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.

Summary

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Mathematics - Statistics
Chemistry
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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

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): 3-4
BIOB 425 Adv Cell & Molecular Biology
BIOL 435 Comparative Animal Physiology
### 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 Applied Calculus 4
- or M 171 Calculus I

**Total Hours** 4

Minimum Required Grade: C-

#### Mathematics - Statistics

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

**One Semester:**
- STAT 216 Introduction to Statistics

**Full Year:**
- STAT 451 Statistical Methods I
  & STAT 452 and Statistical Methods II
- STAT 457 Computer Data Analysis I
  & STAT 458 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:

**One Year:**
- CHMY 121N Introduction to General Chemistry
- CHMY 123 Introduction to Organic and Biochemistry
  & CHMY 124 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 Organic Chemistry I
  & CHMY 222 and Organic Chemistry I Lab
- CHMY 223 Organic Chemistry II
  & CHMY 224 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 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

**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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>BCH 482</td>
<td>Advanced Biochemistry II</td>
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<tr>
<td>BIOB 410</td>
<td>Immunology</td>
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<tr>
<td>BIOB 425</td>
<td>Adv Cell &amp; Molecular Biology</td>
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<tr>
<td>BIOB 483</td>
<td>Phylogenics and Evolution</td>
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<tr>
<td>BIOE 403</td>
<td>Vert Design &amp; Evolution</td>
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<tr>
<td>BIOE 409</td>
<td>Behavior &amp; Evolution Discussion</td>
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<td>BIOE 428</td>
<td>Freshwater Ecology</td>
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<tr>
<td>BIOL 484</td>
<td>Plant Evolution</td>
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<tr>
<td>BIOM 402</td>
<td>Medical Bacteriology &amp; Mycology</td>
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<tr>
<td>BIOO 320</td>
<td>General Botany</td>
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<tr>
<td>BIOO 434</td>
<td>Plant Physiology Lab</td>
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<tr>
<td>BIOO 470</td>
<td>Ornithology</td>
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<tr>
<td>BIOO 475</td>
<td>Mammalogy</td>
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</tbody>
</table>

Minimum Required Grade: C-

#### 2/3 Advanced Writing Courses

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<tr>
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<tbody>
<tr>
<td>BCH 486</td>
<td>Biochemistry Research Lab</td>
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<tr>
<td>BCH 499</td>
<td>Senior Thesis/Capstone</td>
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<tr>
<td>BIOB 411</td>
<td>Immunology Laboratory</td>
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<tr>
<td>BIOB 499</td>
<td>Undergraduate Thesis</td>
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<td>BIOE 342</td>
<td>Field Ecology</td>
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<td>BIOE 371</td>
<td>Gen Ecology Lab (equiv to 271)</td>
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Minimum Required Grade: C-
Complete Advanced Writing Course

BIOH 462 Principles Medical Physiology 3

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

Minimum Required Grade: C-