Natural Sciences BS with Biology Concentration

Overview

The Natural Sciences program provides students more breadth than traditional science programs.

Natural Sciences students **must select one of the following concentrations**:

- Biology
- Chemistry
- Earth and Environmental Sciences
- Physics

Many exciting areas of scientific inquiry, such as the neurosciences, environmental sciences, and biophysical sciences, require general science backgrounds that encompass multiple science disciplines. The **Bachelor of Science in Natural Sciences with a concentration in Biology** prepares students for these trans-disciplinary programs.

With careful selection of laboratory-based courses, students are well prepared for entry-level science positions, and a variety of graduate programs both disciplinary and interdisciplinary. In particular, this is an excellent background for students wishing to enter graduate programs in education, forensic science, scientific writing or editing, or related science technology areas. Students may also select many of the courses required for a variety of pre-health and professional school programs.

In the Bachelor of Science degree, there is greater emphasis on depth of science content knowledge and application of knowledge compared with the Bachelor of Arts in Natural Sciences. The BS degree requires additional science coursework and offers more advanced study in natural sciences. This option provides more flexibility for students declaring the BS in Natural Sciences later in their undergraduate course of study as they can apply more disciplinary science courses to meet the additional science requirements of this degree.

This program of study can prepare students for graduate study in a traditional science discipline, and many Natural Sciences graduates have found employment in technical fields.

Students in this program can apply to our Professional Science Master's (PSM) programs in Bioinnovation, Biotechnology and Scientific Writing. Students interested in these PSM programs can apply for admission to the +1 BS/PSM accelerated options for completion of these degrees. PSM programs provide specific curricula and training for workforce entry or re-entry.

Campus Location: Main

Program Code: ST-NATS-BS

Distinction in Major

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

- achieve a minimum 3.33 GPA in major or
- achieve a minimum 3.0 cumulative GPA and successfully complete six credits of internship coursework (SCTC 1385, SCTC 2385, or SCTC 3185) with approval by the program director.

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 Natural Sciences.

- BA or BS in Natural Sciences / PSM in Scientific Writing
- BA or BS in Natural Sciences / PSM in Bioinnovation
- BA or BS in Natural Sciences / PSM in Biotechnology

Undergraduate Contact Information

Susan Varnum, Program Director and Professor of Chemistry
Senior Associate Dean for Undergraduate Affairs and Science Education
College of Science and Technology
Gladfelter Hall, Room 629
215-204-4073
susan.varnum@temple.edu

Learn more about the Bachelor of Science in Natural Sciences.

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 (123 total s.h.)
   - 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
SCTC 2396	Writing for Science and Technology	3
SCTC 4396	Paradigms of Scientific Knowledge: Knowledge Discovery from Scientific Data	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 (76-88 s.h.)
   At least 7 courses required for the major must be completed at Temple. At least 2 courses in the chosen concentration 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	
Select one of the following:		4
BIOL 1112	Introduction to Biomolecules, Cells and Genomes	
or BIOL 1912	Honors Introduction to Biomolecules, Cells and Genomes	
BIOL 2112	Introduction to Cellular and Molecular Biology	
or BIOL 2912	Honors Introduction to Cellular and Molecular Biology	
Chemistry		
Select one of the following:		4
CHEM 1021 & CHEM 1023	Introduction to Chemistry I and Introduction to Chemistry Laboratory I	
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 1022 & CHEM 1024	Introduction to Chemistry II and Introduction to Chemistry Laboratory II	
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)	
College of Science & Technology		

SCTC 1013	Elements of Data Science for the Physical and Life Sciences	3
SCTC 1501	STEM Challenge: The World Around Us	4
SCTC 1502	STEM Challenge: The World Within	4
SCTC 2396	Writing for Science and Technology	3
SCTC 3001	History of Science	3
SCTC 4396	Paradigms of Scientific Knowledge: Knowledge Discovery from Scientific Data	3
Computer Programming/Physics		
Select two of the following:		6-8
CIS 1051	Introduction to Problem Solving and Programming in Python [1]	
or CIS 1951	Honors Introduction to Problem Solving and Programming in Python	
or CIS 1057	Computer Programming in C	
CIS 1052	Introduction to Web Technology and Programming	
CIS 1053	Programming in Matlab	
PHYS 1004	Introduction to Astronomy (F)	
SCTC 3312	Coding STEM Lessons [2]	
Earth & Environmental Science		
EES 2001	Physical Geology	4
Mathematics		
Select one of the following:		4-8
MATH 1031	Differential and Integral Calculus	
MATH 1041 & MATH 1044	Calculus I and Introduction to Probability and Statistics for the Life Sciences [3]	
MATH 1041 & MATH 1042	Calculus I and Calculus II [3]	
MATH 1941 & MATH 1942	Honors Calculus I and Honors Calculus II [3]	
Physics		
Select one of the following:		4
PHYS 1021	Introduction to General Physics I	
PHYS 1061	Elementary Classical Physics I	
or PHYS 1961	Honors Elementary Classical Physics I	
PHYS 2021	General Physics I	
or PHYS 2921	Honors General Physics I	
Select one of the following:		4
PHYS 1022	Introduction to General Physics II	
PHYS 1062	Elementary Classical Physics II	
or PHYS 1962	Honors Elementary Classical Physics II	
PHYS 2022	General Physics II	
or PHYS 2922	Honors General Physics II	
Biology Concentration Electives		
Four Upper-Level (2200+) Biology Electives [4]		12-16
Science Breadth Electives		
Select one of the following:		3-4
ANTH 2705	Introduction to Evolutionary Anthropology	
CHEM 2201 & CHEM 2203	Organic Chemistry I and Organic Chemistry Laboratory I	
CHEM 2202 & CHEM 2204	Organic Chemistry II and Organic Chemistry Laboratory II	
ENST 2001	Environment and Society	
MATH 2031	Probability and Statistics	
PHIL 2157	Environmental Ethics	
SCTC 2100	Special Topics in Science and Technology	
SCTC 2101	Medical Imaging Physics - Seeing Through Ourselves	

SCTC 2102	SERC: Science of Energy Resource Consumption	
Select one of the following:		3-4
Any Upper-Level (2000+) CST Course		
Total Credit Hours		**76-88**

Code	Title	Credit Hours
(F) - Fall only course		
(S) - Spring only course		

1

Students may **not** take both CIS 1051 and CIS 1057 as their two CIS electives. They must choose one and then make another choice from the list for their second elective. Note: It is recommended that students take CIS 1051 as Python is the language of choice for most science programming needs.

2

SCTC 3312 is a variable credit course and must be taken for 3 credits in order to meet the requirement for this program. Since the default credits are set to 1, students must contact CSTbce@temple.edu to have an advisor change the credits to 3.

3

These courses are not required if MATH 1031 is completed.

4

The four electives (2200+) must all be taken from within the Biology department and must satisfy elective criteria of the department. **Note the Exception:** Natural Science majors in the Biology concentration are permitted to take BIOL 2001 Clinical Microbiology as an elective. In the circumstance where a laboratory course is the complement of a lecture course, both must be completed to fulfill the requirement for ONE science elective.

Suggested Academic Plan

Bachelor of Science in Natural Sciences with Concentration 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
Select one of the following:		4
MATH 1031	Differential and Integral Calculus	
MATH 1041 or MATH 1941	Calculus I or Honors Calculus I	
SCTC 1001	CST First Year Seminar	1
SCTC 1013	Elements of Data Science for the Physical and Life Sciences	3
SCTC 1501	STEM Challenge: The World Around Us	4
	Credit Hours	**16**
Spring		
Select one of the following:		4
BIOL 1112 or BIOL 1912	Introduction to Biomolecules, Cells and Genomes or Honors Introduction to Biomolecules, Cells and Genomes	
BIOL 2112 or BIOL 2912	Introduction to Cellular and Molecular Biology or Honors Introduction to Cellular and Molecular Biology	
Select one of the following: [1]		0-4
MATH 1042 or MATH 1942	Calculus II or Honors Calculus II	
MATH 1044	Introduction to Probability and Statistics for the Life Sciences	
SCTC 1502	STEM Challenge: The World Within	4

ENG 0802 or ENG 0812 or ENG 0902	Analytical Reading and Writing or Analytical Reading and Writing: ESL or Honors Writing About Literature	4
Elective		4-0
	Credit Hours	**16**
Year 2		
Fall		
Select one of the following:		4
CHEM 1021 & CHEM 1023	Introduction to Chemistry I and Introduction to Chemistry Laboratory I	
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	
EES 2001	Physical Geology	4
IH 0851 or IH 0951	Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life	3
GenEd Breadth Course		3
	Credit Hours	**14**
Spring		
Select one of the following:		4
CHEM 1022 & CHEM 1024	Introduction to Chemistry II and Introduction to Chemistry Laboratory II	
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	
Biology Elective (2200+) [2]		3-4
IH 0852 or IH 0952	Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good	3
GenEd Breadth Course		3
Elective		3-2
	Credit Hours	**16**
Year 3		
Fall		
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	
SCTC 3001	History of Science	3
Biology Elective (2200+) [2]		3-4
GenEd Breadth Course		3-4
Elective		2-0
	Credit Hours	**15**
Spring		
Select one of the following:		4
PHYS 1022	Introduction to General Physics II	
PHYS 1062 or PHYS 1962	Elementary Classical Physics II or Honors Elementary Classical Physics II	
PHYS 2022 or PHYS 2922	General Physics II or Honors General Physics II	
Select one of the following:		3-4

CIS 1051 or CIS 1951 or CIS 1057	Introduction to Problem Solving and Programming in Python or Honors Introduction to Problem Solving and Programming in Python or Computer Programming in C	
CIS 1052	Introduction to Web Technology and Programming	
CIS 1053	Programming in Matlab	
SCTC 3312	Coding STEM Lessons (must be taken for 3 credits)	
SCTC 2396	Writing for Science and Technology	3
GenEd Breadth Course		3
Elective		2-1
	Credit Hours	**15**
Year 4		
Fall		
Select one of the following:		3-4
PHYS 1004	Introduction to Astronomy (F)	
CIS 1051 or CIS 1951 or CIS 1057	Introduction to Problem Solving and Programming in Python or Honors Introduction to Problem Solving and Programming in Python or Computer Programming in C	
CIS 1052	Introduction to Web Technology and Programming	
CIS 1053	Programming in Matlab	
SCTC 3312	Coding STEM Lessons (must be taken for 3 credits)	
Biology Elective (2200+) [2]		3-4
Science Breadth Elective [3]		3-4
GenEd Breadth Course		3
Elective		3-0
	Credit Hours	**15**
Spring		
SCTC 4396	Paradigms of Scientific Knowledge: Knowledge Discovery from Scientific Data	3
Biology Elective (2200+) [2]		3-4
Science Breadth Elective [3]		3-4
Elective		3
Elective		4-2
	Credit Hours	**16**
	Total Credit Hours	**123**

1

These courses are not required if MATH 1031 is completed.

2

The four electives (2200+) must all be taken from within the Biology department and must satisfy elective criteria of the department. **Note the Exception:** Natural Science majors in the Biology concentration are permitted to take BIOL 2001 Clinical Microbiology as an elective. In the circumstance where a laboratory course is the complement of a lecture course, both must be completed to fulfill the requirement for ONE science elective.

3

See Requirements for course options.

Code	Title	Credit Hours
(F) - Fall only course		
(S) - Spring only course		