MICROBIOLOGY, B.S. (CALS)

REQUIREMENTS

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 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.

COLLEGE OF AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

In addition to the University General Education Requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Courses may not double count within university requirements (General Education and Breadth) or within college requirements (First-Year Seminar, International Studies, Science, and Capstone), but courses counted toward university requirements may also be used to satisfy a college and/or a major requirement; similarly, courses counted toward college requirements may also be used to satisfy a university and/or a major requirement.

COLLEGE REQUIREMENTS FOR ALL CALS B.S. DEGREE PROGRAMS

Quality of Work: Students must maintain a minimum cumulative grade point average of 2.000 to remain in good standing and be eligible for graduation.

Residency: Students must complete 30 degree credits in residence at UW–Madison after earning 86 credits toward their undergraduate degree.

First Year Seminar (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSFristYearSeminarCourses) 1

International Studies (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSInternationalStudiesCourses) 3

Physical Science Fundamentals 4-5

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 103</td>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM 108</td>
<td>Chemistry in Our World</td>
<td></td>
</tr>
<tr>
<td>CHEM 109</td>
<td>Advanced General Chemistry</td>
<td></td>
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Biological Science 5

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CHEM 115 &amp; CHEM 116</td>
<td>Chemical Principles I and Chemical Principles II</td>
<td>3</td>
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</table>

Additional Science (Biological, Physical, or Natural) 3

Science Breadth (Biological, Physical, Natural, or Social) 3

CALS Capstone Learning Experience: included in the requirements for each CALS major (see “Major Requirements”) (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSCapstoneRequirement)

REQUIREMENTS FOR THE MAJOR

<table>
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<tr>
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<tbody>
<tr>
<td>MATH 171 &amp; MATH 217</td>
<td>Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II</td>
<td>5-10</td>
</tr>
<tr>
<td>MATH 221</td>
<td>Calculus and Analytic Geometry I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Introduction to Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 371</td>
<td>Introductory Applied Statistics for the Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 103 &amp; CHEM 104</td>
<td>General Chemistry I and General Chemistry II</td>
<td>5-10</td>
</tr>
<tr>
<td>CHEM 109</td>
<td>Advanced General Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 343</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 344</td>
<td>Introductory Organic Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 345</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
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Biology Foundation

Complete one of the following: 10-13

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### Microbiology, B.S. (CALS)

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIOLOGY/BOTANY/ZOOLOGY 151 &amp; BIOLOGY/BOTANY/ZOOLOGY 152</td>
<td>Introductory Biology and Introductory Biology¹</td>
</tr>
<tr>
<td>BIOCORE 381 &amp; BIOCORE 382 &amp; BIOCORE 383 &amp; BIOCORE 384 &amp; BIOCORE 485</td>
<td>Evolution, Ecology, and Genetics and Evolution, Ecology, and Genetics Laboratory and Cellular Biology and Cellular Biology Laboratory and Principles of Physiology¹</td>
</tr>
<tr>
<td>ZOOLOGY/BOTANY 101 &amp; ZOOLOGY/BOTANY 102 &amp; BOTANY/BOTANY 130</td>
<td>Animal Biology and Animal Biology Laboratory and General Botany</td>
</tr>
</tbody>
</table>

### Physics

Select one of the following: 8-10

- PHYSICS 103 & PHYSICS 104
- PHYSICS 207 & PHYSICS 208
- PHYSICS 201 & PHYSICS 202

### 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 Biologuy of Microorganisms 3
- MICROBIO 304 Biology of Microorganisms Laboratory 2
- MICROBIO 305 Critical Analyses in Microbiology 1
- MICROBIO 450 Diversity, Ecology and Evolution of Microorganisms 3
- MICROBIO 470 Microbial Genetics & Molecular Machines 3
- MICROBIO 526 Physiology of Microorganisms 3
- MICROBIO 527 Advanced Laboratory Techniques in Microbiology (FALL ONLY) 2

**Microbiology Capstone (required):**

- MICROBIO 551 Capstone Research Project in Microbiology (SPRING ONLY) 2

**Microbiology Electives**

Complete at least 6 credits; at least 3 credits must come from Set A. Note that 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 520 Planetary Microbiology: What Life Here Tells Us About Life Out There
- MICROBIO/SOIL SCI 523 Soil Microbiology and Biochemistry
- MICROBIO 525 Field Studies of Planetary Microbiology and Life in the Universe
- MICROBIO/ONCOLOGY 545 Topics in Biotechnology (topics vary by semester)
- MICROBIO 607 Advanced Microbial Genetics
- MICROBIO/BIOCHEM/GENETICS 612 Prokaryotic Molecular Biology
- MICROBIO 626 Microbial and Cellular Metabolomics
- 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 Biochemistry 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 Clinical and Public Health Microbiology
- 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

Total Credits  64-88

1
(BIOLOGY/BOTANY/ZOOLOGY 151 and BIOLOGY/BOTANY/ZOOLOGY 152) or (BIOCORE 381 / BIOCORE 382 / BIOCORE 383 / BIOCORE 384 / BIOCORE 485) are recommended.

2
(PHYSICS 103 / PHYSICS 104) or (PHYSICS 207 / PHYSICS 208) are recommended.

**HONORS IN THE MAJOR**

Students admitted to the university and to the College of Agricultural and Life Sciences are invited to apply to be considered for admission to the CALS Honors Program.

**Admission Criteria for New First-Year Students:**

- Complete program application including essay questions

**Admission Criteria for Transfer and Continuing UW-Madison Students:**

- UW-Madison cumulative GPA of at least 3.25
- Complete program application including essay questions

**HOW TO APPLY**

The application is available on the CALS Honors Program website (https://cals.wisc.edu/academics/undergraduate/current-students/honors-program/). Applications are accepted at any time.

New first-year students with accepted applications will automatically be enrolled in Honors in Research. It is possible to switch to Honors in the Major in the student’s first semester on campus after receiving approval from the advisor for that major. Transfer and continuing students may apply directly to Honors in Research or Honors in the Major (after approval from the major advisor).

**REQUIREMENTS**

All CALS Honors programs have the following requirements:

- Earn at least a cumulative 3.25 GPA at UW-Madison (some programs have higher requirements)
- Complete the program-specific requirements listed below
- Submit completed thesis documentation to CALS Academic Affairs

**HONORS IN THE MAJOR IN MICROBIOLOGY: REQUIREMENTS**

To earn Honors in the Major in Microbiology, students must satisfy the Requirements for the Major (above) as well as the following requirements. All courses used for Honors in the Major requirements must receive "B" or better grades to fulfill requirements.

- Earn a 3.300 overall university GPA.
- Earn a 3.300 GPA for all MICROBIO courses, and all courses accepted in the major.
- Complete a two-semester Senior Honors Thesis (MICROBIO 681 and MICROBIO 682) for 6 credits total and present research in a public forum. Students completing their senior honors theses in laboratories or departments outside of Microbiology may be able to count that thesis toward Honors in the Major.
- Complete at least 20 credits of any combination of the following coursework:
  - Honors courses that fulfill Requirements for the Major (see above); independent study and thesis credits do not count here.
  - Non-honors coursework credits from this list: CHEM 115, CHEM 311, CHEM 327, GENETICS 466, MATH 222, MATH 234. These courses do not need to be taken for honors to count.
  - At least 10 of the 20 credits of coursework above must come from courses taken for honors from this Microbiology course list: MICROBIO 303, MICROBIO 304, MICROBIO/FOOD SCI 325, MICROBIO 330, MICROBIO/AN SCI/BOTANY 335, MICROBIO 345, MICROBIO/SOIL SCI 425, MICROBIO 450, MICROBIO 470, MICROBIO 526, MICROBIO 607, MICROBIO/BIOCHEM/GENETICS 612, MICROBIO 657, MICROBIO/BMOLCHEM 668.

**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.