

# BIOLOGY B.S. - HUMAN BIOLOGICAL SCIENCES

## 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 SCIENCE - BIOLOGY; HUMAN BIOLOGICAL SCIENCES CONCENTRATION

The Human Biological Sciences concentration is a pre-professional program for students planning careers in a health-related field. The following is a partial list of possible professions: physical therapy, medicine, dentistry, physician's assistant, alternative medicine, nutrition, and public health.

### Course Requirements

Code	Title	Hours
<b>Biology/Microbiology Lower-Division Core <sup>1</sup></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 Human Biological Sciences Concentration</b>		
Complete all of the following courses:		
BIOB 301	Developmental Biology	3
BIOB 375	General Genetics	3
BIOH 365 & BIOH 366	Human Anatomy and Physiology for Health Professions I and Human Anatomy and Physiology for Health Professions I Laboratory	4

BIOH 370 & BIOH 371	Human Anatomy and Physiology for Health Professions II and Human Anatomy and Physiology for Health Professions II Laboratory	4
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BIOM 360	General Microbiology	3
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### Additional Upper-Division Courses Required for the Human Biological Sciences Concentration

#### Biochemistry Requirement <sup>2</sup>

Complete one of the following sequences: 4-6

One Semester:

BCH 380	Biochemistry
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Full Year:

BCH 480 & BCH 482	Advanced Biochemistry I and Advanced Biochemistry II
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#### Additional Depth in Human Biological Sciences

Complete two of the following courses: 6-8

BCH 486	Biochemistry Research Lab
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BIOB 410	Immunology
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BIOB 425	Advanced Cellular & Molecular Biology
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BIOB 435	Comparative Animal Physiology
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BIOB 468	Endocrinology
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BIOB 483	Phylogenics and Evolution
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BIOB 486	Genomics
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BIOB 499	Undergraduate Thesis
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BIOE 403	Comparative Vertebrate Anatomy
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BIOE 406	Behavior & Evolution
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BIOH 405	Hematology
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BIOH 447	Genes and Development Lab
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BIOH 462	Principles of Medical Physiology
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BIOM 402	Pathogenic Microbes
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BIOM 410	Microbial Genetics
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BIOM 420	Host-Microbe Interactions
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BIOM 427 & BIOM 428	General Parasitology and General Parasitology Lab
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BIOM 435	Virology
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BIOM 450	Microbial Physiology
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#### Mathematics and Psychology

Complete all of the following courses:

M 162 or M 171	Applied Calculus or Calculus I	4
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PSYX 100S	Intro to Psychology	3
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STAT 216	Introduction to Statistics	4
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#### Chemistry <sup>3</sup>

Complete one of the following sequences of general and organic chemistry: 10-20

Introductory Chemistry (10 credits):

CHMY 121N	Introduction to General Chemistry
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CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab
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CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab
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Advanced Chemistry (20 credits):

CHMY 141N	College Chemistry I
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& CHMY 142N	and College Chemistry I Lab
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CHMY 143N & CHMY 144N	College Chemistry II and College Chemistry II Lab	
CHMY 221 & CHMY 222	Organic Chemistry I and Organic Chemistry I Lab	
CHMY 223 & CHMY 224	Organic Chemistry II and Organic Chemistry II Lab	

**Physics**

Complete one of the following Physics sequences: 10

Algebra- and Trigonometry-based Physics:

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 Physics:

PHSX 215N Fundamentals of Physics with Calculus I  
& PHSX 216N and Physics Laboratory I with Calculus

PHSX 217N Fundamentals of Physics with Calculus II  
& PHSX 218N and Physics Laboratory II with Calculus

**Advanced Writing Requirement**

To complete the Advanced 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 Human Biological Sciences concentration does not require a specific advanced writing course. 3

**Total Hours 78-92**

1

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.

2

If introductory chemistry is completed, then BCH 380 must be taken. Either BCH 380 or BCH 480/BCH 482 may be taken if the advanced chemistry sequence is completed.

3

Students who begin in the advanced chemistry sequence may substitute those courses for introductory sequence courses at the discretion of the major advisor. If students plan to apply to a graduate or professional school such as medical or dental, they should plan to complete the advanced chemistry sequence. If they plan to pursue nursing or a graduate program in physical therapy, the introductory chemistry sequence is most likely sufficient. The advanced chemistry option is more flexible, and keeps more options open for future careers. Check the requirements of your intended professional program to help determine which sequence is most appropriate.

## Advanced Writing Distributed Model Courses for Biological Sciences

Code	Title	Hours
<b>1/3 Advanced Writing Courses</b>		
BCH 482	Advanced Biochemistry II	3
BIOB 410	Immunology	3
BIOB 425	Advanced Cellular & Molecular Biology	3
BIOB 483	Phylogenetics and Evolution	3
BIOE 403	Comparative Vertebrate Anatomy	4

BIOE 428	Freshwater Ecology	0,5
BIOM 402	Pathogenic Microbes	3
BIOO 320	General Botany	5
BIOO 434	Plant Physiology Lab	1
BIOO 470	Ornithology	4
BIOO 475	Mammalogy	4

**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	General Ecology Lab (equivalent to 271)	2
BIOM 411	Experimental Microbial Genetics Lab	1
BIOM 499	Undergraduate Thesis	3-6

**Complete Advanced Writing Course**

BIOH 462	Principles of Medical Physiology	3
BIOM 420	Host-Microbe Interactions	3