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
Specialized Ecology Course Requirement 3-5
Evolution Core 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.

Minimum Required Grade: C-

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 Plant Physiology & BIOO 434 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 General Microbiology & BIOM 361 and General Microbiology Lab (equiv to 260)
Biology - Ecology and Organismal Biology

BIOM 427 & BIOM 428 General Parasitology and General Parasitology Lab
BIOO 320 General Botany
BIOO 335 Rocky Mountain Flora
BIOO 340 Biology and Mgmt 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:

BIOE 428 Freshwater Ecology
BIOE 448 Terrestrial Plant Ecology
BIOE 449 Plant Biogeography
BIOM 415 Microbial Diversity Ecology & Evolution
WILD 346 Wildlife Physiological Ecology
WILD 470 Conserv of Wildlife Populations

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 Ecology

Total Hours: 3-5

Minimum Required Grade: C-

Evolution Course Requirement
Select at least one of the following:

BIOL 480 Conservation Genetics
BIOL 483 Phylogenetics and Evolution
BIOL 486 Genomics
BIOE 406 Behavior & Evolution
BIOE 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:

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:

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 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:

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-
## 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>Credits</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>
</tr>
<tr>
<td>BIOO 475</td>
<td>Mammalogy</td>
<td>4</td>
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</table>

Minimum Required Grade: C-

### 2/3 Advanced Writing Courses

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

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<tbody>
<tr>
<td>M 162</td>
<td>Applied Calculus</td>
<td>4</td>
</tr>
<tr>
<td>or M 171</td>
<td>Calculus I</td>
<td>4</td>
</tr>
</tbody>
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Total Hours: 4

Minimum Required Grade: C-