# BIOLOGY B.S. - ECOLOGY AND ORGANISMAL BIOLOGY

## General Degree Requirements

To earn a baccalaureate degree, all students must complete successfully, in addition to any other requirements, the University of Montana General Education Requirements. Please refer to the General Education Requirements page (https://catalog.umt.edu/academics/general-education-requirements/) for more information.

Additional requirements for graduation can be found on the Degree/Certificate Requirements for Graduation page (https://catalog.umt.edu/academics/graduation-requirements/).

Unless otherwise noted in individual program requirements, a minimum grade point average of 2.00 in all work attempted at the University of Montana-Missoula is required for graduation. Please see the Academic Policies and Procedures page (https://catalog.umt.edu/academics/policies-procedures/) for information on how your GPA is calculated.

Courses taken to satisfy the requirements of a major, minor, or certificate program must be completed with a grade of C- or better unless a higher grade is noted in the program requirements.

## BACHELOR OF SCIENCE - BIOLOGY; ECOLOGY AND ORGANISMAL BIOLOGY CONCENTRATION

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 or environmental consulting agencies. This concentration is also an excellent choice for pre-veterinary students.

### Course Requirements

| Code | Title | Hours |
|---|---|---|
| **Biology/Microbiology Lower-Division Core** | | |
| Complete all of the following courses: | | |
| BIOB 160 | 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 |
| **Upper-Division Core Courses Required by Ecology & Organismal Biology Concentration** | | |
| Complete one of the following courses: | | 5 |
| BIOE 370 & BIOE 371 | General Ecology and General Ecology Lab (equivalent to 271) | |
| BIOE 342 | Field Ecology | |
| **Additional Upper-Division Courses Required for the Ecology & Organismal Biology Concentration** | | |
| Complete a minimum of 21 credits of upper-division BIOB, BIOE, BIOH, BIOL, BIOM, BIOO, or BCH course, with at least one course from each of the following subcategories. Other recommended courses include BCH 380 or BCH 480-BCH 482. 21 total credits required. | | 21 |
| **Organismal Course Requirement** | | |
| Complete at least one organismal course (lab must also be taken, if available) from the following list: | | |
| BIOB 301 | Developmental Biology | |
| BIOB 375 | General Genetics | |
| BIOB 435 | Comparative Animal Physiology | |
| BIOB 468 | Endocrinology | |
| BIOE 403 | Comparative Vertebrate Anatomy | |
| BIOO 433 & BIOO 434 | Plant Physiology and Plant Physiology Lab | |
| **-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: | | |
| BIOM 360 & BIOM 361 | General Microbiology and General Microbiology Lab | |
| BIOM 427 & BIOM 428 | General Parasitology and General Parasitology Lab | |
| BIOO 320 | General Botany | |
| BIOO 335 | Rocky Mountain Flora | |
| BIOO 340 | Biology and Management of Fishes | |
| BIOO 462 | Entomology | |
| BIOO 470 | Ornithology | |
| BIOO 475 | Mammalogy | |
| **Specialized Ecology Course Requirement** | | |
| Complete one of the following courses: | | |
| BIOE 400 | Aquatic Microbial Ecology (Flathead Lake Biological Station - summer only) | |
| BIOE 416 | Alpine Ecology (Flathead Lake Biological Station - summer only) | |
| BIOE 428 | Freshwater Ecology | |
| BIOE 439 | Stream Ecology (Flathead Lake Biological Station - summer only) | |
| BIOE 440 | Conservation Ecology (Flathead Lake Biological Station - summer only) | |
| BIOE 447 | Ecosystem Ecology | |
| BIOE 448 | Terrestrial Plant Ecology | |
| BIOE 451 | Landscape Ecology (Flathead Lake Biological Station - summer only) | |
| BIOE 453 | Lake Ecology (Flathead Lake Biological Station - summer only) | |
| BIOE 458 | Forest and Fire Ecology (Flathead Lake Biological Station - summer only) | |
| BIOM 415 | Microbial Diversity Ecology & Evolution | |
| BIOM 460 | Ecology of Infectious Diseases | |
| WILD 346 | Wildlife Physiological Ecology | |
| WILD 470 | Conservation of Wildlife Populations | |
| **Evolution Course Requirement** | | |
| Complete one of the following courses: | | |
| BIOB 480 | Conservation Genetics | |

| | | |
|---|---|---|
| BIOB 483 | Phylogenics and Evolution | |
| BIOB 486 | Genomics | |
| BIOE 406 | Behavior & Evolution | |
| BIOE 485 | Plant Evolution | |
| BIOM 420 | Host-Microbe Interactions | |
| **Mathematics - Calculus** [2] | | |
| Complete one of the following courses: | | 4 |
| M 162 | Applied Calculus | |
| M 171 | Calculus I | |
| **Mathematics - Statistics** [3] | | |
| Complete 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 & STAT 452 | Statistical Methods I and Statistical Methods II | |
| STAT 457 & STAT 458 | Computer Data Analysis I and Computer Data Analysis II | |
| **Chemistry** [4] | | |
| Complete one of the following sequences of general and organic chemistry: | | 10-20 |
| Introductory Chemistry (10 credits): | | |
| CHMY 121N | Introduction to General Chemistry | |
| CHMY 123 & CHMY 124 | Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Lab | |
| Advanced Chemistry (20 credits): | | |
| CHMY 141N & CHMY 142N | College Chemistry I and College Chemistry I Lab | |
| CHMY 143N & CHMY 144N | College Chemistry II and College Chemistry II Lab | |
| CHMY 221 & CHMY 222 | Organic Chemistry I and Organic Chemistry I Lab | |
| CHMY 223 & CHMY 224 | Organic Chemistry II and Organic Chemistry II Lab | |
| **Physics** | | |
| Complete one of the following Physics sequences: | | 10 |
| Algebra- and Trigonometry-based Physics: | | |
| 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 Physics: | | |
| PHSX 215N & PHSX 216N | Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus | |
| PHSX 217N & PHSX 218N | Fundamentals of Physics with Calculus II and Physics Laboratory II with Calculus | |
| **Advanced Writing Requirement** | | |
| To complete the Advanced 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 Writing Requirement is completed with one more course, chosen from any of the courses listed below.. | | 3-9 |
| **Total Hours** | | **74-94** |

1 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 160/BIOB 161N or BIOB 170N/BIOB 171N.

2 Students should choose M 171 if they plan to take additional calculus courses if they plan to double major or minor in a field that requires more calculus (e.g. astronomy, math, physics, biochemistry, computer science).

3 Students should choose the full year of statistics for graduate preparation in ecology.

4 Students who begin in the advanced chemistry sequence may substitute those courses for introductory sequence courses at the discretion of the major advisor. Students should choose the advanced sequence for graduate preparation in organismal biology or pre-veterinary medicine.

## Advanced Writing Distributed Model Courses for Biological Sciences

| Code | Title | Hours |
|---|---|---|
| **1/3 Advanced Writing Courses** | | |
| BCH 482 | Advanced Biochemistry II | 3 |
| BIOB 410 | Immunology | 3 |
| BIOB 425 | Advanced Cellular & Molecular Biology | 3 |
| BIOB 483 | Phylogenics and Evolution | 3 |
| BIOE 403 | Comparative Vertebrate Anatomy | 4 |
| BIOE 428 | Freshwater Ecology | 0,5 |
| BIOM 402 | Pathogenic Microbes | 3 |
| BIOO 320 | General Botany | 5 |
| BIOO 434 | Plant Physiology Lab | 1 |
| BIOO 470 | Ornithology | 4 |
| BIOO 475 | Mammalogy | 4 |
| **2/3 Advanced Writing Courses** | | |
| BCH 486 | Biochemistry Research Lab | 3 |
| BCH 499 | Senior Thesis/Capstone | 3-6 |
| BIOB 411 | Immunology Laboratory | 2 |
| BIOB 499 | Undergraduate Thesis | 3-6 |
| BIOE 342 | Field Ecology | 5 |
| BIOE 371 | General Ecology Lab (equivalent to 271) | 2 |
| BIOM 411 | Experimental Microbial Genetics Lab | 1 |
| BIOM 499 | Undergraduate Thesis | 3-6 |
| **Complete Advanced Writing Course** | | |
| BIOH 462 | Principles of Medical Physiology | 3 |
| BIOM 420 | Host-Microbe Interactions | 3 |