

BIOLOGICAL EDUCATION (TEACHER PREPARATION BIOLOGY)

Individuals interested in teaching in K-12 schools must complete a degree in the content area they want to teach plus the teacher preparation program through the Department of Teaching and Learning. Individuals must complete the teaching major/teaching track within that degree program, which may contain different course requirements than the academic major 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 (<http://www.coehs.umt.edu/departments/currinst/undergradprograms/seced/default.php>)
- Licensure Degree Requirements (<http://catalog.umt.edu/past-catalogs/2017-2018/colleges-schools-programs/education-human-sciences/teaching-learning/lic-secondary-licensure>)

Bachelor of Arts - Biology; Biological Education Concentration

College Humanities & Sciences

Degree Specific Credits: 62

Required Cumulative GPA: 2.75

Catalog Year: 2017-2018

Note: This option provides students with coursework in biology and related science 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 and Human Sciences.

General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umt.edu/academics/general-education-requirements>) of the catalog.

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Chemistry	
Physics	

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Education	
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Secondary Teaching Licensure	
Total Hours	65

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

BIOB 160N	Principles of Living Systems	3
BIOB 161N	Prncpls of Living Systems Lab	1
BIOB 170N	Prncpls Biological Diversity	3
BIOB 171N	Prncpls Biological Dvrsty Lab	2
BIOB 260	Cellular and Molecular Biology	4
BIOB 272	Genetics and Evolution	4
Total Hours		17

Minimum Required Grade: C-

Upper Division Core Courses Required by the Biological Education Concentration

Rule: All of the following courses are required.

BIOE 370	General Ecology	3
BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 360	General Microbiology	3
BIOM 361	General Microbiology Lab	2
BIOO 433	Plant Physiology	3
BIOO 434	Plant Physiology Lab	1
Total Hours		14

Minimum Required Grade: C-

Animal-Based Organismal Requirement

Rule: Complete one of the following courses

BIOB 301	Developmental Biology	3
or BIOL 435	Comparative Animal Physiology	
Total Hours		3

Minimum Required Grade: C-

Required Content Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Complete one of the following calculus courses

Note: Choose M 171, if you plan to take additional calculus courses, or if you plan a double major or minor in a field that requires more calculus (e.g. math, physics, biochemistry, computer science).

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Mathematics - Statistics

Rule: The following course is required

STAT 216	Introduction to Statistics	4
Total Hours		4

Minimum Required Grade: C-

Chemistry

Rule: All of the following courses are required

CHMY 123	Introduction to Organic and Biochemistry	5
& CHMY 124	and Introduction to Organic and Biochemistry Lab	

Choose one of the Chemistry sequences: 4-10

CHMY 121N	Introduction to General Chemistry	
CHMY 485	Laboratory Safety	

Or (Required for the broadfield teaching concentration)

CHMY 141N	College Chemistry I	
CHMY 142N	College Chemistry I Lab	
CHMY 143N	College Chemistry II	
& CHMY 144N	and College Chemistry II Lab	

Total Hours 9-15

Minimum Required Grade: C-

Physics

Select one of the following Physics sequences: 10

Algebra- and Trigonometry-based:

PHSX 205N	College Physics I	
& PHSX 206N	and College Physics I Laboratory	
PHSX 207N	College Physics II	
& PHSX 208N	and College Physics II Laboratory	

Calculus-based:

PHSX 215N	Fund of Physics w/Calc I	
& PHSX 216N	and Physics Laboratory I w/Calc (requires M 171)	
PHSX 217N	Fund of Physics w/Calc II	
& PHSX 218N	and Physics Laboratory II w/Calc	
Total Hours		10

Minimum Required Grade: C-

Environmental Geosciences

Rule: Complete one of the following courses

GEO 105N	Oceanography	3
or GEO 103N	Introduction to Environmental Geology	
Total Hours		3

Minimum Required Grade: C-

Education

Rule: The following course is required

Note: The course number EDU 497 covers many different teaching method courses. The section of EDU 497 entitled "Methods: 5 - 12 Science" for 3 credits is required for the Biological Education option.

EDU 497	Teaching and Assessing	4
Total Hours		4

Minimum Required Grade: C-

Advanced College Writing Requirement

Rule: Complete the equivalent of a full writing course (either three 1/3 writing courses or one 2/3 writing course + one 1/3 writing course or one complete writing course)

Note: To meet the Advanced College Writing Requirement, Biology students take 2 or 3 partial writing courses (either three 1/3 writing courses or one 1/3 writing course and one 2/3 writing course) or one complete writing course. The Biological Education concentration requires one 2/3 writing course (BIOE 371) and one 1/3 writing course (BIOO 434). No additional courses are needed to meet this requirement.

Minimum Required Grade: C-

1/3 Advanced Writing Courses

BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 403	Vert Design & Evolution	5
BIOE 409	Behavior & Evolution Discussion	1
BIOE 428	Freshwater Ecology	5
BIOB 484	Plant Evolution	3
BIOM 402	Medical Bacteriology& Mycology	3
BIOO 320	General Botany	5
BIOO 434	Plant Physiology Lab	1
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4

Minimum Required Grade: C-

2/3 Advanced Writing Courses

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 342	Field Ecology	5
BIOE 371	Gen Ecology Lab (equiv to 271)	2
BIOM 411	Exprmntl Microbial Genetcs Lab	1
BIOM 499	Undergraduate Thesis	3-6

Minimum Required Grade: C-

Complete Advanced Writing Course

BIOH 462 Principles Medical Physiology 3

Secondary Teaching Licensure

Note: For endorsement to teach biology, a student also must gain admission to the Teacher Education Program and meet all the requirements for secondary teaching licensure (see the College of Education & Human Sciences (<http://catalog.umt.edu/past-catalogs/2017-2018/colleges-schools-programs/education-human-sciences>))

Exception to the Modern/Classical Languages Requirement

Rule: Choose one of the following Math courses

Note: The Division of Biological Sciences has been granted an exception to the Modern/Classical Language Requirement. Either of these Calculus courses (required by the major) will satisfy this requirement.

M 162	Applied Calculus	4
or M 171	Calculus I	

Total Hours		4
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Minimum Required Grade: C-