BIOLOGY B.S. - HUMAN BIOLOGICAL SCIENCES

Bachelor of Science - Biology; Human Biological Sciences Concentration

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		10-14
	Biochemistry Requirement	
	Microbiology Requirement	
	Additional Depth in Human Biological Sciences	
Required Courses Outside of the major		28-42
	Mathematics and Psychology	
	Chemistry	
	Physics	
Advanced College Writing Requirement		
Total Hours		**72-90**

Degree Specific Credits: 72-90

Required Cumulative GPA: 2.0

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.

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
Complete all of the following courses:		
BIOB 160N	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
Total Hours		**17**

Minimum Required Grade: C-

Upper-Division Core Courses Required by Human Biological Sciences Concentration

Code	Title	Hours
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
BIOM 360	General Microbiology	3
Total Hours		**17**

Minimum Required Grade: C-

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

Biochemistry Requirement

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

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

Minimum Required Grade: C-

Additional Depth in Human Biological Sciences

Code	Title	Hours
Complete two of the following courses:		**6-8**
BCH 486	Biochemistry Research Lab	
BIOB 410	Immunology	
BIOB 425	Advanced Cellular & Molecular Biology	
BIOB 435	Comparative Animal Physiology	
BIOB 468	Endocrinology	
BIOB 483	Phylogenics and Evolution	
BIOB 486	Genomics	
BIOB 499	Undergraduate Thesis	
BIOE 403	Comparative Vertebrate Anatomy	
BIOE 406	Behavior & Evolution	

BIOH 405	Hematology	
BIOH 447	Genes and Development Lab	
BIOH 462	Principles of Medical Physiology	
BIOM 402	Pathogenic Microbes	
BIOM 410	Microbial Genetics	
BIOM 420	Host-Microbe Interactions	
BIOM 427 & BIOM 428	General Parasitology and General Parasitology Lab	
BIOM 435	Virology	
BIOM 450	Microbial Physiology	
Total Hours		**6-8**

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics and Psychology

Code	Title	Hours
Complete all of the following courses:		
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
Complete a sequence of general and organic chemistry:		**10-20**
Introductory Chemistry (10 credits):		
CHMY 121N	Introduction to General Chemistry	
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab	
Advanced Chemistry (20 credits):		
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		**10-20**

Minimum Required Grade: C-

Physics

Code	Title	Hours
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 (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	Advanced Cellular & Molecular Biology	3
BIOB 483	Phylogenics and Evolution	3
BIOE 403	Comparative Vertebrate Anatomy	4
BIOE 409	Behavior & Evolution Discussion	1
BIOE 428	Freshwater Ecology	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

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	General Ecology Lab (equivalent to 271)	2

BIOM 411	Experimental Microbial Genetics Lab	1
BIOM 499	Undergraduate Thesis	3-6

Minimum Required Grade: C-

Complete UD Writing Course

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

Minimum Required Grade: C-