

MICROBIOLOGY, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements

For the Bachelor of Science degree in Microbiology, a minimum of 125 credits is required:

| Requirement | Credits |
|----------------------------|---------|
| General Education | 45 |
| Requirements for the Major | 95 |

15 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses.

Requirements for the Major

To graduate, a grade of C or better is required in 9 credits of any BMB, or MICRB 400-level course except BMB 443W, BMB 445W, BMB 448, BMB 488, BMB 496, MICRB 421W, MICRB 422, MICRB 447.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44>).

| Code | Title | Credits |
|---|--|---------|
| Prescribed Courses | | |
| BIOL 322 | Genetic Analysis | 3 |
| BMB 400 | Molecular Biology of the Gene | 2 |
| BMB 401 | General Biochemistry | 3 |
| BMB 402 | General Biochemistry | 3 |
| BMB 428 | Physical Chemistry with Biological Applications | 3 |
| BMB 442 | Laboratory in Proteins, Nucleic Acids, and Molecular Cloning | 3 |
| CHEM 113 | Experimental Chemistry II | 1 |
| CHEM 210 | Organic Chemistry I | 3 |
| CHEM 212 | Organic Chemistry II | 3 |
| CHEM 213 | Laboratory in Organic Chemistry | 2 |
| MATH 141 | Calculus with Analytic Geometry II | 4 |
| MICRB 201 | Introductory Microbiology ¹ | 3 |
| MICRB 202 | Introductory Microbiology Laboratory | 2 |
| MICRB 251 | Molecular and Cell Biology I ¹ | 3 |
| MICRB 252 | Molecular and Cell Biology II ¹ | 3 |
| MICRB 421W | Laboratory of General and Applied Microbiology | 3 |
| PHYS 250 | Introductory Physics I | 4 |
| PHYS 251 | Introductory Physics II | 4 |
| PSU 16 | First-Year Seminar Science | 1 |
| <i>Prescribed Courses: Require a grade of C or better</i> | | |
| CHEM 110 | Chemical Principles I | 3 |
| CHEM 111 | Experimental Chemistry I | 1 |
| CHEM 112 | Chemical Principles II | 3 |
| MATH 140 | Calculus With Analytic Geometry I | 4 |

Additional Courses

Select four of the following: 11-12

| | |
|-----------|--|
| MICRB 401 | Microbial Physiology and Structure |
| MICRB 410 | Principles of Immunology |
| MICRB 412 | Medical Microbiology |
| MICRB 415 | General Virology: Bacterial and Animal Viruses |
| MICRB 450 | Microbial/Molecular Genetics |

Select 3-4 credits of the following: 3-4

| | |
|-----------|--|
| BMB 445W | Laboratory in Molecular Genetics |
| BMB 448 | Model Systems and Approaches in Cell Biology Inquiry |
| MICRB 422 | Medical Microbiology Laboratory |
| MICRB 447 | Laboratory in Molecular Immunology |

Select 6-7 credits of the following: ² 6-7

| | |
|----------------------------------|---|
| BMB 408 | Instructional Practice |
| BMB 488 | Communities of Practice in Biochemistry and Molecular Biology |
| BMB 496 | Independent Studies |
| FDSC 408 | Food Microbiology |
| Any other MICRB 400-level course | |

Supporting Courses and Related Areas

Select 8-10 credits from department list 8-10

¹ To graduate, a grade of C or better is required in two of the following courses:

- MICRB 201
- BMB 251/MICRB 251
- BMB 252/MICRB 252

² With a total maximum of 3 credits in BMB 408 and/or MICRB 408 and a maximum of 4 credits in BMB 488 and/or BMB 496.

Note: A student enrolled in an ROTC program may, after consultation with the head of the microbiology program, substitute up to 6 credits of ROTC in the categories of Additional Courses and Supporting Courses and Related Areas.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- **United States Cultures:** 3 credits
- **International Cultures:** 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or

within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80>)). For more information, check the Suggested Academic Plan for your intended program.