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
-Ology Course Requirement
Specialized Ecology Course Requirement
Evolution Course Requirement
Required Courses Outside of the Major 26-42
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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
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 Ecology & Organismal Biology Concentration
Select one of the following: 5

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 370</td>
<td>General Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOE 371</td>
<td>General Ecology Lab</td>
<td></td>
</tr>
<tr>
<td>BIOE 342</td>
<td>Field Ecology (taken at the Flathead Lake Biological Station)</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOB 301</td>
<td>Developmental Biology</td>
<td></td>
</tr>
<tr>
<td>BIOB 375</td>
<td>General Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOB 468</td>
<td>Endocrinology</td>
<td></td>
</tr>
<tr>
<td>BIOE 403</td>
<td>Vert Design &amp; Evolution</td>
<td></td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Comparative Animal Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOO 433</td>
<td>Plant Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOO 434</td>
<td>Plant Physiology Lab</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 360</td>
<td>General Microbiology</td>
<td></td>
</tr>
<tr>
<td>BIOM 361</td>
<td>and General Microbiology Lab (equiv to 260)</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours 3-5
Minimum Required Grade: C-
Biology - Ecology and Organismal Biology

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
BIOE 449  Plant Biogeography
BIOM 415  Microbial Dvrsty Eclgy & Evltn
WILD 346  Wildlife Physiological Ecology
WILD 470  Consrv of Wildlife Populats

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

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

Total Hours 3

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
& 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
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-

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-
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>
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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>
</tr>
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</table>

Minimum Required Grade: C-

2/3 Advanced Writing Courses

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<tr>
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<th>Title</th>
<th>Hours</th>
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</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>

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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<th>Hours</th>
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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>
</table>