HUMAN BIOLOGY AND BIOMEDICAL SCIENCES B.S.

The B.S. in Human Biology and Biomedical Sciences is for students interested in health, biomedical, and biotechnology. Students are provided a solid background in the biological, biomedical, and related physical sciences and are prepared for careers in biomedical research as well as professional health programs (medical, M.D./Ph.D., dental, physician's assistant, physical therapy, etc.).

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 - Human Biology and Biomedical Sciences

Course Requirements

Code	Title	Hours
Biology/Microbiology Lower-Division Core [1]		
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
Human and Biomedical 300-level Depth Courses		
Complete three of the following courses:		9-13
BIOB 301	Developmental Biology	
BIOB 375	General Genetics	
BIOH 365 & BIOH 366	Human Anatomy and Physiology for Health Professions I and Human Anatomy and Physiology for Health Professions I Laboratory	
BIOH 370 & BIOH 371	Human Anatomy and Physiology for Health Professions II and Human Anatomy and Physiology for Health Professions II Laboratory	
BIOM 360 & BIOM 361	General Microbiology and General Microbiology Lab	
NEUR 380	Molecular Neuroscience	
Biochemistry Requirement		
Complete one of the following sequences:		4-6
One Semester:		
BCH 380	Biochemistry	
Full Year:		
BCH 480 & BCH 482	Advanced Biochemistry I and Advanced Biochemistry II	
Human and Biomedical 400-level Depth Courses		
If BCH 480/482 were taken, complete three of the following courses. If BCH 380 was taken, complete four of the following courses:		9-13
BCH 486	Biochemistry Research Lab	
BCH 490	Undergraduate Research	
BIOB 410	Immunology	
BIOB 425	Advanced Cellular & Molecular Biology	
BIOB 468	Endocrinology	
BIOB 486	Genomics	
BIOB 490	Advanced Undergraduate Research	
BIOB 499	Undergraduate Thesis	
BIOH 405	Hematology	
BIOH 447	Genes and Development Lab	
BIOH 462	Principles of Medical Physiology	
BIOM 402	Pathogenic Microbes	
BIOM 420	Host-Microbe Interactions	
BIOM 427 & BIOM 428	General Parasitology and General Parasitology Lab	
BIOM 435	Virology	
BIOM 490	Advanced Undergraduate Research	
Careers Course		
Complete one of the following courses:		1-2
BIOB 194	Your Future in Biology	
HMED 140	PreMedical Sciences 101 Honors: The Science of Health Professions Success	
Related Mathematical and Social Sciences		
Complete three of the following courses:		9-11
CSCI 150	Introduction to Computer Science	
M 162	Applied Calculus	
or M 171	Calculus I	
PSYX 100S	Intro to Psychology	
SOCI 101S	Introduction to Sociology	
STAT 216	Introduction to Statistics	
Chemistry [2]		
Complete one of the following sequences 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	
Physics		
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	
Writing in the Disciplines Requirement		
To complete the Writing in the Disciplines 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.		
Total Hours		**69-92**

[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] 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.

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

Plan for Pre-Health Track

**This is an example of a four-year plan for a B.S. Degree in Human Biology & Biomedical Sciences. This pre-health track is for students interested in health-related careers that do not require advanced chemistry: for example, Public Health, Occupational Therapy, some Physician Assistant and most Physical Therapy.*

Course	Title	Hours
Freshman		
Autumn		
BIOB 160 & BIOB 161N	Principles of Living Systems and Principles of Living Systems Lab	4
CHMY 121N	Introduction to General Chemistry [1]	4
M 162 or M 171	Applied Calculus [1] or Calculus I	4
WRIT 101	College Writing I	4
	Hours	**16**
Spring		
BIOB 170N & BIOB 171N	Principles of Biological Diversity and Principles of Biological Diversity Lab	5
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab [1]	6
PSYX 100S	Intro to Psychology [1]	3
HMED 140	Introduction to Health Professions [1]	2
	Hours	**16**
Sophomore		
Autumn		
BIOB 260	Cellular and Molecular Biology	4
BIOH 365 & BIOH 366	Human Anatomy and Physiology for Health Professions I and Human Anatomy and Physiology for Health Professions I Laboratory [1]	4
STAT 216	Introduction to Statistics [1]	4
Intermediate Writing Course		3
	Hours	**15**
Spring		
BIOB 272	Genetics and Evolution	4
BIOH 370 & BIOH 371	Human Anatomy and Physiology for Health Professions II and Human Anatomy and Physiology for Health Professions II Laboratory [1]	4
General Education Requirement		3
General Education Requirement		3
	Hours	**14**

Junior		
Autumn		
BIOM 360 & BIOM 361	General Microbiology and General Microbiology Lab [1]	5
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory [1]	5
General Education Requirement		3
Elective		1
	Hours	**14**
Spring		
BCH 380	Biochemistry [1]	4
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory [1]	5
General Education Requirement		3
Upper Division Elective		3
Elective		1
	Hours	**16**
Senior		
Autumn		
BIOB 410 & BIOM 428	Immunology and General Parasitology Lab [1]	4
BIOM 427 & BIOM 428	General Parasitology and General Parasitology Lab	5
Upper Division Elective		3
Elective		5
	Hours	**17**
Spring		
BIOM 435	Virology [1]	3
BIOM 402	Pathogenic Microbes [1]	3
Upper Division Elective		3
Elective		6
	Hours	**15**
	Total Hours	**123**

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Plan for Pre-Medical Track

This is an example of a four-year plan for a B.S. Degree in Human Biology & Biomedical Sciences. This pre-medical track covers all courses that are required or recommended for **Medical school and MCAT preparation. With this plan, MCAT can be taken after junior year. This is also for **Dental, Optometry, Chiropractic, some Physician Associates**.*

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 [1]	5
M 171 & M 162	Calculus I and Applied Calculus [1]	4
HMED 140	Introduction to Health Professions [1]	2
	Hours	**15**
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 [1]	5
WRIT 101	College Writing I	4
General Education Requirement		3
	Hours	**17**
Sophomore		
Autumn		
BIOB 260	Cellular and Molecular Biology	4
CHMY 221 & CHMY 222	Organic Chemistry I and Organic Chemistry I Lab [1]	5
PSYX 100S	Intro to Psychology [1]	3
Intermediate Writing Course		3
	Hours	**15**
Spring		
BIOB 272	Genetics and Evolution	4
CHMY 223 & CHMY 224	Organic Chemistry II and Organic Chemistry II Lab [1]	5
SOCI 101S	Introduction to Sociology [1]	3
STAT 216	Introduction to Statistics [1]	4
	Hours	**16**
Junior		
Autumn		
BIOH 365 & BIOH 366	Human Anatomy and Physiology for Health Professions I and Human Anatomy and Physiology for Health Professions I Laboratory [1]	4
BCH 480	Advanced Biochemistry I [1]	3
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory [1]	5
General Education Requirement		3
	Hours	**15**
Spring		
BIOH 370 & BIOH 371	Human Anatomy and Physiology for Health Professions II and Human Anatomy and Physiology for Health Professions II Laboratory [1]	4
BCH 482	Advanced Biochemistry II [1]	3
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory [1]	5
General Education Requirement		3
	Hours	**15**
Senior		
Autumn		
BIOB 410	Immunology [1]	3
BIOM 360 & BIOM 361	General Microbiology and General Microbiology Lab [1]	5
General Education Requirement		3
Upper Division Elective		3
	Hours	**14**
Spring		
BCH 486	Biochemistry Research Lab [1]	3
BIOM 435	Virology [1]	3
Upper Division Elective		8
	Hours	**14**
	Total Hours	**121**

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Plan for Research Track

**This is an example of a four-year plan for a B.S. Degree in Human Biology & Biomedical Sciences. This research track is for any student interested in a graduate-prep program to prepare for a career in cellular, molecular, biochemical, or biomedical research.*

Course	Title	Hours
Freshman		
Autumn		
BIOB 160 & BIOB 161N	Principles of Living Systems and Principles of Living Systems Lab	4

CHMY 141N & CHMY 143N	College Chemistry I and College Chemistry II [1]	5
M 171 or M 162	Calculus I [1] or Applied Calculus	4
BIOB 194	Your Future in Biology [1]	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 [1]	5
WRIT 101	College Writing I	4
General Education Requirement		3
	Hours	**17**
Sophomore		
Autumn		
BIOB 260	Cellular and Molecular Biology	4
CHMY 221 & CHMY 222	Organic Chemistry I and Organic Chemistry I Lab [1]	5
CSCI 150	Introduction to Computer Science [1]	3
Intermediate Writing Course		3
	Hours	**15**
Spring		
BIOB 272	Genetics and Evolution	4
CHMY 223 & CHMY 224	Organic Chemistry II and Organic Chemistry II Lab [1]	5
STAT 216	Introduction to Statistics [1]	4
General Education Requirement		3
	Hours	**16**
Junior		
Autumn		
BIOB 301	Developmental Biology [1]	3
BIOM 360 & BIOM 361	General Microbiology and General Microbiology Lab [1]	5
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory [1]	5
General Education Requirement		3
	Hours	**16**
Spring		
BIOB 375	General Genetics [1]	3
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory [1]	5
General Education Requirement		3
Upper Division Elective		3
	Hours	**14**
Senior		
Autumn		
BCH 480	Advanced Biochemistry I [1]	3
BIOB 490	Advanced Undergraduate Research [1]	3
General Education Requirement		3
Upper Division Elective		6
	Hours	**15**
Spring		
BCH 482	Advanced Biochemistry II [1]	3
BCH 486	Biochemistry Research Lab [1]	3
BIOH 447	Genes and Development Lab [1]	3
Upper Division Elective		4
Elective		1
	Hours	**14**
	Total Hours	**121**

[1] Indicates you have a choice of alternative courses for degree completion. See catalog, Degree Works, or your advisor for other options.