BIOLOGY - ECOLOGY AND ORGANISMAL BIOLOGY

Bachelor of Science - Biology; Ecology and Organismal Biology Concentration

College Humanities & Sciences

Degree Specific Credits: 69

Required Cumulative GPA: 2.0

Catalog Year: 2018-2019

Note: The Ecology and Organismal Biology concentration is for students interested in the biology of organisms (plants or animals) or the biology of populations or communities. Course offerings include those from organismal biology, ecology, evolutionary biology, and conservation biology. This concentration is a graduate prep program, and it is designed for students interested in academia or employment with government agencies (e.g., National Biological Survey, U.S. FWS, etc.), or environmental consulting agencies. This concentration is also an excellent choice for pre-veterinary 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

Code | Title | Hours
---|---|---
Biology/Microbiology Lower Division Core | 17
Upper Division Core Courses Required by Ecology & Organismal Biology Concentration | 5
Additional Upper Division Major Courses Required for the Ecology & Organismal Biology Concentration | 21
Organismal Course Requirement | -Ology Course Requirement | 3-5
Specialized Ecology Course Requirement | Evolution Course Requirement | 3-5
Required Courses Outside of the Major | Mathematics - Calculus | 26-42
Mathematics - Statistics | Physics | 69-85

Biology/Microbiology Lower Division Core

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
---|---|---
BIOB 160N | Principles of Living Systems Lab | 1
BIOB 170N | Principles of Living Systems | 3
BIOB 161N | Principles of Biological Diversity | 2
BIOB 171N | Principles of Biological Diversity Lab | 4
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 Ecology & Organismal Biology Concentration

Code | Title | Hours
---|---|---
Select one of the following: | 5
BIOE 370 | General Ecology | 5
& BIOE 371 | and Gen Ecology Lab (equiv to 271) | 5
BIOE 342 | Field Ecology (taken at the Flathead Lake Biological Station) | 5

Total Hours: 5

Minimum Required Grade: C:

Additional Upper Division Major Courses Required for the Ecology & Organismal Biology Concentration

Complete a minimum of 21 credits of UD BIOB, BIOE, BIOH, BIOL, BIOM, BIOO, or BCH, with at least one course from each subcategory. Other recommended courses include BCH 380 or BCH 480-BCH 482.

21 Total Credits Required

Organismal Course Requirement

Complete at least one organismal course (lab must also be taken, if available) from the following list

Code | Title | Hours
---|---|---
BIOB 301 | Developmental Biology | 3-5
BIOB 375 | General Genetics | 3-5
BIOB 468 | Endocrinology | 3-5
BIOE 403 | Vert Design & Evolution | 3-5
BIOL 435 | Comparative Animal Physiology | 3-5
BIOO 335 | Plant Physiology | 3-5
BIOO 433 | Plant Physiology Lab | 3-5

Total Hours: 3-5

Minimum Required Grade: C:

-Ology Course Requirement

Complete at least one course with a focus on a group of organisms (lab must also be taken, if available) from the following list

Code | Title | Hours
---|---|---
Biom 360 | General Microbiology | 3-5
& BIOM 361 | and General Microbiology Lab (equiv to 260) | 3-5
Biom 427 | General Parasitology | 3-5
& BIOM 428 | and General Parasitology Lab | 3-5
BIOO 320 | General Botany | 3-5
BIOO 335 | Rocky Mountain Flora | 3-5
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIEO 340</td>
<td>Biology and Mgmt of Fishes</td>
<td></td>
</tr>
<tr>
<td>BIEO 462</td>
<td>Entomology</td>
<td></td>
</tr>
<tr>
<td>BIEO 470</td>
<td>Ornithology</td>
<td></td>
</tr>
<tr>
<td>BIEO 475</td>
<td>Mammalogy</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: **3-5**

Minimum Required Grade: C-

### Specialized Ecology Course Requirement

Select at least one of the following:

- BIEO 428 Freshwater Ecology
- BIEO 448 Terrestrial Plant Ecology
- BIEO 449 Plant Biogeography
- BIEO 415 Microbial Dvrsity Eclgy & Evltn
- WILD 346 Wildlife Physiological Ecology
- WILD 470 Conserv of Wildlife Populatns

Flathead Lake Biological Station courses:

- BIEO 416 Alpine Ecology
- BIEO 439 Stream Ecology
- BIEO 440 Conservation Ecology
- BIEO 451 Landscape Ecology
- BIEO 453 Ecology of Small & Large Lakes
- BIEO 458 Forest and Grassland Ecol

Total Hours: **3-5**

Minimum Required Grade: C-

### Evolution Course Requirement

Select at least one of the following:

- BIEO 480 Conservation Genetics
- BIEO 483 Phylogenics and Evolution
- BIEO 486 Genomics
- BIEO 406 Behavior & Evolution
- BIOL 484 Plant Evolution

Total Hours: **3**

Minimum Required Grade: C-

### Required Courses Outside of the Major

#### Mathematics - Calculus

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).

Complete one of the following calculus courses

- M 162 Applied Calculus
- or M 171 Calculus I

Total Hours: **4**

Minimum Required Grade: C-

#### Mathematics - Statistics

Choose the full year of statistics for graduate preparation in ecology.

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

**One Semester:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 216</td>
<td>Introduction to Statistics</td>
<td></td>
</tr>
</tbody>
</table>

**Full Year:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>STAT 451 &amp; STAT 452</td>
<td>Statistical Methods I and Statistical Methods II</td>
<td></td>
</tr>
<tr>
<td>STAT 457 &amp; STAT 458</td>
<td>Computer Data Analysis I and Computer Data Analysis II</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: **4-8**

Minimum Required Grade: C-

#### Chemistry

Choose the advanced sequence for graduate preparation in organismal biology, or if you are pre-veterinary.

Complete a sequence of general and organic chemistry

- Introductory:
  - CHMY 121N Introduction to General Chemistry
  - CHMY 123 & CHMY 124 Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab

- Advanced:
  - 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

Complete a two-semester sequence of physics.

- 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 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-
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 Ecology & Organismal Biology concentration requires one 2/3 writing course (BIOE 371). The Advanced College Writing Requirement is completed with one more course, chosen from any of the following.

### 1/3 Advanced Writing Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>BCH 482</td>
<td>Advanced Biochemistry II</td>
<td>3</td>
</tr>
<tr>
<td>BIOB 410</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>BIOB 425</td>
<td>Adv Cell &amp; Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOB 483</td>
<td>Phylogenics and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOE 403</td>
<td>Vert Design &amp; Evolution</td>
<td>5</td>
</tr>
<tr>
<td>BIOE 409</td>
<td>Behavior &amp; Evolution Discussion</td>
<td>1</td>
</tr>
<tr>
<td>BIOE 428</td>
<td>Freshwater Ecology</td>
<td>5</td>
</tr>
<tr>
<td>BIOL 484</td>
<td>Plant Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOM 402</td>
<td>Medical Bacteriology &amp; Mycology</td>
<td>3</td>
</tr>
<tr>
<td>BIOO 320</td>
<td>General Botany</td>
<td>5</td>
</tr>
<tr>
<td>BIOO 434</td>
<td>Plant Physiology Lab</td>
<td>1</td>
</tr>
<tr>
<td>BIOO 470</td>
<td>Ornithology</td>
<td>4</td>
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<td>BIOO 475</td>
<td>Mammalogy</td>
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Minimum Required Grade: C-

### 2/3 Advanced Writing Courses

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<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BCH 486</td>
<td>Biochemistry Research Lab</td>
<td>3</td>
</tr>
<tr>
<td>BCH 499</td>
<td>Senior Thesis/Capstone</td>
<td>3-6</td>
</tr>
<tr>
<td>BIOB 411</td>
<td>Immunology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>BIOB 499</td>
<td>Undergraduate Thesis</td>
<td>3-6</td>
</tr>
<tr>
<td>BIOE 342</td>
<td>Field Ecology</td>
<td>5</td>
</tr>
<tr>
<td>BIOE 371</td>
<td>Gen Ecology Lab (equiv to 271)</td>
<td>2</td>
</tr>
<tr>
<td>BIOM 411</td>
<td>Exprmntl Microbial Genetcs Lab</td>
<td>1</td>
</tr>
<tr>
<td>BIOM 499</td>
<td>Undergraduate Thesis</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Minimum Required Grade: C-

### Complete Advanced Writing Course

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<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOH 462</td>
<td>Principles Medical Physiology</td>
<td>3</td>
</tr>
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