAL SCIENCE LABORATORY | 4 |
| CHEM 311 | BIOCHEMISTRY SURVEY | 3 |
| CHEM 425 & 425L | ENVIRONMENTAL CHEMISTRY and ENVIRONMENTAL CHEMISTRY LAB | 5 |
| Approved Chemistry Electives | | |
| Select 4 credits, the following are encouraged elective options: | | 4 |
| CHEM 292 | RESEARCH | 1-3 |
| CHEM 492 | RESEARCH | 1-3 |
| MATH 156 | INTRODUCTION TO STATISTICS | 3 |
| Other Required Courses | | |
| MATH 126 | CALCULUS AND ANALYTIC GEOMETRY I | 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 | 5 |
| BIOL 181 & 181L | COLLEGE BIOLOGY I/ORGANISMAL BIO and COLLEGE BIOLOGY I/ORGANISMAL BIO LAB | 4 |
| BIOL 182 & 182L | COLLEGE BIOLOGY II/CELLULAR BIOLOGY and COLLEGE BIOLOGY II/CELLULAR BIO LAB | 4 |
| BIOL 301 & 301L | GENERAL MICROBIOLOGY and GENERAL MICROBIOLOGY LAB | 5 |
| BIOL 465 | ENVIRONMENTAL TOXICOLOGY | 3 |
| Institutional and General Education | | |
| Select 24 credits | | 24 |
| Free Electives | | |
| Select 2 credits | | 2 |
| 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 | | |
| BIOL 181 & 181L | College Biology I/Organismal Bio (GT-FSC2) and College Biology I/Organismal Bio Lab (GT-SC1) | 4 |
| CHEM 121 & 121L | General Chemistry I (GT-SC2) and General Chemistry Lab I (GT-SC1) | 5 |
| CHEM 125 & 125L | Environmental Science (GT-SC2) and Environmental Science Laboratory (GT-SC1) | 4 |
| CHEM 170 | Academic Orientation | 0.5 |
| ENG 101 | Rhetoric & Writing I (GT-CO1) | 3 |
| Credits | | 16.5 |

| | | |
|--|---|------|
| Spring | | |
| BIOL 182 & 182L | College Biology II/Cellular Biology (GT-SC2) and College Biology II/Cellular Bio Lab (GT-SC1) | 4 |
| CHEM 122 & 122L | General Chemistry II (GT-SC2) and General Chemistry Lab II (GT-SC1) | 5 |
| CHEM 370 | Academic Enrichment | 0.5 |
| ENG 102 | Rhetoric & Writing II (GT-CO2) | 3 |
| General Education | | 3 |
| Credits | | 15.5 |
| Year 2 | | |
| Fall | | |
| BIOL 301 & 301L | General Microbiology and General Microbiology Lab | 5 |
| CHEM 301 & 301L | Organic Chemistry I and Organic Chemistry Lab I | 5 |
| MATH 126 | Calculus and Analytic Geometry I (GT-MA1) | 5 |
| Credits | | 15 |
| Spring | | |
| CHEM 302 & 302L | Organic Chemistry II and Organic Chemistry Lab II | 5 |
| PHYS 221 & 221L | General Physics I (GT-FSC2) and General Physics I Lab (GT-SC1) | 5 |
| MATH 224 | Calculus and Analytic Geometry II | 5 |
| Credits | | 15 |
| Year 3 | | |
| Fall | | |
| CHEM 322 | Physical Chemistry II | 3 |
| CHEM 420 & 420L | Inorganic Chemistry and Inorganic Chemistry Lab | 3 |
| PHYS 222 & 222L | General Physics II (GT-SC2) and General Physics II Lab (GT-SC1) | 5 |
| General Education | | 3 |
| Credits | | 14 |
| Spring | | |
| CHEM 321 | Physical Chemistry I | 3 |
| General Education | | 6 |
| Elective ¹ credit must be Chemistry course. | | 3 |
| Credits | | 12 |
| Year 4 | | |
| Fall | | |
| BIOL 465 | Environmental Toxicology | 3 |
| CHEM 311 | Biochemistry Survey | 3 |
| CHEM 317 & 317L | Quantitative Analysis and Quantitative Analysis Lab | 5 |
| CHEM 425 & 425L | Environmental Chemistry and Environmental Chemistry Lab | 5 |
| Credits | | 16 |
| Spring | | |
| CHEM 419 & 419L | Instrumental Analysis and Instrumental Analysis Lab | 5 |
| CHEM 493 | Seminar | 1 |
| General Education | | 6 |
| Elective ¹ Must be Chemistry course. | | 3 |
| Credits | | 15 |
| Total Credits | | 119 |