

BIOLOGY - CELLULAR AND MOLECULAR BIOLOGY

Bachelor of Science - Biology; Cellular & Molecular Biology Concentration

College Humanities & Sciences

Degree Specific Credits: 81

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: Cellular and molecular biology is the study of cellular, molecular, and physiological aspects of biology. This concentration is a graduate prep program, and is for students interested in academia or research jobs in private or government laboratories. It is also an excellent concentration for pre-medical sciences students.

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

Biology/Microbiology Lower Division Core	17
Upper Division Core Courses Required by Cellular & Molecular Biology concentration	20
Additional UD Major Courses Required for the Cellular & Molecular Biology concentration	7-12
Disease Elective	
Additional UD Depth Courses (Lecture)	
Additional UD Depth Courses (Laboratory)	
Required Courses Outside of the Major	37-38
Mathematics - Calculus	
Chemistry	
Additional Depth in Chemistry	
Physics	
Upper Division Writing Expectation for the Major	7-12
Total Hours	88-99

Biology/Microbiology Lower Division Core

Rule: All of the following courses are required.

Note: The lower division core should be completed before attempting most upper division major courses.

AP Biology credit may be substituted for either BIOB 160N/BIOB 161N or BIOB 170N/BIOB 171N.

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
Total Hours		17

Minimum Required Grade: C-

Upper Division Core Courses Required by Cellular & Molecular Biology Concentration

Rule: All of the following courses are required.

BCH 480	Advanced Biochemistry I	3
BCH 482	Advanced Biochemistry II	3
BIOB 301	Developmental Biology	3
BIOB 375	General Genetics	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOM 360	General Microbiology	3
BIOM 361	General Microbiology Lab	2
Total Hours		20

Minimum Required Grade: C-

Additional UD Major Courses Required for the Cellular & Molecular Biology Concentration

Rule: Complete one or two courses in each subcategory (as indicated)

Minimum Required Grade: C-

Disease Elective

Select at least one of the following:	3
BIOB 410	Immunology
BIOM 435	Virology
Total Hours	3

Minimum Required Grade: C-

Additional UD Depth Courses (Lecture)

Select at least one of the following:	2-4
BIOB 440	Biological Electron Microscopy
BIOB 468	Endocrinology
BIOB 483	Phylogenics and Evolution
BIOB 486	Genomics
BIOL 435	Comparative Animal Physiology
BIOM 410	Microbial Genetics
BIOM 450	Microbial Physiology
BIOO 433	Plant Physiology
& BIOO 434	and Plant Physiology Lab
Total Hours	2-4

Minimum Required Grade: C-

Additional UD Depth Courses (Laboratory)

Select at least two of the following:	2-5
BCH 486	Biochemistry Research Lab
BIOB 411	Immunology Laboratory
BIOM 411	Exprmntl Microbial Genetics Lab
BIOM 451	Microbial Physiology Lab

BIOM 490	Adv Undergrad Research	
Total Hours		2-5

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Required

M 162	Applied Calculus	4
or M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Chemistry

Rule: All of the following courses are required.

CHMY 141N	College Chemistry I	4
CHMY 142N	College Chemistry I Lab	1
CHMY 143N	College Chemistry II	4
CHMY 144N	College Chemistry II Lab	1
CHMY 221	Organic Chemistry I	3
CHMY 222	Organic Chemistry I Lab	2
CHMY 223	Organic Chemistry II	3
CHMY 224	Organic Chemistry II Lab	2
Total Hours		20

Minimum Required Grade: C-

Additional Depth in Chemistry

Select at least one of the following: 3-4

CHMY 311	Analytical Chem-Quant Analysis	
CHMY 360	Applied Physical Chemistry	
CHMY 373	Phys Chem-Kntcs & Thrmodynms	
Total Hours		3-4

Minimum Required Grade: C-

Physics

Rule: All of the following courses are required.

Select one of the following physics sequences: 10

Algebra- and Trigonometry-based:		
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:

PHSX 215N	Fund of Physics w/Calc I	
& PHSX 216N	and Physics Laboratory I w/Calc	
PHSX 217N	Fund of Physics w/Calc II	
& PHSX 218N	and Physics Laboratory II w/Calc (require M 171 and M 172)	
Total Hours		10

Minimum Required Grade: C-

Advanced College Writing Requirement

Rule: Complete the equivalent of a full writing course (either three 1/3 writing courses or one 2/3 writing course + one 1/3 writing course or one complete writing course)

Note: To meet 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 Cellular & Molecular Biology concentration requires two 1/3 writing courses: BCH 482 and BIOB 425. The Advanced College Writing Requirement is completed with one additional course, chosen from any of the following.

Minimum Required Grade: C-

1/3 Advanced Writing Courses

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

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 Advanced Writing Course

BIOH 462	Principles Medical Physiology	3
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Minimum Required Grade: C-

Exception to the Modern/Classical Languages Requirement

Rule: Choose one of the following Math courses

Note: The Division of Biological Sciences has been granted an exception to the Modern/Classical Language Requirement. Either of these Calculus courses (required by the major) will satisfy this requirement.

M 162	Applied Calculus	4
or M 171	Calculus I	
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Total Hours		4

Minimum Required Grade: C-