

BIOTECHNOLOGY, B.S.

Seven Penn State campuses are scheduled for closure after Spring 2027: DuBois, Fayette, New Kensington, Mont Alto, Shenango, Wilkes-Barre, and York. New students are not being admitted at these campuses.

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements

For the Bachelor of Science degree in Biotechnology, a minimum of 120 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	90-93

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 with a B.S. degree in Biotechnology, a grade of C or better is required in 9 credits of any BIOTC, B M B, or MICRB 400-level course except BMB 442, 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/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>).

Common Requirements for the Major (All Options)

Code	Title	Credits
Prescribed Courses		
BMB 211	Elementary Biochemistry	3
BMB 221	Applied Biochemistry	2
BMB/MICRB 251	Molecular and Cell Biology I ¹	3
BMB/MICRB 252	Molecular and Cell Biology II ¹	3
CHEM 113	Experimental Chemistry II	1
MICRB 201	Introductory Microbiology ¹	3
MICRB 410	Principles of Immunology	3
MICRB 421W	Laboratory of General and Applied Microbiology	3
PHYS 250	Introductory Physics I	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		
BIOL 322 or BIOL 222	Genetic Analysis Genetics	3
MICRB 202 or MICRB 203	Introductory Microbiology Laboratory Inquiry-based Microbiology Laboratory	2

Requirements for the Option

Select an option 48-51

¹ To graduate with a B.S. degree in Biotechnology, a grade of C or better is required in two of the following courses:

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

Requirements for the Option

General Biotechnology Option (48-50 credits)

Code	Title	Credits
Prescribed Courses		
BIOTC 416	Microbial Biotechnology	3
BIOTC 459	Plant Tissue Culture and Biotechnology	3
BIOTC 479	Methods in Biofermentations	3
BIOTC 489	Animal Cell Culture Methods	3
BMB 442	Laboratory in Proteins, Nucleic Acids, and Molecular Cloning	3
STAT 250	Introduction to Biostatistics	3
<i>Prescribed Courses: Require a grade of C or better</i>		
MATH 141	Calculus with Analytic Geometry II	4

Additional Courses

Select one of the following sequences: 6-8

CHEM 202 & CHEM 203	Fundamentals of Organic Chemistry I and Fundamentals of Organic Chemistry II
CHEM 210 & CHEM 212 & CHEM 213	Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry

Supporting Courses and Related Areas

Select 14 credits from department list C	14
Select 6 credits from the following:	6
Any 400-level BMB/BIOTC/MICRB lecture course	
FDSC 408	Food Microbiology
Additional courses from department list D	

Clinical Laboratory Science Option (48-51 credits)

This option provides both the academic and clinical preparation for students interested in a career as a clinical laboratory scientist. Positions are found in hospital, physician-office, reference, industrial, and research laboratories. To complete baccalaureate degree requirements, students enter a ten-month clinical practicum (MICRB 405A, MICRB 405B, MICRB 405C, MICRB 405D, MICRB 405E, MICRB 405F) at an affiliate hospital for the senior year. (Current affiliations are with Mount Nittany Medical Center, State College and Pennsylvania Hospital, Philadelphia.) Students are recommended for a fixed number of hospital positions on a competitive basis. Cumulative grade-point average and hospital school admission requirements serve as criteria for recommendation. The B.S. degree is awarded at the first commencement following completion of the clinical practicum.

Code	Title	Credits
Prescribed Courses		
BMB 212	Elementary Biochemistry Laboratory	1
MICRB 405A	Seminar and Practicum in Medical Technology	8
MICRB 405B	Seminar and Practicum in Medical Technology	1

MICRB 405C	Seminar and Practicum in Medical Technology	6
MICRB 405D	Seminar and Practicum in Medical Technology	5
MICRB 405E	Seminar and Practicum in Medical Technology	7
MICRB 405F	Seminar and Practicum in Medical Technology	3
MICRB 412	Medical Microbiology	3
MICRB 422	Medical Microbiology Laboratory	2

Additional Courses

Select one of the following sequences: 6-8

CHEM 202 Fundamentals of Organic Chemistry I
& CHEM 203 and Fundamentals of Organic Chemistry II

CHEM 210 Organic Chemistry I
& CHEM 212 and Organic Chemistry II
& CHEM 213 and Laboratory in Organic Chemistry

Additional Courses: Require a grade of C or better

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

MATH 141 Calculus with Analytic Geometry II

STAT 200 Elementary Statistics

STAT 250 Introduction to Biostatistics

Supporting Courses and Related Areas

Select 3 credits from department list C 3

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/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>)). For more information, check the Suggested Academic Plan for your intended program.