BIOLOGY B.A. - TEACHER PREPARATION GENERAL SCIENCE BROADFIELD

This concentration provides students with coursework in Biology, Chemistry, Physics, Earth Sciences and Mathematics needed to be certified by the State of Montana in broadfield science. This allows students to teach secondary sciences - Biology, Chemistry, Physics, and Earth Science in middle and high schools. This concentration is appropriate for students interested in teaching science in smaller, more rural schools. In order to be licensed to teach secondary science, students must be admitted to the Teacher Education Program through the Phyllis J. Washington College of Education and Human Sciences.

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/default.php)
- 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; Teaching General Science Broadfield Concentration

- This major requires a minimum cumulative institutional GPA of 2.75.

Course Requirements

Code	Title	Hours
Lower-Division Courses in the Content Areas - Biology, Chemistry, Earth Sciences, and Physics [1]		
Biology Content Courses [2]		
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
Chemistry Content Courses [3]		
Complete all of the following courses:		
CHMY 123	Introduction to Organic and Biochemistry	4
CHMY 141N & CHMY 142N	College Chemistry I and College Chemistry I Lab	5
CHMY 143N & CHMY 144N	College Chemistry II and College Chemistry II Lab	5
CHMY 485	Laboratory Safety	1
Earth Sciences Content Courses [4]		
Complete all of the following courses:		
ASTR 131N	Planetary Astronomy	3
ASTR 134N	Planetary Astronomy Lab	1
ERTH 101N	Earth Systems Science	3
ERTH 103N	Earth Systems Science Lab	1
Geoscience Elective - Complete 1 course in Geoscience (GEO)		3
Physics Content Courses		
Complete one of the following Physics sequences:		10
Algebra- and Trigonometry-based Physics:		
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory	
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory	
Calculus-based Physics:		
PHSX 215N & PHSX 216N	Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus	
PHSX 217N & PHSX 218N	Fundamentals of Physics with Calculus II and Physics Laboratory II with Calculus	
Upper-Division Content Courses		
Complete all of the following courses:		
BIOE 370	General Ecology	3
BIOE 371	General Ecology Lab (equivalent to 271)	2
Mathematics - Calculus		
Complete one of the following courses:		4
M 162	Applied Calculus	
M 171	Calculus I	
Mathematics - Statistics		
Complete the following course:		
STAT 216	Introduction to Statistics	4
Education Course		
Complete the following course:		

EDU 497	Teaching and Assessing (Methods: 5 - 12 Science)	4
Writing in the Disciplines Requirement		
To meet the Writing in the Disciplines Requirement, Biology students must complete 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.		3-9
Total Hours		**73-79**

1 A minimum of 10 credits is required in each of the four content areas.
2 An AP Biology score of 3 will substitute for either BIOB 160/BIOB 161N or BIOB 170N/BIOB 171N.
3 CHMY 141N/CHMY 142N & CHMY 143N/CHMY 144N should be completed before attempting CHMY 123.
4 ASTR 132N/ASTR 135N are NOT acceptable substitutes for ASTR 131N/ASTR 134N.

Writing in the Disciplines Distributed Model Courses for Biological Sciences

Code	Title	Hours
1/3 Writing in the Disciplines Courses		
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
2/3 Writing in the Disciplines 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 448	Terrestrial Plant Ecology	4
BIOE 485	Plant Evolution	3
BIOM 499	Undergraduate Thesis	3-6
Full Writing in the Disciplines Courses		
BIOH 462	Principles of Medical Physiology	3
BIOM 420	Host-Microbe Interactions	3

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).

Four Year Plan

Course	Title	Hours
Freshman		
Autumn		
BIOB 160 & BIOB 161N	Principles of Living Systems and Principles of Living Systems Lab	4
CHMY 141N & CHMY 142N	College Chemistry I and College Chemistry I Lab	5
M 162 or M 171	Applied Calculus or Calculus I	4
BIOB 194	Your Future in Biology	1
	Hours	**14**
Spring		
BIOB 170N & BIOB 171N	Principles of Biological Diversity and Principles of Biological Diversity Lab	5
CHMY 143N & CHMY 144N	College Chemistry II and College Chemistry II Lab	5
WRIT 101	College Writing I	4
General Education Requirement		3
	Hours	**17**
Sophomore		
Autumn		
BIOB 260	Cellular and Molecular Biology	4
NASX 105H	Introduction to Native American Studies	3
ASTR 131N & ASTR 134N	Planetary Astronomy and Planetary Astronomy Lab	4
Intermediate Writing Course/Literary & Artistic Studies		3
General Education Requirement		3
	Hours	**17**
Spring		
BIOB 272	Genetics and Evolution	4
CHMY 123	Introduction to Organic and Biochemistry	4
ERTH 101N & ERTH 103N	Earth Systems Science and Earth Systems Science Lab	4
STAT 216	Introduction to Statistics	4
	Hours	**16**
Junior		
Autumn		
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory	5
EDU 395	Clinical Experience (K-12 I)	1
EDU 222	Educational Psychology and Child Development	3
EDU 444	Classroom Management in Secondary Schools	3
EDU 346	Addressing the Needs of Diverse Learners	3
	Hours	**15**
Spring		
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory	5
EDU 382	Assessment, Curriculum, & Instruction	3
Major Elective - Writing in the Disciplines		3
GEO Elective		3
General Education Requirement		3
	Hours	**17**
Senior		
Autumn		
BIOE 370 & BIOE 371	General Ecology and General Ecology Lab (equivalent to 271)	5
CHMY 485	Laboratory Safety	1
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 (K-12 Science)	3
	Hours	**16**
Spring		
EDU 494	Seminar	1
EDU 495	Student Teaching	14
	Hours	**15**
	Total Hours	**127**

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