

BIOLOGY

JOHN ADDIS, PH.D.
SAM ALVEY, PH.D.
JACQUELINE BREHE, PH.D.
JENNIFER GEIGER, PH.D.
DAN GRETCH, PH.D.
D. GRANT HOKIT, PH.D.
GERALD SHIELDS, PH.D.
DAVID TRAYNOR, D.V.M.

Mission and Goals

The biology major program is designed to provide students with the knowledge and skills needed to enter graduate or professional school or to gain employment in their field. Students completing the major program in biology are expected to have

- an understanding of the basic principles and concepts of the major field;
- the critical thinking skills needed for solving problems in the field;
- the abilities to evaluate and interpret data and to analyze and synthesize information from different sources;
- a working knowledge of fundamental laboratory techniques and the ability to use them to perform experiments in the field;
- the writing and speaking skills needed to communicate effectively in the field.

Major in Biology

I. Major Program Requirements

BI 171-172	Biological Principles I & II
BI 221	Cell Biology
BI 300	Genetics
BI 420	Topics In Biological Sciences
BI 496	Senior seminar

Three additional upper-division courses from the following list:

BI 305	Microbiology
BI 306	Plant Biology
BI 308	Animal Physiology
BI 311	Ecology
BI 323	Comparative Anatomy
BI 350	Developmental Biology
BI 370	Evolutionary Biology
CH 353	Biochemistry

II. Other Program Requirements

CH 101-102	General Chemistry
CH 301-302	Organic Chemistry
MA 131	Calculus of Single Variable Functions
or MA 121-122	Differential and Integral Calculus
MA 207	Elementary Statistics
PHYS 201-202	General Physics I and II

Notes:

1. All biology majors must take the following courses, or their equivalent, in sequence - BI 171, BI 712, BI 221, BI 300.
2. All biology majors must earn a grade of "C" or better in all major courses (sections I and II above) and successfully pass the senior comprehensive examination in biology. Students must pass prerequisites with a "C" or better to advance to subsequent courses.
3. All degree students should review requirements for graduation as described in this catalog.

Major In Biology For Secondary Education

I. Major Program Requirements

BI 171-172	Biological Principles I & II
BI 221	Cell Biology
BI 300	Genetics
BI 420	Topics in Biological Science

One additional upper division course from the following list:

BI 305	Microbiology
BI 306	Plant Biology
BI 308	Animal Physiology
BI 311	Ecology
BI 323	Comparative Anatomy
BI 350	Developmental Biology
BI 370	Evolutionary Biology
CH 353	Biochemistry

II. Other Program Requirements

CH 101-102	General Chemistry
CH 301	Organic Chemistry
MA 207	Elementary Statistics
MA xxx	One additional course in mathematics
PHIL 252	Philosophy and History of Science
PHYS xxx	One course in physics is recommended

Note:

1. All biology majors must take the following courses, or their equivalent, in sequence - BI 171, BI 712, BI 221, BI 300.
2. All biology for secondary education students must earn a grade of "C" or better in all major courses (sections I and II above) and successfully pass the senior comprehensive examination in biology.

III. Professional Education Requirements

AN/SO 218	Introduction to Native American Studies
CS 103	Instructional Media and Technology
ED 102	Foundations of Education
ED/PSY 229	Educational Psychology

ED 245	Diversity Field Experience
ED 327	Content Area Reading/Language Arts
ED 309	Teaching in the Secondary School
ED 346	Teaching Science in the Secondary School
ED 405	Education Seminar
ED 410	Student Teaching
ED 412	Measurement & Assessment in Teaching
HPE 214	The School Health Program
PSY 228	Adolescent Psychology
SPED 300	Introduction to Exceptional Children
United States and contemporary world cultures course(s)—see index for page number.	

IV. Acceptance into the Teacher Education Program and Student Teaching Program

Teacher Education Program: Students pursuing academic programs that lead to teacher licensure must seek admission to the teacher education program by the end of their sophomore year.

Student Teaching Program: In the spring semester of the junior year, all preservice teachers must seek admission to the student teaching program. See index for page numbers for Teacher Education and Student Teaching programs.

Note: In order to be licensed to teach in a secondary school in Montana, a student is required to have a teaching minor in a subject field acceptable for licensure endorsement as well as the teaching major. All degree students should review requirements for graduation as described in this catalog.

Minor in BiologyI. Minor Program Requirements

BI 171-172	Biological Principles I & II
BI 221	Cell Biology
BI 300	Genetics
One additional upper-division course from the following list:	
BI 305	Microbiology
BI 306	Plant Biology
BI 308	Animal Physiology
BI 311	Ecology
BI 323	Comparative Anatomy
BI 350	Developmental Biology
BI 370	Evolutionary Biology
CH 353	Biochemistry

II. Other Program Requirements

CH 101-102	General Chemistry
CH 301	Organic Chemistry

Minor in Biology for Secondary Education

I. Minor Program Requirements

BI 171-172	Biological Principles I & II
BI 221	Cell Biology
BI 300	Genetics

II. Other Program Requirements

CH 101-102	General Chemistry
CH 301	Organic Chemistry
ED 346	Teaching Science in the Secondary School
MA 207	Elementary Statistics
PHIL 252	Philosophy and History of Science

CHEMISTRY

DAWN BREGEL, PH.D.
DAN GRETCH, PH.D.
JOHN SALZSIEDER, PH.D.
KYLE S. STRODE, PH.D.
RON L. WILDE, PH.D.

Mission and Goals

The chemistry major program is designed to provide students with the knowledge and skills needed to enter graduate or professional school or to gain employment in their field. Students completing the major program in chemistry are expected to have

- an understanding of the basic principles and concepts of the major field;
- the critical thinking skills needed for solving problems in the field;
- the abilities to evaluate and interpret data and to analyze and synthesize information from different sources;
- a working knowledge of fundamental laboratory techniques and the ability to use them to perform experiments in the field;
- the writing and speaking skills needed to communicate effectively in the field.

Major in Chemistry

I. Major Program Requirements

CH 101-102 General Chemistry
CH 205 Quantitative Analysis

- CH 301-302 Organic Chemistry
- CH 306 Instrumental Methods
- CH 391-392 Physical Chemistry
- CH 496 Senior Seminar

One additional upper-division course from the following list:

- CH 353 Biochemistry
- CH 405 Advanced Inorganic Chemistry
- CH 406 Advanced Organic Chemistry

II. Other Program Requirements

- MA 131 Calculus of Single Variable Functions
or MA 121-122 Differential and Integral Calculus
- MA 233 Multivariable Calculus
- PHYS 205-206 Engineering Physics I & II

Note: All chemistry majors must earn a grade of "C" or better in all major courses (Section I and II above). Students must pass prerequisites with a "C" or better to enroll in chemistry courses.

Major in Chemistry for Secondary Education

I. Major Program Requirements

- CH 101-102 General Chemistry
- CH 205 Quantitative Analysis
- CH 301-302 Organic Chemistry
- Two additional upper division Chemistry courses

II. Other Program Requirements

- MA 121 Differential Calculus
- PHIL 252 Philosophy and History of Science
- One additional two-semester course from the following list:
- BI 171-172 Biological Principles I & II
- PHYS 201-202 Physics I and II
- PHYS 205-206 Engineering Physics

III. Professional Education Requirements

- AN/SO 218 Introduction to Native American Studies
- CS 103 Instructional Media and Technology
- ED 102 Foundations of Education
- ED/PSY 229 Educational Psychology
- ED 245 Diversity Field Experience
- ED 309 Teaching in the Secondary School
- ED 327 Content Area Reading/Language Arts
- ED 346 Teaching Science in the Secondary School
- ED 405 Education Seminar
- ED 410 Student Teaching
- ED 412 Measurement & Assessment in Teaching
- HPE 214 The School Health Program
- PSY 228 Adolescent Psychology
- SPED 300 Introduction to Exceptional Children

United States and contemporary world cultures course(s)—see index for page number.

Note: All chemistry for secondary education majors must earn a grade of "C" or better in all major courses (Section I and II above). Students must pass prerequisites with a "C" or better to enroll in chemistry courses.

IV. Acceptance into the Teacher Education Program and Student Teaching Program

- A. Teacher Education Program: Individuals pursuing academic programs that lead to teacher licensure must seek admission to the teacher education program by the end of their sophomore year.
- B. Student Teaching Program: In the spring semester of the junior year, all preservice teachers must seek admission to the student teaching program. See index for page numbers for these programs.

Note: In order to be licensed to teach in a secondary school in Montana, a student is required to have a teaching minor in a subject field acceptable for licensure endorsement as well as the teaching major. All degree students should review requirements for graduation as described in this catalog.

Minor in Chemistry

I. Minor Program Requirements

- CH 101-102 General Chemistry
- CH 205 Quantitative Analysis
- CH 301-302 Organic Chemistry
- Plus 1 additional upper-division chemistry course

Minor in Chemistry for Secondary Education

I. Minor Program Requirements

- CH 101-102 General Chemistry
- CH 205 Quantitative Analysis
- CH 301-302 Organic Chemistry

II. Other Program Requirements

- ED 346 Teaching Science in the Secondary School
- MA 121 Differential Calculus
- MA 207 Elementary Statistics
- PHIL 252 Philosophy and History of Science
- Plus 1 additional 4-credit course in biology or physics.