

BIOLOGY - GENETICS AND EVOLUTION

Bachelor of Science - Biology; Genetics and Evolution Concentration

College Humanities & Sciences

Degree Specific Credits: 70

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: The Genetics and Evolution Concentration is for students interested in genetics and evolutionary biology, including molecular genetics, population genetics, ecological genetics, and genomics. 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 students interested in a professional health program such as medical school or a genetic counseling graduate program.

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.

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Mathematics - Statistics	
Chemistry	
Physics	
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Total Hours	73-100

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	Princpls Biological Diversity	3
BIOB 171N	Princpls 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 the Genetics & Evolution Concentration

Rule: All of the following courses are required.

BIOB 375	General Genetics	3
BIOB 486	Genomics	3
BIOE 370	General Ecology	3
BIOE 371	Gen Ecology Lab (equiv to 271)	2
Total Hours		11

Minimum Required Grade: C-

Additional UD Major Courses Required for the Genetics & Evolution Concentration

Minimum Required Grade: C-

Biochemistry

Note: 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.

Select one of the following:	4-6
BCH 380	Biochemistry
BCH 480 & BCH 482	Advanced Biochemistry I and Advanced Biochemistry II
Total Hours	4-6

Minimum Required Grade: C-

Genetics/Evolution Depth Courses

Select at least three of the following:	9-12
BIOB 480	Conservation Genetics
BIOB 483	Phylogenics and Evolution
BIOB 488	Programming for Biology
BIOE 403	Vert Design & Evolution
BIOE 406	Behavior & Evolution
BIOL 484	Plant Evolution
BIOM 410	Microbial Genetics
BIOM 415	Microbial Dvrsty Eclgy & Evltn
CSCI 451	Computational Biology
Total Hours	9-12

Minimum Required Grade: C-

Physiology Requirement

Select at least one of the following (labs must be taken if available):

BIOB 425	Adv Cell & Molecular Biology	3-4
BIOL 435	Comparative Animal Physiology	

BIOM 450 & BIOM 451	Microbial Physiology and Microbial Physiology Lab	
BIOO 433 & BIOO 434	Plant Physiology and Plant Physiology Lab	
Total Hours		3-4

Minimum Required Grade: C-

Required Courses Outside of the Major

Minimum Required Grade: C-

Mathematics - Calculus

Rule: Complete one of the following calculus courses

Note: Choose M 171 if you plan to take additional calculus courses, or if you plan a double major or minor in a field that requires more calculus (e.g. math, physics, biochemistry, computer science).

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

Minimum Required Grade: C-

Mathematics - Statistics

Select either one semester or a full year of statistics from the following: 4-8

One Semester:		
STAT 216	Introduction to Statistics	
Full Year:		
STAT 451 & STAT 452	Statistical Methods I and Statistical Methods II	
STAT 457 & STAT 458	Computer Data Analysis I and Computer Data Analysis II	
Total Hours		4-8

Minimum Required Grade: C-

Chemistry

Select either one or two years of chemistry from the following: 8-20

One Year:		
CHMY 121N	Introduction to General Chemistry	
CHMY 123 & CHMY 124	Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab	
Two Years:		
CHMY 141N	College Chemistry I	
CHMY 142N	College Chemistry I Lab	
CHMY 143N	College Chemistry II	
CHMY 144N	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

Rule: All of the following courses are required

Select one of the following physics sequences: 10

Algebra- and Trigonometry-based:		
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:		
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	
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 Genetics & Evolution concentration requires one 2/3 writing course: BIOE 371. 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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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	

Total Hours		4
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Minimum Required Grade: C-