

Biology BS

Overview

Biology spans a continuum of organization from molecules and cells to individuals and ecosystems. The Department of Biology offers programs designed to give students a broad base, while allowing a measure of sub-field specialization. All Biology majors are required to take a two-semester series of "Introduction to Biology" classes, plus a course in Genetics. In addition, students have the choice of Cell Biology, Biochemistry, or Molecular Biology, and Ecology or Evolution as part of their core program requirements, followed by upper-level electives.

The **Bachelor of Science in Biology** provides a strong preparation for those wishing to attend professional or graduate school in biology or related disciplines such as cell or molecular biology, ecology, bioinformatics, biochemistry, biophysics, medicine, pharmacy, dentistry and allied health fields. It is also recommended for those who intend to enter the scientific workforce upon completion of a bachelor's degree.

Campus Location: Main

Program Code: ST-BIOL-BS

Distinction in Major

To graduate with distinction in this major, a student must satisfy the following criteria:

- achieve a minimum 3.2 cumulative GPA;
- achieve a minimum 3.2 major GPA;
- successfully complete BIOL 4391 Accelerated Research in Biology or BIOL 4291 Extradepartmental Research for a total of 6 credits over two semesters;
- write a final research paper; and
- present their research at a departmental research poster session.

Accelerated Programs

Accelerated programs provide a pathway for students to pursue both an undergraduate degree and an advanced degree in a shorter amount of time. Below is a list of available accelerated programs for students in the BS in Biology.

- BS in Biology / MEd in Middle Grades Education with a Concentration in Science
- BS in Biology / MEd in Middle Grades Education with a Concentration in Mathematics and Science
- BA or BS in Biology / PSM in Scientific Writing
- BA or BS in Biology / PSM in Bioinformatics and Biological Data Science
- BA or BS in Biology / PSM in Bioinnovation
- BA or BS in Biology / PSM in Biotechnology

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Learn more about the Bachelor of Science in Biology.

These requirements are for students who matriculated in academic year 2023-2024. Students who matriculated prior to fall 2023 should refer to the Archives to view the requirements for their Bulletin year.

Bachelor of Science Requirements

Summary of Requirements for the Degree

1. University Requirements
 - Students must complete all University requirements including those listed below.
 - All undergraduate students must complete at least two writing-intensive courses for a total of at least six credits at Temple as part of their major. The specific writing-intensive course options for this major are:

Code	Title	Credit Hours
BIOL 2297	Research Techniques in Genetics (S)	3
BIOL 3396	Scientific Writing for Biology: The Art of Communicating	3
BIOL 4396	Advanced Study in Biology	3
 - Students must complete the General Education (GenEd) requirements.
 - See the General Education section of the *Undergraduate Bulletin* for the GenEd curriculum.
 - Students who complete CST majors receive a waiver for 2 Science & Technology (GS) and 1 Quantitative Literacy (GQ) GenEd courses.
 - Students must satisfy general Temple University residency requirements.
2. College Requirements
 - A minimum of 90 total credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA), and/or the College of Engineering (ENG).
 - A minimum of 45 of these credits must be upper-level (courses numbered 2000 and above).
 - Complete a one-credit first-year or transfer seminar.
 - SCTC 1001 CST First Year Seminar for every entering first-year CST student.
 - SCTC 2001 CST Transfer Seminar for every entering transfer CST student.
3. Major Requirements for Bachelor of Science (73-80 s.h.)

At least 9 courses required for the major must be completed at Temple. At least 6 Biology courses must be completed at Temple.

Code	Title	Credit Hours
Biology		
BIOL 1111	Introduction to Organismal Biology	4
or BIOL 1911	Honors Introduction to Organismal Biology	
BIOL 1112	Introduction to Biomolecules, Cells and Genomes	4
or BIOL 1912	Honors Introduction to Biomolecules, Cells and Genomes	
BIOL 2207	Genetics (S)	3
BIOL 2297	Research Techniques in Genetics (WI, S) ¹	3
Select one of the following:		3
BIOL 2227	Principles of Ecology	
BIOL 3101	Evolution (F)	
Select one of the following: ²		3-4
BIOL 3204	Cell Structure and Function (F)	
BIOL 3324	Molecular Biology	
BIOL 4375	General Biochemistry I	
Select 6 Biology Electives numbered 2200 and above ^{3, 4, 5}		18-24
Chemistry		
Select one of the following:		4
CHEM 1031 & CHEM 1033	General Chemistry I and General Chemistry Laboratory I	
CHEM 1951 & CHEM 1953	Honors General Chemical Science I and Honors Chemical Science Laboratory I (F)	

Select one of the following: 4

CHEM 1032 & CHEM 1034	General Chemistry II and General Chemistry Laboratory II
CHEM 1952 & CHEM 1954	Honors General Chemical Science II and Honors Chemical Science Laboratory II (S)

Select one of the following: 4

CHEM 2201 & CHEM 2203	Organic Chemistry I and Organic Chemistry Laboratory I
CHEM 2921 & CHEM 2923	Organic Chemistry for Honors I and Organic Honors Laboratory I (F)

Select one of the following: 4

CHEM 2202 & CHEM 2204	Organic Chemistry II and Organic Chemistry Laboratory II
CHEM 2922 & CHEM 2924	Organic Chemistry for Honors II and Organic Honors Laboratory II (S)

College of Science and Technology

SCTC 1013 Elements of Data Science for the Physical and Life Sciences 3

Mathematics

MATH 1041 Calculus I 4
or MATH 1941 Honors Calculus I

Select one of the following: 4

MATH 1042 or MATH 1942	Calculus II Honors Calculus II
MATH 1044	Introduction to Probability and Statistics for the Life Sciences

Physics

Select one of the following: 4

PHYS 1021	Introduction to General Physics I
PHYS 1061 or PHYS 1961	Elementary Classical Physics I Honors Elementary Classical Physics I
PHYS 2021 or PHYS 2921	General Physics I Honors General Physics I

Select one of the following: 4

PHYS 1022	Introduction to General Physics II
PHYS 1062 or PHYS 1962	Elementary Classical Physics II Honors Elementary Classical Physics II
PHYS 2022 or PHYS 2922	General Physics II Honors General Physics II

Total Credit Hours 73-80

Code	Title	Credit Hours
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(F) - Fall only course

(S) - Spring only course

1

This course has a co-requisite of BIOL 2207.

2

Only one of these courses need be selected to meet the requirement of the major. If additional courses from this group are taken they may be used to fulfill the requirement for upper-level electives.

3

Up to two (2) Biology Electives (6-8 s.h.) may be replaced by Cognate electives selected from the following (B.S. degree only): ANTH 2764; CHEM 3301, CHEM 3302; MATH 1042/MATH 1942; or MATH 2043/MATH 2943 (but only one of these math courses, and MATH 1042/MATH 1942 may only count if MATH 1044 is used to satisfy the second math course requirement in the major); PHYS 2511 and PHYS 3511, PHYS 4301; STAT 5002 (if substituted for BIOL 3312; students are not allowed to use both BIOL 3312 and STAT 5002 as upper-level electives).

4

Students may fulfill one upper-level elective by completing a total of 6 credits of research. A maximum of 3 credits may come from the junior level research course BIOL 3082 and the remaining 3 credits must come from a senior level (**4000+**) research course. Students may also complete all 6 credits using two semesters of the senior research course if they prefer. Consult with your departmental advisor to determine which course(s) are appropriate. Once completed, students must seek approval from a CST advisor to obtain the waiver for credit towards one upper-level elective.

5

At least one upper-level biology elective must be writing intensive.

With the exception in footnote 4 above, the research and independent study courses shown below do not count as Biology electives, but they may count as free elective credits toward graduation. Most research courses can only be taken ONCE for a letter grade. Check individual course descriptions for details and/or exceptions.

Code	Title	Credit Hours
BIOL 2082	Independent Research I	1 to 4
BIOL 3082	Independent Research II	1 to 4
BIOL 3181	Cooperative Research in Biochemistry	3
BIOL 3681	Cooperative Studies	2 to 4
BIOL 3685	Externship Studies	3
BIOL 4291	Extrdepartmental Research	1 to 4
BIOL 4391	Accelerated Research in Biology	1 to 4
BIOL 4483	Accelerated Research in Biochemistry	3
BIOL 4491	Research in Biochemistry	3
BIOL 4591	Research in Neuroscience	1 to 4

Note: Grades of C- or higher are required unless otherwise specified in all courses for the major, including course prerequisites. The College of Science and Technology requires that students have a GPA of at least 2.00 overall and at least 2.00 in the courses applicable to their major and/or minor GPA to graduate.

A total of up to 3 credits of Biology research courses numbered lower than 4000 (to include: BIOL 2082, BIOL 3082, BIOL 3181, BIOL 3281, and BIOL 3681) may be taken for a letter grade. Any additional credits in research courses in this category can be taken only on a CR/NC basis.

Suggested Academic Plan

Bachelor of Science in Biology

Suggested Plan for New Students Starting in the 2023-2024 Academic Year

Year 1			
Fall			Credit Hours
BIOL 1111 or BIOL 1911	Introduction to Organismal Biology or Honors Introduction to Organismal Biology		4
MATH 1041 or MATH 1941	Calculus I or Honors Calculus I		4
SCTC 1001	CST First Year Seminar		1
SCTC 1013	Elements of Data Science for the Physical and Life Sciences		3
GenEd Breadth Course			3
Credit Hours			15
Spring			
BIOL 1112 or BIOL 1912	Introduction to Biomolecules, Cells and Genomes or Honors Introduction to Biomolecules, Cells and Genomes		4
Select one of the following:			4
CHEM 1031 & CHEM 1033	General Chemistry I and General Chemistry Laboratory I		
CHEM 1951 & CHEM 1953	Honors General Chemical Science I and Honors Chemical Science Laboratory I		
Select one of the following:			4

MATH 1042 or MATH 1942	Calculus II or Honors Calculus II	
MATH 1044	Introduction to Probability and Statistics for the Life Sciences	
ENG 0802 or ENG 0812 or ENG 0902	Analytical Reading and Writing or Analytical Reading and Writing: ESL or Honors Writing About Literature	4
Credit Hours		16
Year 2		
Fall		
Select one of the following:		3
BIOL 2227	Principles of Ecology	
BIOL 3101	Evolution (F)	
Select one of the following:		4
CHEM 1032 & CHEM 1034	General Chemistry II and General Chemistry Laboratory II	
CHEM 1952 & CHEM 1954	Honors General Chemical Science II and Honors Chemical Science Laboratory II	
IH 0851 or IH 0951	Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life	3
Elective		3-4
Elective		2-1
Credit Hours		15
Spring		
BIOL 2207	Genetics (S)	3
BIOL 2297	Research Techniques in Genetics (S)	3
Select one of the following:		4
CHEM 2201 & CHEM 2203	Organic Chemistry I and Organic Chemistry Laboratory I	
CHEM 2921 & CHEM 2923	Organic Chemistry for Honors I and Organic Honors Laboratory I	
IH 0852 or IH 0952	Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good	3
GenEd Breadth Course		3
Credit Hours		16
Year 3		
Fall		
Select one of the following: ¹		3-4
BIOL 3204	Cell Structure and Function (F)	
Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}		
Select one of the following:		4
CHEM 2202 & CHEM 2204	Organic Chemistry II and Organic Chemistry Laboratory II	
CHEM 2922 & CHEM 2924	Organic Chemistry for Honors II and Organic Honors Laboratory II	
Select one of the following:		4
PHYS 1021	Introduction to General Physics I	
PHYS 1061 or PHYS 1961	Elementary Classical Physics I or Honors Elementary Classical Physics I	
PHYS 2021 or PHYS 2921	General Physics I or Honors General Physics I	
GenEd Breadth Course		3
Elective		2-1
Credit Hours		16

Spring

Select one of the following: ¹	3-4
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BIOL 3324	Molecular Biology	
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BIOL 4375	General Biochemistry I	
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Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}		
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Select one of the following:	4
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PHYS 1022	Introduction to General Physics II	
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PHYS 1062	Elementary Classical Physics II	
or PHYS 1962	or Honors Elementary Classical Physics II	

PHYS 2022	General Physics II	
or PHYS 2922	or Honors General Physics II	

Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}	3-4
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GenEd Breadth Course	3
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Elective	2-0
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Credit Hours	15
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Year 4**Fall**

Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}	3-4
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Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}	3-4
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GenEd Breadth Course	3-4
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Elective	3-0
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Elective	3
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Credit Hours	15
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Spring

Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}	3-4
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Upper-level Biology Elective (numbered 2200 and above) ^{2, 3}	3-4
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Elective	3
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Elective	3
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Elective	3-1
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Credit Hours	15
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Total Credit Hours	123
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Code	Title	Credit Hours
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(F) - Fall only course

(S) - Spring only course

1

This program requires only one of the following courses: BIOL 3204, BIOL 3324 or BIOL 4375. Note that due to prerequisite requirements, BIOL 3324 and BIOL 4375 are shown in the next term of the suggested academic plan. If BIOL 3204 is completed it is not necessary to take BIOL 3324 or BIOL 4375 as the program only requires one of these three courses. If taken in addition to BIOL 3204 these courses can be used to fulfill the upper-level biology electives (numbered 2200 and above) required by the program.

2

If the student has taken the necessary prerequisite courses, some of the Biology or Cognate elective courses may be taken before the Spring semester of Year 3.

3

Select an upper-level biology elective (numbered 2200 and above). At least one of the electives must be a writing-intensive (WI) course.