CHEMISTRY

Bachelor of Science degree with a major in Chemistry

Bachelor of Science degree with a major in Chemistry — concentration in Biochemistry

Bachelor of Arts degree with a major in Chemistry

Minor in Chemistry

Department Chair
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The Program

Students completing this program will have demonstrated:

- understanding of what chemistry reveals about the nature of physical reality
- proficiency in abstract reasoning
- sound abilities in written and oral communications
- understanding of and use of physical and mathematical models
- understanding of the relationship of experimental observation to chemical theory and knowledge
- proficiency in spatial perception
- critical independent thinking
- chemical knowledge and skills needed in chemistry as well as in other disciplines
- breadth, depth, and rigor characteristic of a professional chemist
- proficiency and skill in performing laboratory techniques and in making and interpreting laboratory observations
- understanding of the theory and operation of fundamental modern laboratory instruments.

Students majoring in chemistry may choose either a Bachelor of Science or a Bachelor of Arts degree. Both degrees offer excellent preparation for graduate study and professional schools.

The BS degree with a major in chemistry fulfills requirements for professional training established by the American Chemical Society. Students may choose the biochemistry concentration, which prepares them for careers in biochemistry and related fields, as well as for graduate study.

Students who choose the BA program find less specialization in chemistry and greater opportunity for study in other fields. This program is recommended for students wanting a standard teaching credential with specialization in secondary school teaching.

Potential careers: analytical chemist, biotechnologist, nutritionist, food and drug inspector, toxicologist, organic or inorganic chemist, medical technologist, genetic engineer, physical chemist, pharmacologist, science librarian, biochemist, forensic chemist, sanitarian, geochemist, environmental consultant, chemical engineer.

Preparation

High school students should take chemistry, English, and mathematics.

REQUIREMENTS FOR THE MAJOR (Bachelor of Science)

For a description of degree requirements to be fulfilled in addition to those listed below for the major, please see "The Bachelor's Degree" section of the catalog, pp. 66-80.

The Upper Division Area B General Education requirement is met by the coursework within the Bachelor of Science degree for either option in the Chemistry major.

Students must complete all courses in the major with a C- or better.

Lower Division

CHEM 109 (5) General Chemistry I
CHEM 110 (5) General Chemistry II
MATH 109 (4) Calculus I
MATH 110 (4) Calculus II
MATH 210 (4) Calculus III
PHYX 109 (4) General Physics I
PHYX 110 (4) General Physics II
PHYX 111 (4) General Physics III

Upper Division

CHEM 310 (3) Inorganic Chemistry I
CHEM 321 (5) Organic Chemistry
CHEM 322 (5) Organic Chemistry
CHEM 323 (1) Nuclear Magnetic Resonance Spectroscopy Techniques
CHEM 330 (3) Molecular Modeling
CHEM 341 (5) Quantitative Analysis
CHEM 361 (3) Physical Chemistry I
CHEM 362 (3) Physical Chemistry II
CHEM 363 (2) Physical Chemistry II Lab
CHEM 410 (3) Inorganic Chemistry II
CHEM 410L (2) Inorganic Chemistry II Lab
CHEM 438 (4) Introductory Biochemistry
CHEM 441 (4) Instrumental Analysis
CHEM 485 (1) Seminar in Chemistry

Plus free electives to bring the total units for the BS degree to 120.

Biochemistry Concentration

Lower Division

Same lower division requirements listed for the BS chemistry major, plus:

BIOL 105 (4) Principles of Biology

BOT 105 (4) General Botany, **or**
ZOOL 110 (4) Introductory Zoology

Upper Division

CHEM 321 (5) Organic Chemistry
CHEM 322 (5) Organic Chemistry
CHEM 323 (1) Nuclear Magnetic Resonance Spectroscopy Techniques
CHEM 341 (5) Quantitative Analysis
CHEM 361 (3) Physical Chemistry I
CHEM 362 (3) Physical Chemistry II
CHEM 431 (5) Biochemistry
CHEM 432 (5) Biochemistry
CHEM 485 (1) Seminar in Chemistry
BIOL 340 (4) Genetics

Plus one of the following:
BIOL 412 (4) General Bacteriology
BOT 310 (4) Gen. Plant Physiology
ZOOL 310 (4) Animal Physiology

REQUIREMENTS FOR THE MAJOR (Bachelor of Arts)

For a description of degree requirements to be fulfilled in addition to those listed below for the major, please see "The Bachelor's Degree" section of the catalog, pp. 66-80.

Students must earn a minimum grade of C- in all courses with the "CHEM" prefix for the BA Chemistry Major degree.

Lower Division

CHEM 109 (5) General Chemistry I
CHEM 110 (5) General Chemistry II

Plus one of these calculus series:

- MATH 105 (3) Calculus for the Biological Sciences & Natural Resources
  MATH 205 (3) Multivariate Calculus for the Biological Sciences & Natural Resources, **or**

- MATH 109 (4) Calculus I
  MATH 110 (4) Calculus II
  MATH 210 (4) Calculus III

Plus one of these physics **series**:

- PHYX 106 (4) College Physics: Mechanics and Heat
  PHYX 107 (4) College Physics: Electromagnetism & Modern Physics, **or**

- PHYX 109 (4) General Physics I: Mechanics
  PHYX 110 (4) General Physics II: Electricity and Heat
  PHYX 111 (4) General Physics III: Thermodynamics & Waves

Upper Division

CHEM 310 (3) Inorganic Chemistry I
CHEM 321 (5) Organic Chemistry
CHEM 322 (5) Organic Chemistry
CHEM 323 (1) Nuclear Magnetic Resonance Spectroscopy Techniques
CHEM 341 (5) Quantitative Analysis
CHEM 361 (3) Physical Chemistry I
CHEM 485 (1) Seminar in Chemistry

One of the following:

CHEM 362 (3) Physical Chemistry II **and**
CHEM 363 (2) Physical Chemistry II Lab
or
CHEM 410 (3) Inorganic Chemistry II **and**
CHEM 410L (2) Inorganic Chemistry II Lab
or
CHEM 441 (4) Instrumental Analysis

One of the following:

CHEM 438 (4) Introductory Biochemistry
or
CHEM 431 (5) Biochemistry **and**
CHEM 432 (5) Biochemistry

Plus additional approved courses to bring total units in upper division chemistry to 25.

Plus electives to bring the total BA units to 120.

REQUIREMENTS FOR THE MINOR

A minimum of 8 upper division units must be completed at Humboldt State University.

Students must earn a minimum grade of C- in all courses with the "CHEM" prefix for the BS Chemistry Minor degree.

Lower Division

CHEM 109 (5) General Chemistry I
CHEM 110 (5) General Chemistry II

Upper Division

15 approved upper division units, including at least one of the following sequences:

- CHEM 321 (5) Organic Chemistry
  CHEM 322 (5) Organic Chemistry
  CHEM 323 (1) Nuclear Magnetic Resonance Spectroscopy Techniques, **or**

- CHEM 341 (5) Quantitative Analysis
  CHEM 441 (4) Instrumental Analysis, **or**

- CHEM 361 (3) Physical Chemistry I
  CHEM 362 (3) Physical Chemistry II
  CHEM 363 (2) Physical Chemistry II Lab, **or**

- CHEM 431 (5) Biochemistry
  CHEM 432 (5) Biochemistry

For the required 15 upper division units, all of the above upper division courses and the following courses are approved for all students:

CHEM 310 (3) Inorganic Chemistry I
CHEM 330 (3) Molecular Modeling
CHEM 370 (3) Earth System Chemistry
CHEM 410 (3) Inorganic Chemistry II
CHEM 410L (2) Inorganic Chemistry II Lab
CHEM 495 (1-3) Undergraduate Research

The following courses are approved for all students except those listed:

CHEM 328 (4) Brief Organic Chemistry [not approved for students getting credit for CHEM 321 or 322]

CHEM 438 (4) Introductory Biochemistry [not approved for students getting credit for CHEM 431 or 432]