

BIOLOGY B.S. - GENETICS AND EVOLUTION

Bachelor of Science - Biology; Genetics and Evolution 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 the Genetics & Evolution Concentration	11
	Additional Upper-Division Courses Required for the Genetics & Evolution Concentration	16-20
	Biochemistry	
	Genetics/Evolution Depth Courses	
	Physiology Requirement	
	Required Courses Outside of the Major	28-42
	Mathematics - Calculus	
	Mathematics - Statistics	
	Chemistry	
	Physics	
	Advanced College Writing Requirement	
Total Hours		72-90

Degree Specific Credits: 72-90

Required Cumulative GPA: 2.0

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.

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 the Genetics & Evolution Concentration

Code	Title	Hours
Complete all of the following courses:		
BIOB 375	General Genetics	3
BIOB 486	Genomics	3
BIOE 370	General Ecology	3
BIOE 371	General Ecology Lab (equivalent to 271)	2
Total Hours		11

Minimum Required Grade: C-

Additional Upper-Division Courses Required for the Genetics & Evolution Concentration

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.

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

Minimum Required Grade: C-

Genetics/Evolution Depth Courses

Code	Title	Hours
Complete three of the following courses:		
BIOB 480	Conservation Genetics	3
BIOB 483	Phylogenetics and Evolution	3
BIOE 403	Comparative Vertebrate Anatomy	3
BIOE 406	Behavior & Evolution	3
BIOE 485	Plant Evolution	3
BIOH 447	Genes and Development Lab	3
BIOM 410	Microbial Genetics	3
BIOM 415	Microbial Diversity Ecology & Evolution	3
BIOM 420	Host-Microbe Interactions	3
CSCI 451	Computational Biology	3
Total Hours		9-10

Minimum Required Grade: C-

Physiology Requirement

Code	Title	Hours
Complete one of the following courses (labs must be taken if available):		3-4
BIOB 425	Advanced Cellular & Molecular Biology	
BIOB 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*Mathematics - Calculus*

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

Code	Title	Hours
Complete one of the following courses:		4
M 162	Applied Calculus	
M 171	Calculus I	
Total Hours		4

Minimum Required Grade: C-

Mathematics - Statistics

Code	Title	Hours
Complete 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**Notes:**

- Students who begin in the advanced chemistry sequence may substitute those courses for introductory sequence courses at the discretion of the major advisor.
- Students should choose the advanced sequence for graduate preparation.

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 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.

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	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	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 Advanced Writing Course

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

Minimum Required Grade: C-
