

Biochemistry, B.S.

Learn more about the Bachelor of Science in Biochemistry.

The Bachelor of Science degree in Biochemistry prepares students for excellence in graduate or medical school, and employment in the chemical, biotechnological, or pharmaceutical industries. Students learn a wide array of topics in Biology, Chemistry, Mathematics, and Physics. In upper division studies, Biochemistry majors learn to apply biochemical principles to real-life situations via problem-based approaches in their courses. Laboratory courses give students the tools they will need as biochemists to pursue research. Accomplished majors are encouraged to pursue independent research with a professor, and to present their work internally and at national meetings.

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Bachelor of Science

Summary of Requirements for the Degree

1. University Requirements (123 total s.h.)

- MATH 0701 (4 s.h.) and/or ENG 0701 (4 s.h.), if required by placement testing.
- All Temple students must take a minimum of two writing-intensive courses at Temple as part of their major. Following is a list of courses that can be used to satisfy the writing-intensive requirement:

Code	Title	Credit Hours
BIOL 2296	Genetics (S)	4
BIOL 3096	Cell Structure and Function (F)	4
CHEM 4196	Techniques of Chemical Measurement II	5

- 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 typically 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

- 45 Upper Level (2000+) credits within the College of Science & Technology (CST) or the College of Liberal Arts (CLA).
- 90 credits within the College of Science & Technology (CST) or the College of Liberal Arts (CLA).
- First Year Seminar Requirement: All students in the College of Science & Technology (CST) are required to take a 1 credit first year seminar course, SCTC 1001 CST First Year Seminar. Other courses that fulfill this requirement may be found on the CST College Requirements page. Only one course in this category may count towards graduation.

3. Major Requirements for Bachelor of Science (78-81 s.h.)

At least 10 courses required for the major must be completed at Temple. At least 4 Biology and 4 Chemistry courses must be completed at Temple.

Code	Title	Credit Hours
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 2211 & CHEM 2213	Organic Chemistry for Majors I and Organic Majors Laboratory I (F)	
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 2212 & CHEM 2214	Organic Chemistry for Majors II and Organic Majors Laboratory II (S)	
CHEM 2922 & CHEM 2924	Organic Chemistry for Honors II and Organic Honors Laboratory II (S)	
CHEM 3103 & CHEM 3105	Techniques of Chemical Measurement I and Introduction to Chemical Research Techniques	4

CHEM 3405	Physical Chemistry of Biomolecules	3
CHEM 4401	Biochemistry I	3
Biology		
BIOL 1111 or BIOL 1911	Introduction to Organismal Biology Honors Introduction to Organismal Biology	4
BIOL 2112 or BIOL 2912	Introduction to Cellular and Molecular Biology Honors Introduction to Cellular and Molecular Biology	4
BIOL 2296	Genetics (S)	4
BIOL 3096	Cell Structure and Function (F)	4
BIOL 3324	Molecular Biology (F)	3
BIOL 4344	Research Techniques in Biochemistry (S)	4
BIOL 4376	General Biochemistry II (F)	3
Biochemistry Electives		
Select two of the following: ¹		6-9
BIOL 3113	Genome Analytics	
BIOL 3128	Genomics and Infectious Disease Dynamics (F)	
BIOL 3201	Human Genetics (F)	
BIOL 3212	Introduction to Bioinformatics and Computational Biology	
BIOL 3225	Evolutionary Genetics (S)	
BIOL 3232	Behavioral Genetics (F)	
BIOL 3243	Parasitology (Not offered every year)	
BIOL 3265	Developmental Biology (F)	
BIOL 3301	Advanced Cell Biology (Not offered every year)	
BIOL 3317	General Microbiology (S)	
BIOL 3322	Biology of Plants (F)	
BIOL 3324	Molecular Biology (F)	
BIOL 3325	Research Techniques in Molecular Biology (S)	
BIOL 3327	Immunology (S)	
BIOL 3328	Virology (F)	
BIOL 3329	Developmental Genetics (Not offered every year)	
BIOL 3333	Advanced Techniques in Microscopy (S)	
BIOL 3334	Mammalian Physiology (S)	
BIOL 3352	Systems Neuroscience	
BIOL 3356	Organization and Development of the Nervous System (S)	
BIOL 3358	Cellular and Molecular Neuroscience (S)	
BIOL 3361	Molecular Neuropharmacology (Not offered every year)	
BIOL 3367	Endocrinology (F)	
BIOL 3368	Biology of Cancer (S)	
BIOL 3371	Cell Proliferation (S)	
BIOL 3373	Cell Signaling (S)	
BIOL 3374	Physical Biochemistry (S)	
BIOL 3379	Biotechnology (S)	
BIOL 3380	Contemporary Biology	
BIOL 3396	Scientific Writing for Biology: The Art of Communicating (S)	
BIOL 3403	Genomic Biology	
BIOL 4338	Epigenetics (Not offered every year)	
BIOL 4341	Genome Editing	
BIOL 4364	Biochemistry of Embryogenesis (F)	
BIOL 4365	Evolutionary Developmental Biology: Evo-Devo (S)	
BIOL 4366	Stem Cell Biology (F)	
BIOL 4375	General Biochemistry I (F)	
BIOL 4483	Accelerated Research in Biochemistry ¹	

BIOL 4491	Research in Biochemistry ¹	
CHEM 3001	Inorganic Chemistry	
CHEM 3301	Physical Chemistry Lecture I	
CHEM 3302	Physical Chemistry Lecture II	
CHEM 3397 & CHEM 3398	Physical Chemistry Laboratory I and Physical Chemistry Laboratory II	
CHEM 3881	Cooperative Research ¹	
CHEM 3891	Undergraduate Research ¹	
CHEM 4000-4800		
CHEM 4881	Cooperative Research ¹	
CHEM 4891	Undergraduate Research ¹	
Mathematics		
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
MATH 1042 or MATH 1942	Calculus II Honors Calculus II	4
MATH 2043 or MATH 2943	Calculus III Honors Calculus III	4
Physics		
Select one of the following:		4
PHYS 1061	Elementary Classical Physics I	
PHYS 1961	Honors Elementary Classical Physics I (F)	
PHYS 2021	General Physics I	
PHYS 2921	Honors General Physics I (F)	
Select one of the following:		4
PHYS 1062	Elementary Classical Physics II	
PHYS 1962	Honors Elementary Classical Physics II (S)	
PHYS 2022	General Physics II	
PHYS 2922	Honors General Physics II (S)	
Total Credit Hours		78-81

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

¹ A minimum of 6 credits of these research courses, in any combination, may be used to fulfill one of the Biochemistry Electives.

Note: Grades of C or higher in both CHEM 1031 and CHEM 1032 or their Honors alternates are required to take BIOL 2112. Grades of C or higher in BIOL 1111 and BIOL 2112 or their Honors alternates are required to take upper-level Biology courses, and a C- or higher is required unless otherwise specified in all other courses for the major, including course prerequisites. Most research and Independent Study courses are not available for major credit, such as:

Code	Title	Credit Hours
BIOL 3091	Research Methods	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	1-4
BIOL 4591	Research in Neuroscience	1 to 4

Calculation of Major GPA

Courses listed under the major requirements for the degree will be included in the calculation of the major GPA. Courses that could not apply toward the major as an elective or required course would not be counted in the calculation of the major GPA. This would include BIOL 1011, for example.

Distinction in Major

To graduate with Distinction in Major, students are required to achieve a 3.33 GPA or higher in all the Biology and Chemistry courses in their major.

Suggested Academic Plan

All prospective majors should schedule an appointment with one of the departmental advisors (names of current Faculty Advisors are available in the About section) to plan a program of study. The recommended order of courses for the major is listed below; a different order is acceptable as long as the student adheres to prerequisite requirements.

Bachelor of Science in Biochemistry

Requirements for New Students starting in the 2020-2021 Academic Year

Year 1		Credit Hours
Fall		
Select one of the following:		4
CHEM 1031 & CHEM 1033	General Chemistry I	
CHEM 1951 & CHEM 1953	Honors General Chemical Science I (F)	
MATH 1041 or 1941	Calculus I	4
SCTC 1001	CST First Year Seminar	1
General Education/Elective Credits		6
Term Credit Hours		15
Spring		
BIOL 1111 or 1911	Introduction to Organismal Biology	4
Select one of the following:		4
CHEM 1032 & CHEM 1034	General Chemistry II	
CHEM 1952 & CHEM 1954	Honors General Chemical Science II (S)	
MATH 1042 or 1942	Calculus II	4
General Education/Elective Credits		3
Term Credit Hours		15
Year 2		
Fall		
BIOL 2112 or 2912	Introduction to Cellular and Molecular Biology	4
Select one of the following:		4
CHEM 2201 & CHEM 2203	Organic Chemistry I	
CHEM 2211 & CHEM 2213	Organic Chemistry for Majors I (F)	
CHEM 2921 & CHEM 2923	Organic Chemistry for Honors I (F)	
Select one of the following:		4
PHYS 1061	Elementary Classical Physics I	
PHYS 1961	Honors Elementary Classical Physics I (F)	
PHYS 2021	General Physics I	
PHYS 2921	Honors General Physics I (F)	
General Education/Elective Credits		3
Term Credit Hours		15
Spring		

BIOL 2296	Genetics [WI] (S)	4
Select one of the following:		4
CHEM 2202 & CHEM 2204	Organic Chemistry II	
CHEM 2212 & CHEM 2214	Organic Chemistry for Majors II (S)	
CHEM 2922 & CHEM 2924	Organic Chemistry for Honors II (S)	
Select one of the following:		4
PHYS 1062	Elementary Classical Physics II	
PHYS 1962	Honors Elementary Classical Physics II (S)	
PHYS 2022	General Physics II	
PHYS 2922	Honors General Physics II (S)	
General Education/Elective Credits		3
Term Credit Hours		15
Year 3		
Fall		
BIOL 3096	Cell Structure and Function [WI] (F)	4
CHEM 3103	Techniques of Chemical Measurement I ¹	3
CHEM 3105	Introduction to Chemical Research Techniques ¹	1
MATH 2043 or 2943	Calculus III	4
General Education/Elective Credits		3
Term Credit Hours		15
Spring		
CHEM 3405	Physical Chemistry of Biomolecules ²	3
CHEM 4401	Biochemistry I	3
General Education/Elective Credits		10
Term Credit Hours		16
Year 4		
Fall		
BIOL 3324	Molecular Biology (F)	3
BIOL 4376	General Biochemistry II (F)	3
Biochemistry Elective ²		3-4
General Education/Elective Credits		7-6
Term Credit Hours		16
Spring		
BIOL 4344	Research Techniques in Biochemistry (S)	4
Biochemistry Elective ²		3-5
General Education/Elective Credits		9-7
Term Credit Hours		16
Total Credit Hours:		123

¹ It is strongly encouraged that CHEM 3103/CHEM 3105 be taken prior to any laboratory courses numbered above CHEM 3105.

² Biochemistry majors who want to take CHEM 4196 or the combination of CHEM 3397 & CHEM 3398 as a Biochemistry elective **must** take the CHEM 3301-CHEM 3302 sequence as CHEM 3405 does not serve as a prerequisite for these courses or any other course that has CHEM 3301 as a prerequisite or co-requisite.

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Biochemistry Electives

Students are required to take two courses from the following list:

Code	Title	Credit Hours
Select two of the following:		
BIOL 3113	Genome Analytics	6-9
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BIOL 3201	Human Genetics (F)	
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