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: 2017-2018

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

| 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 | 3-5 |
| - Ology Course Requirement | |
| Specialized Ecology Course Requirement | |
| Evolution Course Requirement | |
| Required Courses Outside of the Major | 26-42 |
| Mathematics - Calculus | |
| Mathematics - Statistics | |
| Chemistry | |
| Physics | |
| Upper Division Writing Expectation for the Major | 3-8 |
| Total Hours | 72-93 |

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

Upper Division Core Courses Required by Ecology & Organismal Biology Concentration

Select one of the following: 5

| BIOE 370 & BIOE 371 | General Ecology and Gen Ecology Lab (equiv to 271) |
| BIOE 342 | Field Ecology (taken at the Flathead Lake Biological Station) |

Total Hours 5

Minimum Required Grade: C-

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

Rule: Complete a minimum of 21 credits of UD BIOB, BIOE, BIOH, BIOL, BIOM, BIOO, or BCH, with at least one course from each subcategory

Note: Other recommended courses include BCH 380 or BCH 480-BCH 482.

Minimum Required Grade: C-

21 Total Credits Required

Organismal Course Requirement

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

Select at least one of the following: 3-5

| BIOB 301 | Developmental Biology |
| BIOB 375 | General Genetics |
| BIOB 468 | Endocrinology |
| BIOE 403 | Vert Design & Evolution |
| BIOL 435 | Comparative Animal Physiology |
| BIOO 433 & BIOO 434 | Plant Physiology and Plant Physiology Lab |

Total Hours 3-5

Minimum Required Grade: C-

-Ology Course Requirement

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

Select at least one of the following: 3-5

| BIOM 360 & BIOM 361 | General Microbiology and General Microbiology Lab (equiv to 260) |
| BIOM 427 & BIOM 428 | General Parasitology and General Parasitology Lab |
BIOO 320  General Botany
BIOO 335  Rocky Mountain Flora
BIOO 340  Biology and Mgmnt of Fishes
BIOO 462  Entomology
BIOO 470  Ornithology
BIOO 475  Mammalogy

Total Hours 3-5
Minimum Required Grade: C-

**Specialized Ecology Course Requirement**
Select at least one of the following: 3-5
- BIOE 428  Freshwater Ecology
- BIOE 448  Terrestrial Plant Ecology
- BIOM 415  Microbial Dvrsty Eclgy & Evltn
- WILD 346  Wildlife Physiological Ecology
- WILD 470  Consrv of Wildlife Populatns

Flathead Lake Biological Station courses:
- BIOE 416  Alpine Ecology
- BIOE 439  Stream Ecology
- BIOE 440  Conservation Ecology
- BIOE 451  Landscape Ecology
- BIOE 453  Ecology of Small & Large Lakes
- BIOE 458  Forest and Grassland Ecol

Total Hours 3-5
Minimum Required Grade: C-

**Evolution Course Requirement**
Select at least one of the following: 3
- BIOC 480  Conservation Genetics
- BIOC 483  Phylogenics and Evolution
- BIOC 486  Genomics
- BIOE 406  Behavior & Evolution
- BIOL 484  Plant Evolution

Total Hours 3
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  Applied Calculus
or M 171  Calculus I

Total Hours 4
Minimum Required Grade: C-

**Mathematics - Statistics**
**Note:** Choose the full year of statistics for graduate preparation in ecology.

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

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

**One Year:**
- CHMY 121N  Introduction to General Chemistry
- CHMY 123  Introduction to Organic and Biochemistry

**Two Years:**
- CHMY 121N  College Chemistry I
- CHMY 121N  College Chemistry I Lab
- CHMY 141N  College Chemistry II
- CHMY 124  Introduction to Organic and Biochemistry Lab
- 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**
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 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.

Minimum Required Grade: C-

### 1/3 Advanced Writing Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</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>BIOI 484</td>
<td>Plant Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOI 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>
</tr>
<tr>
<td>BIOO 475</td>
<td>Mammalogy</td>
<td>4</td>
</tr>
</tbody>
</table>

Minimum Required Grade: C-

### 2/3 Advanced Writing Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<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

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

**Total Hours: 4**

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 162</td>
<td>Applied Calculus</td>
<td>4</td>
</tr>
</tbody>
</table>