

# MICROBIOLOGY, B.S. (L&S)

## REQUIREMENTS

### COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (B.S.)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

#### BACHELOR OF SCIENCE DEGREE REQUIREMENTS

**Mathematics** Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.

**Foreign Language** Complete the third unit of a foreign language.

**L&S Breadth** Complete:  
 • 12 credits of Humanities, which must include at least 6 credits of Literature; and  
 • 12 credits of Social Science; and  
 • 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.

**Liberal Arts and Science Coursework** Complete at least 108 credits.

**Depth of Intermediate/Advanced Coursework** Complete at least 60 credits at the Intermediate or Advanced level.

**Major** Declare and complete at least one major.

**Total Credits** Complete at least 120 credits.

**UW-Madison Experience** Complete both:  
 • 30 credits in residence, overall, and  
 • 30 credits in residence after the 86th credit.

**Quality of Work**  
 • 2.000 in all coursework at UW-Madison  
 • 2.000 in Intermediate/Advanced level coursework at UW-Madison

#### NON-L&S STUDENTS PURSUING AN L&S MAJOR

Non-L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

## UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin-Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (<http://guide.wisc.edu/undergraduate/#requirementsforundergraduatetext>) section of the *Guide*.

- General Education**
- Breadth-Humanities/Literature/Arts: 6 credits
  - Breadth-Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
  - Breadth-Social Studies: 3 credits
  - Communication Part A & Part B \*
  - Ethnic Studies \*
  - Quantitative Reasoning Part A & Part B \*

\* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

## REQUIREMENTS FOR THE MAJOR

| Code                           | Title  | Credits |
|--------------------------------|--|---------|
| <b>Mathematics</b>             |  |         |
| Complete one of the following: |  | 5-10    |
| MATH 171 & MATH 217            | Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II |         |
| MATH 221                       | Calculus and Analytic Geometry 1   |         |
| <b>Statistics</b>              |  |         |
| Complete one of the following: |  | 3       |
| STAT 301                       | Introduction to Statistical Methods  |         |
| STAT 371                       | Introductory Applied Statistics for the Life Sciences                                  |         |
| <b>General Chemistry</b>       |  |         |
| Complete one of the following: |  | 5-10    |
| CHEM 103 & CHEM 104            | General Chemistry I and General Chemistry II   |         |
| CHEM 109                       | Advanced General Chemistry   |         |
| CHEM 115 & CHEM 116            | Chemical Principles I and Chemical Principles II                                       |         |
| <b>Organic Chemistry</b>       |  |         |
| Complete ALL of the following: |  |         |
| CHEM 343                       | Organic Chemistry I  | 3       |
| CHEM 344                       | Introductory Organic Chemistry Laboratory  | 2       |
| CHEM 345                       | Organic Chemistry II   | 3       |

**Biology Foundation**

Complete one of the following: 10-13

BIOLOGY/  
BOTANY/  
ZOOLOGY 151  
& BIOLOGY/  
BOTANY/  
ZOOLOGY 152

Introductory Biology  
and Introductory Biology

BIOCORE 381  
& BIOCORE 382  
& BIOCORE 383  
& BIOCORE 384  
& BIOCORE 485

Evolution, Ecology, and Genetics  
and Evolution, Ecology, and  
Genetics Laboratory  
and Cellular Biology  
and Cellular Biology Laboratory  
and Principles of Physiology

ZOOLOGY/  
BIOLOGY 101  
& ZOOLOGY/  
BIOLOGY 102  
& BOTANY/  
BIOLOGY 130

Animal Biology  
and Animal Biology Laboratory  
and General Botany

**Physics**

Complete one of the following: 8-10

PHYSICS 103  
& PHYSICS 104

General Physics  
and General Physics

PHYSICS 207  
& PHYSICS 208

General Physics  
and General Physics

PHYSICS 201  
& PHYSICS 202

General Physics  
and General Physics

**Biochemistry**

Complete one of the following: 3-6

BIOCHEM 501

Introduction to Biochemistry

BIOCHEM 507  
& BIOCHEM 508

General Biochemistry I  
and General Biochemistry II

**Microbiology Courses***Microbiology Core (all required):*

Except where noted, all Microbiology Core courses are  
offered every fall and spring semester.

MICROBIO 303 3

Biology of Microorganisms

MICROBIO 304 2

Biology of Microorganisms  
Laboratory

MICROBIO 305 1

Critical Analyses in Microbiology

MICROBIO 450 3

Diversity, Ecology and Evolution of  
Microorganisms

MICROBIO 470 3

Microbial Genetics & Molecular  
Machines

MICROBIO 526 3

Physiology of Microorganisms

MICROBIO 527 2

Advanced Laboratory Techniques in  
Microbiology (FALL ONLY)

*Microbiology Capstone (required):*

MICROBIO 551 2

Capstone Research Project in  
Microbiology (SPRING ONLY)

*Microbiology Electives*

Complete at least 6 credits; at least 3 credits must come  
from Set A. Not all elective courses are offered every  
semester.

Set A: 3-6

MICROBIO/  
FOOD SCI 324

Food Microbiology Laboratory

MICROBIO/  
FOOD SCI 325

Food Microbiology

MICROBIO 330

Host-Parasite Interactions

MICROBIO/  
AN SCI/  
BOTANY 335

The Microbiome of Plants, Animals,  
and Humans

MICROBIO 345

Introduction to Disease Biology

MICROBIO/  
SOIL SCI 425

Environmental Microbiology

MICROBIO/  
SOIL SCI 523

Soil Microbiology and Biochemistry

MICROBIO/  
ONCOLOGY 545

Topics in Biotechnology (topics vary  
by semester)

MICROBIO 607

Advanced Microbial Genetics

MICROBIO/  
BIOCHEM/  
GENETICS 612

Prokaryotic Molecular Biology

MICROBIO 657

Bioinformatics for Microbiologists

MICROBIO/  
BMOLCHEM 668

Microbiology at Atomic Resolution

Set B:

0-3

BIOCHEM 570

Computational Modeling of  
Biological Systems

BIOCHEM/M M &  
I 575

Biology of Viruses

BIOCHEM 601

Protein and Enzyme Structure and  
Function

BOTANY 330

Algae

BOTANY/PL PATH  
332

Fungi

BOTANY/  
ENTOM/PL PATH  
505

Plant-Microbe Interactions:  
Molecular and Ecological Aspects

CHEM 565

Biophysical Chemistry

COMP SCI/  
B M I 576

Introduction to Bioinformatics

F&W ECOL/SURG  
SCI 548

Diseases of Wildlife

FOOD SCI 550

Fermented Foods and Beverages

M M & I 301

Pathogenic Bacteriology

M M & I 341

Immunology

M M & I/ENTOM/  
PATH-BIO/  
ZOOLOGY 350

Parasitology

M M & I 554

Emerging Infectious Diseases and  
Bioterrorism

M M & I/POP  
HLTH 603

Public Health

ONCOLOGY/  
PL PATH 640

General Virology-Multiplication of  
Viruses

PATH-BIO/  
M M & I 528

Immunology

PL PATH 622

Plant-Bacterial Interactions

PL PATH/  
BOTANY/  
GENETICS/  
M M & I 655

Biology and Genetics of Fungi

MICROBIO/  
BMOLCHEM 668

Microbiology at Atomic Resolution

3

**Total Credits**

**64-88**

## RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in all MICROBIO courses and courses approved for the major
- 2.000 GPA on 15 upper-level major credits, in residence<sup>1</sup>
- 15 credits of MICROBIO or courses counting toward the major, taken on campus

<sup>1</sup>

MICROBIO 300 through 699 count as upper level in the major, excluding MICROBIO 303 and MICROBIO 304. Intermediate- and advanced-level courses outside of MICROBIO that count for the major are also considered upper level.

## HONORS IN THE MAJOR

Students may declare Honors in the Microbiology Major in consultation with the Microbiology undergraduate advisor.

## HONORS IN THE MAJOR REQUIREMENTS

To earn Honors in the Major in Microbiology, students must satisfy both the requirements for the major (above) and the following requirements:

- Earn a 3.300 University GPA
- Earn a 3.300 GPA for all courses accepted in the major
- MICROBIO 681 and MICROBIO 682 for a total of 6 credits
- 9 credits of Honors course work (with grade B or better) from:

| Code                                  | Title  | Credits |
|---------------------------------------|--|---------|
| MICROBIO 303                          | Biology of Microorganisms                          | 3       |
| MICROBIO 304                          | Biology of Microorganisms Laboratory               | 2       |
| MICROBIO 330                          | Host-Parasite Interactions                         | 3       |
| MICROBIO/<br>SOIL SCI 425             | Environmental Microbiology                         | 3       |
| MICROBIO 450                          | Diversity, Ecology and Evolution of Microorganisms | 3       |
| MICROBIO 470                          | Microbial Genetics & Molecular Machines            | 3       |
| MICROBIO 526                          | Physiology of Microorganisms                       | 3       |
| PATH-BIO/<br>M M & I 528              | Immunology   | 3       |
| MICROBIO 607                          | Advanced Microbial Genetics                        | 3       |
| MICROBIO/<br>BIOCHEM/<br>GENETICS 612 | Prokaryotic Molecular Biology                      | 3       |
| PL PATH 622                           | Plant-Bacterial Interactions                       | 2-3     |
| MICROBIO 632                          | Industrial Microbiology/<br>Biotechnology          | 2       |
| ONCOLOGY/<br>PL PATH 640              | General Virology-Multiplication of Viruses         | 3       |

## UNIVERSITY DEGREE REQUIREMENTS

**Total Degree** To receive a bachelor's degree from UW-Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

**Residency** Degree candidates are required to earn a minimum of 30 credits in residence at UW-Madison. "In residence" means on the UW-Madison campus with an undergraduate degree classification. "In residence" credit also includes UW-Madison courses offered in distance or online formats and credits earned in UW-Madison Study Abroad/Study Away programs.

**Quality of Work** Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.