

# BIOLOGY B.A. - BIOLOGICAL EDUCATION

This concentration provides students with coursework in biology and related sciences and mathematics needed to be certified by the State of Montana to teach secondary biology in middle and high school. This concentration is appropriate for students interested in teaching biology in a larger, more urban school. In order to be licensed to teach secondary biology, students must be admitted to the Teacher Education Program through the Phyllis J. Washington College of Education.

Individuals interested in teaching in K-12 schools must complete a degree in the content area they want to teach plus the Teacher Education Program through the Department of Teaching and Learning. Individuals must complete the teaching track within that degree program, which may contain different course requirements than the non-teaching track since the sequence of courses is designed to meet state standards. Upon completion of the degree program with the teaching track and the secondary licensure program, one will be eligible for a standard Montana teaching license in this content area.

- Secondary Education Licensure Program (<https://www.umt.edu/education/departments/teaching-and-learning/tep/>)
- Licensure Degree Requirements (<https://catalog.umt.edu/colleges-schools-programs/education/teaching-learning/lic-secondary-licensure/>)

## General Degree Requirements

To earn a baccalaureate degree, all students must complete successfully, in addition to any other requirements, the University of Montana General Education Requirements. Please refer to the General Education Requirements page (<https://catalog.umt.edu/academics/general-education-requirements/>) for more information.

Additional requirements for graduation can be found on the Degree/Certificate Requirements for Graduation page (<https://catalog.umt.edu/academics/graduation-requirements/>).

Unless otherwise noted in individual program requirements, a minimum grade point average of 2.00 in all work attempted at the University of Montana-Missoula is required for graduation. Please see the Academic Policies and Procedures page (<https://catalog.umt.edu/academics/policies-procedures/>) for information on how your GPA is calculated.

Courses taken to satisfy the requirements of a major, minor, or certificate program must be completed with a grade of C- or better unless a higher grade is noted in the program requirements.

## Bachelor of Arts - Biology; Biological Education Concentration

- This major requires a minimum cumulative institutional GPA of 2.75.
- The lower-division core should be completed before attempting most upper division major courses. AP Biology credit with a score of 3 may be substituted for either BIOB 160/BIOB 161N or BIOB 170N/BIOB 171N.

## Course Requirements

Code	Title	Hours
<b>Biology/Microbiology Lower-Division Core</b>		
Complete all of the following courses:		
BIOB 160	Principles of Living Systems	3
BIOB 161N	Principles of Living Systems Lab	1
BIOB 170N	Principles of Biological Diversity	3
BIOB 171N	Principles of Biological Diversity Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
<b>Upper-Division Core Courses Required by the Biological Education Concentration</b>		
Complete all of the following courses:		
BIOE 370	General Ecology	3
BIOE 371	General Ecology Lab (equivalent to 271)	2
BIOM 360	General Microbiology	3
BIOM 361	General Microbiology Lab	2
<b>Plant-Based Organismal Course Requirement</b>		
Complete one of the following courses:		4-5
BIOE 448	Terrestrial Plant Ecology	
BIOE 485	Plant Evolution	
BIOO 320	General Botany	
BIOO 433 & BIOO 434	Plant Physiology and Plant Physiology Lab	
<b>Animal-Based Organismal Course Requirement</b>		
Complete one of the following courses:		3-4
BIOB 301	Developmental Biology	
BIOB 435	Comparative Animal Physiology	
BIOE 403	Comparative Vertebrate Anatomy	
<b>Mathematics</b>		
Complete all of the following courses:		
M 162 or M 171	Applied Calculus <sup>1</sup> / Calculus I	4
STAT 216	Introduction to Statistics	4
<b>Chemistry</b>		
Complete all of the following courses:		
CHMY 121N	Introduction to General Chemistry	4
CHMY 123	Introduction to Organic and Biochemistry	4
CHMY 124	Introduction to Organic and Biochemistry Lab	2
CHMY 485	Laboratory Safety	1
<b>Physics</b>		
Complete one of the following Physics courses:		5
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory	
PHSX 215N & PHSX 216N	Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus	
<b>Environmental Geosciences</b>		
Complete one of the following courses:		3
ERTH 101N	Earth Systems Science	
GEO 105N	Oceanography	
<b>Education Course</b>		
Complete the following course:		

EDU 497	Teaching and Assessing (Methods: 5 - 12 Science)	3
<b>Advanced Writing Requirement</b>		
Complete all of the following courses:		
BIOE 371	General Ecology Lab (equivalent to 271)	2
BIOO 434	Plant Physiology Lab	1
or BIOO 320	General Botany	
<b>Total Hours</b>		<b>67-69</b>

<sup>1</sup> Students should choose M 171 if they plan to take additional calculus courses or if they plan a double major or minor in a field that requires more calculus (e.g. astronomy, math, physics, biochemistry, computer science).

## Secondary Teaching Licensure

For endorsement to teach this subject, a student also must gain admission to the Teacher Education Program and meet all the requirements for secondary teaching licensure (<https://catalog.umt.edu/colleges-schools-programs/education/teaching-learning/lic-secondary-licensure/>). For more information, see the Teaching and Learning Department webpage (<https://www.umt.edu/education/departments/currinst/default.php>).

## Writing in the Disciplines Distributed Model Courses for Biological Sciences

Code	Title	Hours
<b>1/3 Writing in the Disciplines Courses</b>		
BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Advanced Cellular & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 371	General Ecology Lab (equivalent to 271)	2
BIOE 403	Comparative Vertebrate Anatomy	4
BIOE 428	Freshwater Ecology	5
BIOH 447	Genes and Development Lab	3
BIOM 327	Vector-Borne Diseases: Public Health Perspectives	3
BIOM 435	Virology	3
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4
WILD 470	Conservation of Wildlife Populations	4
<b>2/3 Writing in the Disciplines Courses</b>		
BCH 486	Biochemistry Research Lab	3
BCH 499	Senior Thesis/Capstone	3-6
BIOB 411	Immunology Laboratory	2
BIOB 499	Undergraduate Thesis	3-6
BIOE 448	Terrestrial Plant Ecology	4
BIOE 485	Plant Evolution	3
BIOM 499	Undergraduate Thesis	3-6
<b>Full Writing in the Disciplines Courses</b>		
BIOH 462	Principles of Medical Physiology	3
BIOM 420	Host-Microbe Interactions	3

## Four Year Plan

Course	Title	Hours
<b>Freshman</b>		
<b>Autumn</b>		
BIOB 160	Principles of Living Systems	4
& BIOB 161N	and Principles of Living Systems Lab	
BIOB 194	Your Future in Biology	1
CHMY 121N	Introduction to General Chemistry	4
M 162	Applied Calculus	4
or M 171	or Calculus I	
WRIT 101	College Writing I	4
<b>Hours</b>		<b>17</b>
<b>Spring</b>		
BIOB 170N	Principles of Biological Diversity	5
& BIOB 171N	and Principles of Biological Diversity Lab	
CHMY 123	Introduction to Organic and Biochemistry	6
& CHMY 124	and Introduction to Organic and Biochemistry Lab	
General Education Requirement		3
<b>Hours</b>		<b>14</b>
<b>Sophomore</b>		
<b>Autumn</b>		
BIOB 260	Cellular and Molecular Biology	4
BIOM 360	General Microbiology	5
& BIOM 361	and General Microbiology Lab	
CHMY 485	Laboratory Safety	1
Intermediate Writing Course		3
General Education Requirement		3
<b>Hours</b>		<b>16</b>
<b>Spring</b>		
BIOB 272	Genetics and Evolution	4
STAT 216	Introduction to Statistics	4
NASX 105H	Introduction to Native American Studies	3
General Education Requirement		3
<b>Hours</b>		<b>14</b>
<b>Junior</b>		
<b>Autumn</b>		
BIOE 370	General Ecology	5
& BIOE 371	and General Ecology Lab (equivalent to 271)	
EDU 346	Addressing the Needs of Diverse Learners	3
EDU 222	Educational Psychology and Child Development	3
EDU 444	Classroom Management in Secondary Schools	3
EDU 395	Clinical Experience (K-12 I)	1
<b>Hours</b>		<b>15</b>
<b>Spring</b>		
EDU 382	Assessment, Curriculum, & Instruction	3
Major Elective (Animal Organismal)		3
Major Elective (Plant Organismal)		3
Environmental GEO/ERTH Elective		3
General Education Requirement		3
<b>Hours</b>		<b>15</b>
<b>Senior</b>		
<b>Autumn</b>		
PHSX 205N	College Physics I	5
& PHSX 206N	and College Physics I Laboratory	
EDU 395	Clinical Experience (K-12 II)	1
EDU 407E	Ethics & Policy Issues	3
EDU 481	Content Area Literacy	3
EDU 497	Teaching and Assessing (5-12 Science)	3
<b>Hours</b>		<b>15</b>
<b>Spring</b>		
EDU 494	Seminar	1

EDU 495	Student Teaching	14
<b>Hours</b>		<b>15</b>
<b>Total Hours</b>		<b>121</b>

*Last Updated Autumn 2025*