MICROBIOLOGY - MICROBIAL ECOLOGY

Bachelor of Science - Microbiology; Microbial Ecology Concentration

College Humanities & Sciences

Degree Specific Credits: 76

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

Note: Microbiology is the study of microorganisms including bacteria, fungi, viruses, and protozoa. The concentration in Microbial Ecology emphasizes microbial structure and function as well as interactions and relationships with the environment and other organisms. Students may continue their studies at the graduate level and seek research careers in government, or private laboratories.

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 Microbiology Core Courses 19

Additional UD Major Courses Required for Microbial Ecology Concentration 11-15

Biochemistry

Additional UD Depth Courses in Microbiology

Required Courses Outside of the Major 27-39

Mathematics - Calculus

Mathematics - Statistics

Chemistry

Physics

Additional Science Requirement

Upper Division Writing Expectation for the Major 2-7

Total Hours 76-97

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 160 N  Principles of Living Systems  3
BIOB 161 N  Pnclps of Living Systems Lab  1
BIOB 170 N  Princpls Biological Diversity  3
BIOB 171 N  Princpls Biological Dvrsty Lab  2
BIOB 260  Cellular and Molecular Biology  4

BIOB 272  Genetics and Evolution  4

Total Hours 17

Minimum Required Grade: C-

Upper Division Microbiology Core Courses

Rule: All of the following courses are required.

BIOE 370  General Ecology  3
BIOM 360  General Microbiology (equiv to 260)  3
BIOM 361  General Microbiology Lab (equiv to 261)  2
BIOM 410  Microbial Genetics  3
BIOM 411  Exprmntl Microbial Genetcs Lab  1
BIOM 415  Microbial Dvrsty Eclogy & Evltn  3
BIOM 450  Microbial Physiology  3
BIOM 451  Microbial Physiology Lab  1

Total Hours 19

Minimum Required Grade: C-

Additional UD Major Courses Required for Microbial Ecology Concentration

Minimum Required Grade: C-

Biochemistry

Select either one semester or one year of biochemistry from the following: 4-6

One Semester:

BCH 380  Biochemistry

One Year:

BCH 480  Advanced Biochemistry I
BCH 482  Advanced Biochemistry II

Total Hours 4-6

Minimum Required Grade: C-

Additional UD Depth Courses in Microbiology

Select 7-9 credits from the following (labs must be taken if available): 7-9

BIOB 410  Immunology
& BIOB 411  and Immunology Laboratory
BIOB 440  Biological Electron Microscopy
BIOE 371  Gen Ecology Lab (equiv to 271)
BIOE 428  Freshwater Ecology
BIOE 439  Stream Ecology
BIOE 453  Ecology of Small & Large Lakes
BIOM 427  General Parasitology
& BIOM 428  and General Parasitology Lab
BIOM 435  Virology
BIOM 490  Adv Undergrad Research
BIOO 433  Plant Physiology
& BIOO 434  and Plant Physiology Lab

Total Hours 7-9

Minimum Required Grade: C-
Required Courses Outside of the Major
Minimum Required Grade: C-

Mathematics - Calculus
Rule: Complete one of the following calculus courses
M 162  Applied Calculus  4
or M 171  Calculus I  4
Total Hours  4
Minimum Required Grade: C-

Mathematics - Statistics
Rule: The following course is required
STAT 216  Introduction to Statistics  4
Total Hours  4
Minimum Required Grade: C-

Chemistry
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
Rule: The following courses are required.
Select one of the following physics sequences:  5
Algebra- and Trigonometry-based:
PHSX 205N  College Physics I
& PHSX 206N  and College Physics I Laboratory
Calculus-based:
PHSX 215N  Fund of Physics w/Calc I
& PHSX 216N  and Physics Laboratory I w/Calc
Total Hours  5
Minimum Required Grade: C-

Additional Science Requirement
Select at least 6 credits from the following:  6
CHMY 311  Analytical Chem-Quant Analysis
CSCI 135  Fund of Computer Science I

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, Microbiology students take at least 2 partial writing courses. The Microbiology degree requires one 2/3 writing course (BIOM 411). 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
BCH 482  Advanced Biochemistry II  3
BIOB 410  Immunology  3
BIOB 425  Adv Cell & Molecular Biology  3
BIOB 483  Phylogenics and Evolution  3
BIOE 403  Vert Design & Evolution  5
BIOE 409  Behavior & Evolution Discussion  1
BIOE 428  Freshwater Ecology  5
BIOL 484  Plant Evolution  3
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

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  Gen Ecology Lab (equiv to 271)  2
BIOM 411  Exprmntl Microbial Genetics Lab  1
BIOM 499  Undergraduate Thesis  3-6
Minimum Required Grade: C-
Complete Advanced Writing Course
BIOH 462 Principles Medical Physiology 3

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.

M 162 Applied Calculus 4
or M 171 Calculus I

Total Hours 4

Minimum Required Grade: C-