

# BIOLOGY B.S. - HUMAN BIOLOGICAL SCIENCES

## Bachelor of Science - Biology; Human Biological Sciences Concentration

### College of Humanities & Sciences

Degree Specific Credits: 73-90

Required Cumulative GPA: 2.0

### Catalog Year: 2018-2019

**Note:** 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.

## 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.

## Summary

Code	Title	Hours
	Biology/Microbiology Lower-Division Core	17
	Upper-Division Core Courses Required by Human Biological Sciences Concentration	17
	Additional Upper-Division Courses Required for the Human Biological Sciences Concentration	10-15
	Biochemistry Requirement	
	Microbiology Requirement	
	Additional Depth in Human Biological Sciences	
	Required Courses Outside of the major	29-41
	Mathematics and Psychology	
	Chemistry	
	Physics	
	Advanced College Writing Requirement	
	<b>Total Hours</b>	<b>73-90</b>

## Biology/Microbiology Lower Division Core

**Note:** 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 160N/BIOB 161N or BIOB 170N/BIOB 171N.

Code	Title	Hours
<b>Complete all of the following courses:</b>		
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
<b>Total Hours</b>		<b>17</b>

Minimum Required Grade: C-

## Upper-Division Core Courses Required by Human Biological Sciences Concentration

Code	Title	Hours
<b>Complete all of the following courses:</b>		
BIOB 301	Developmental Biology	3
BIOB 375	General Genetics	3
BIOH 365	Human AP I for Health Profsns	4
BIOH 370	Human AP II for Health Profsns	4
BIOM 360	General Microbiology	3
<b>Total Hours</b>		<b>17</b>

Minimum Required Grade: C-

## Additional Upper-Division Courses Required for the Human Biological Sciences Concentration

### Biochemistry Requirement

Code	Title	Hours
<b>Complete one of the following sequences:</b>		
<b>One Semester:</b>		
BCH 380	Biochemistry	4-6
<b>Full Year:</b>		
BCH 480	Advanced Biochemistry I	
BCH 482	Advanced Biochemistry II	
<b>Total Hours</b>		<b>4-6</b>

Minimum Required Grade: C-

### Additional Depth in Human Biological Sciences

Code	Title	Hours
<b>Complete two of the following courses:</b>		
BCH 486	Biochemistry Research Lab	
BIOB 410	Immunology	
BIOB 425	Adv Cell & Molecular Biology	
BIOB 468	Endocrinology	
BIOB 483	Phylogenics and Evolution	
BIOB 486	Genomics	
BIOB 499	Undergraduate Thesis	
BIOE 403	Vert Design & Evolution	
BIOE 406	Behavior & Evolution	
BIOH 462	Principles Medical Physiology	
BIOL 435	Comparative Animal Physiology	
BIOM 402	Medical Bacteriology& Mycology	
BIOM 410	Microbial Genetics	
BIOM 427	General Parasitology	
& BIOM 428	and General Parasitology Lab	
BIOM 435	Virology	

BIOM 450	Microbial Physiology	
Total Hours		6-9

Minimum Required Grade: C-

## Required Courses Outside of the Major

Minimum Required Grade: C-

### Mathematics and Psychology

Code	Title	Hours
<b>Complete all of the following courses:</b>		
M 162	Applied Calculus	4
or M 171	Calculus I	
PSYX 100S	Intro to Psychology	3
STAT 216	Introduction to Statistics	4
Total Hours		11

Minimum Required Grade: C-

### Chemistry

#### Notes:

- 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.

Code	Title	Hours
<b>Complete a sequence of general and organic chemistry:</b>		8-20
<b>Introductory Chemistry (8 credits):</b>		
CHMY 121N	Introduction to General Chemistry	
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab	
<b>Advanced Chemistry (20 credits):</b>		
CHMY 141N & CHMY 142N	College Chemistry I and College Chemistry I Lab	
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	
Total Hours		8-20

Minimum Required Grade: C-

### Physics

Code	Title	Hours
<b>Complete one of the following Physics sequences:</b>		10
<b>Algebra- and Trigonometry-based Physics:</b>		

PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory	
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory	
<b>Calculus-based Physics:</b>		
PHSX 215N & PHSX 216N	Fund of Physics w/Calc I and Physics Laboratory I w/Calc	
PHSX 217N & PHSX 218N	Fund of Physics w/Calc II and Physics Laboratory II w/Calc (require M 171 and M 172)	
Total Hours		10

Minimum Required Grade: C-

## Advanced College Writing Requirement

**Rule:** To complete 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 Human Biological Sciences concentration does not require a specific advanced writing course.

### 1/3 Advanced Writing Courses

Code	Title	Hours
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
BIOL 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

Code	Title	Hours
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 UD Writing Course

Code	Title	Hours
BIOH 462	Principles Medical Physiology	3

Minimum Required Grade: C-

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