# BIOLOGY B.S. - FIELD ECOLOGY

## Bachelor of Science - Biology; Field Ecology Concentration

## 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 for the Field Ecology Concentration | | 5 |
| Additional Upper Division Major Courses Required for the Field Ecology Concentration | | 8 |
| Evolution Course Requirement | | |
| -Ology Course Requirement | | |
| Ecology Requirement at the Flathead Lake Biological Station | | 13 |
| Aquatic Emphasis | | |
| Terrestrial Emphasis | | |
| Required Courses Outside of the Major | | 28-42 |
| Mathematics - Calculus | | |
| Mathematics - Statistics | | |
| Chemistry | | |
| Physics | | |
| Advanced College Writing Requirement | | |
| **Total Hours** | | **71-85** |

**Degree Specific Credits:** 71-84

**Required Cumulative GPA:** 2.0

**Note:** The Field Ecology Concentration is for students interested in field-based ecology. Students with this concentration spend one or two summers taking field courses at the Flathead Lake Biological Station (http://flbs.umt.edu/). This concentration is a graduate prep program, and is for students interested in academia or employment at a governmental, private, or non-profit agency.

## Biology/Microbiology Lower-Division Core

**Note**: 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 |
|---|---|---|
| **Complete all of the following courses:** | | |
| 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 for the Field Ecology Concentration

| Code | Title | Hours |
|---|---|---|
| **Complete one of the following courses:** | | **5** |
| BIOE 342 | Field Ecology (at Flathead Lake Biological Station) | |
| BIOE 370 & BIOE 371 | General Ecology and General Ecology Lab (equivalent to 271) | |
| **Total Hours** | | **5** |

Minimum Required Grade: C-

## Additional Upper-Division Major Courses Required for the Field Ecology Concentration

**Rule:** Complete a minimum of 8 credits of upper-division Biology or Microbiology (BIOB, BIOE, BIOH, BIOL, BIOM, or BIOO), with at least one course from each of the following subcategories. 8 total credits required.

### Evolution Course Requirement

| Code | Title | Hours |
|---|---|---|
| **Complete at least one evolutionary biology course from the following list:** | | **3** |
| 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 | |
| **Total Hours** | | **3** |

Minimum Required Grade: C-

### -Ology Course Requirement

| Code | Title | Hours |
|---|---|---|
| **Complete one of the following courses:** | | **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 Management of Fishes | |
| BIOO 462 | Entomology | |
| BIOO 470 | Ornithology | |

| | | |
|---|---|---|
| BIOO 475 | Mammalogy | |
| **Total Hours** | | **3-5** |

Minimum Required Grade: C-

## Ecology Requirement at the Flathead Lake Biological Station

**Rule**: Complete either the Aquatic Emphasis or the Terrestrial Emphasis.

### Aquatic Emphasis

| Code | Title | Hours |
|---|---|---|
| **If choosing the Aquatic Emphasis:** | | |
| **Complete all of the following courses:** | | |
| BIOE 440 | Conservation Ecology | 3 |
| BIOE 451 | Landscape Ecology | 3 |
| BIOB 494 | Seminar in Biology | 1 |
| **Complete 2 of the following courses:** | | **6** |
| BIOE 400 | Aquatic Microbial Ecology | |
| BIOE 439 | Stream Ecology | |
| BIOE 453 | Lake Ecology | |
| **Total Hours** | | **13** |

Minimum Required Grade: C-

### Terrestrial Emphasis

| Code | Title | Hours |
|---|---|---|
| **If choosing the Terrestrial Emphasis:** | | |
| **Complete all of the following courses:** | | |
| BIOE 416 | Alpine Ecology | 3 |
| BIOE 440 | Conservation Ecology | 3 |
| BIOE 451 | Landscape Ecology | 3 |
| BIOE 458 | Forest and Fire Ecology | 3 |
| BIOB 494 | Seminar in Biology | 1 |
| **Total Hours** | | **13** |

Minimum Required Grade: C-

## Required Courses Outside of the Major

### Mathematics - Calculus

| Code | Title | Hours |
|---|---|---|
| **Complete one of the following courses:** | | **4** |
| M 162 | Applied Calculus | |
| M 171 | Calculus I | |
| **Total Hours** | | **4** |

Minimum Required Grade: C-

### Mathematics - Statistics

| Code | Title | Hours |
|---|---|---|
| **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 | |
| **Total Hours** | | **4-8** |

Minimum Required Grade: C-

### Chemistry

**Notes**:

- Students who begin in the advanced chemistry sequence may substitute those courses for introductory sequence courses at the discretion of the major advisor.

| Code | Title | Hours |
|---|---|---|
| **Complete a sequence 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 | |
| **Total Hours** | | **10-20** |

Minimum Required Grade: C-

### Physics

| Code | Title | Hours |
|---|---|---|
| **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 (require M 171 and M 172) | |
| **Total Hours** | | **10** |

Minimum Required Grade: C-

## Advanced College Writing Requirement

**Rule:** To complete 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 Field Ecology concentration requires

BIOE 371 or BIOE 342 (both 2/3 writing courses). The Advanced College Writing Requirement is completed with one additional course, chosen from any of the following.

### 1/3 Advanced Writing Courses

| Code | Title | Hours |
|---|---|---|
| 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 409 | Behavior & Evolution Discussion | 1 |
| BIOE 428 | Freshwater Ecology | 5 |
| BIOM 402 | Medical Bacteriology& Mycology | 3 |
| BIOO 320 | General Botany | 5 |
| BIOO 434 | Plant Physiology Lab | 1 |
| BIOO 470 | Ornithology | 4 |
| BIOO 475 | Mammalogy | 4 |

Minimum Required Grade: C-

### 2/3 Advanced Writing Courses

| Code | Title | Hours |
|---|---|---|
| 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 |

Minimum Required Grade: C-

### Complete Advanced Writing Course

| Code | Title | Hours |
|---|---|---|
| BIOH 462 | Principles of Medical Physiology | 3 |
| BIOM 420 | Host-Microbe Interactions | 3 |

Minimum Required Grade: C-