Biophysics, B.S.

The Bachelor of Science in Biophysics fulfills all medical and pharmacy school requirements. Biophysics students interested in research careers can pursue a graduate degree in biophysics, biology, molecular biology or neuroscience, as well as the combined MD/PhD degree in medical physics, health physics or nuclear medicine.

Undergraduate Contact Information:

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abricker@temple.edu

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:
     | Course     | Title                                      | Credits |
     |------------|--------------------------------------------|---------|
     | BIOL 2296  | Genetics (S)                               | 4       |
     | BIOL 3096  | Cell Structure and Function (F)            | 4       |
     | BIOL 3396  | Scientific Writing for Biology: The Art of Communicating | 3       |
     | CHEM 4196  | Techniques of Chemical Measurement II      | 5       |
     | CHEM 3397 & CHEM 3398 | Physical Chemistry Laboratory I and Physical Chemistry Laboratory II | 4       |
     | MATH 3098  | Modern Algebra (F)                         | 3       |
     | MATH 4096  | Senior Problem Solving                     | 3       |
     | PHYS 2796  | Introduction to Modern Physics (S)         | 4       |
     | PHYS 4796  | Experimental Physics                       | 3       |
   • Students must complete the General Education (GenEd) requirements.
     • See the General Education (http://bulletin.temple.edu/undergraduate/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 (http://bulletin.temple.edu/undergraduate/academic-policies/academic-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).

3. Major Requirements for Bachelor of Science (75-79 s.h.)

At least 10 courses required for the major must be completed at Temple. At least 3 Biology and 4 Physics courses must be completed at Temple.

### Biology

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 2112</td>
<td>Introduction to Biology II</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 2912</td>
<td>Honors Introduction to Biology II</td>
<td></td>
</tr>
<tr>
<td>BIOL 2296</td>
<td>Genetics (S)</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 3096</td>
<td>Cell Structure and Function (F)</td>
<td>4</td>
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### Physics

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
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<tr>
<td>PHYS 1961</td>
<td>Honors Elementary Classical Physics I (F)</td>
<td></td>
</tr>
<tr>
<td>PHYS 2021</td>
<td>General Physics I</td>
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</tr>
<tr>
<td>PHYS 2921</td>
<td>Honors General Physics I (F)</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 1062</td>
<td>Elementary Classical Physics II</td>
<td>4</td>
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<td>PHYS 1962</td>
<td>Honors Elementary Classical Physics II (S)</td>
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<tr>
<td>PHYS 2022</td>
<td>General Physics II</td>
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<tr>
<td>PHYS 2922</td>
<td>Honors General Physics II (S)</td>
<td></td>
</tr>
<tr>
<td>PHYS 2502</td>
<td>Mathematical Physics (S)</td>
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</tr>
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<td>PHYS 2796</td>
<td>Introduction to Modern Physics (S)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 3301</td>
<td>Electricity and Magnetism (F)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 4101</td>
<td>Thermal Physics (F)</td>
<td>3</td>
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### Chemistry

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1031</td>
<td>General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 1033</td>
<td>and General Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>CHEM 1951</td>
<td>Honors General Chemical Science I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 1953</td>
<td>and Honors Chemical Science Laboratory I (F)</td>
<td></td>
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Select one of the following:

<table>
<thead>
<tr>
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<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 1032</td>
<td>General Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 1034</td>
<td>and General Chemistry Laboratory II</td>
<td></td>
</tr>
<tr>
<td>CHEM 1952</td>
<td>Honors General Chemical Science II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 1954</td>
<td>and Honors Chemical Science Laboratory II (S)</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 2201</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 2203</td>
<td>and Organic Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>CHEM 2211</td>
<td>Organic Chemistry for Majors I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 2213</td>
<td>and Organic Majors Laboratory I (F)</td>
<td></td>
</tr>
<tr>
<td>CHEM 2921</td>
<td>Organic Chemistry for Honors I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 2923</td>
<td>and Organic Honors Laboratory I (F)</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 2202</td>
<td>Organic Chemistry II</td>
<td>4</td>
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<td>&amp; CHEM 2204</td>
<td>and Organic Chemistry Laboratory II</td>
<td></td>
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<tr>
<td>CHEM 2212</td>
<td>Organic Chemistry for Majors II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 2214</td>
<td>and Organic Majors Laboratory II (S)</td>
<td></td>
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</tbody>
</table>
Biophysics, B.S.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 2922 &amp; CHEM 2924</td>
<td>Organic Chemistry for Honors II and Organic Honors Laboratory II (S)</td>
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### Mathematics

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 1041</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 1941</td>
<td>Honors Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 1042</td>
<td>Calculus II</td>
<td>4</td>
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<tr>
<td>or MATH 1942</td>
<td>Honors Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 2043</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 2943</td>
<td>Honors Calculus III</td>
<td></td>
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</table>

### Biophysics Electives

Four 2000+ Biophysics Electives chosen in consultation with the Physics faculty advisor. At least two of the electives must be Physics courses.

<table>
<thead>
<tr>
<th>Current</th>
<th>Total Credit Hours</th>
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<tbody>
<tr>
<td>12-16</td>
<td>75-79</td>
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</table>

(F) - Fall only course  
(S) - Spring only course

1 A grade of C or higher in CHEM 1031 and CHEM 1032 is required to take BIOL 1111 and BIOL 2112. A grade of C or higher in BIOL 1111 and BIOL 2112 is 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.

**Note:** Most research and Independent Study courses are not available for major credit, such as:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 2082</td>
<td>Independent Research I</td>
<td>1 - 4</td>
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<tr>
<td>BIOL 3082</td>
<td>Independent Research II</td>
<td>1 - 4</td>
</tr>
<tr>
<td>BIOL 3091</td>
<td>Research Methods</td>
<td>3</td>
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<tr>
<td>BIOL 3681</td>
<td>Cooperative Studies</td>
<td>2 - 4</td>
</tr>
<tr>
<td>BIOL 4291</td>
<td>Extradepartmental Research</td>
<td>1 - 4</td>
</tr>
<tr>
<td>BIOL 4483</td>
<td>Accelerated Research in Biochemistry</td>
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<tr>
<td>BIOL 4491</td>
<td>Research in Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 4591</td>
<td>Research in Neuroscience</td>
<td>1 - 4</td>
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</table>

### 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

A student who wishes to graduate with Distinction in the Major must complete all courses required for the biophysics major with a GPA of 3.5 or better, and carry out an independent study or undergraduate thesis project. Consult the undergraduate physics advisor for more details.

### Suggested Academic Plan

#### Bachelor of Science in Biophysics

#### Requirements for New Students starting in the 2017-2018 Academic Year

**Year 1**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Credit Hours</th>
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<tr>
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<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td></td>
<td>CHEM 1031 &amp; CHEM 1033</td>
<td>General Chemistry I</td>
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<tr>
<td></td>
<td>CHEM 1951 &amp; CHEM 1953</td>
<td>Honors General Chemical Science I (F)</td>
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<td>MATH 1041 or 1941</td>
<td>Calculus I</td>
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<td>General Education/Elective Credits</td>
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**Spring**
<table>
<thead>
<tr>
<th>Year 2</th>
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<th>Year 3</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td><strong>Fall</strong></td>
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<tr>
<td>Select one of the following:</td>
<td>4</td>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>CHEM 1032 &amp; CHEM 1034</td>
<td>General Chemistry II</td>
<td>PHYS 1062 &amp; PHYS 1962</td>
<td>Elementary Classical Physics II</td>
</tr>
<tr>
<td>CHEM 1952 &amp; CHEM 1954</td>
<td>Honors General Chemical Science II (S)</td>
<td>PHYS 2022 &amp; PHYS 2922</td>
<td>General Physics II</td>
</tr>
<tr>
<td>MATH 1042 or 1942</td>
<td>Calculus II</td>
<td></td>
<td>Honors General Physics II (S)</td>
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<tr>
<td><strong>General Education/Elective Credits</strong></td>
<td>8</td>
<td><strong>General Education/Elective Credits</strong></td>
<td>4-3</td>
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<tr>
<td><strong>Term Credit Hours</strong></td>
<td>16</td>
<td><strong>Term Credit Hours</strong></td>
<td>15</td>
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<table>
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<tr>
<th>Spring</th>
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<th>Spring</th>
<th></th>
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<tbody>
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<td>Select one of the following:</td>
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<td>Select one of the following:</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 2201 &amp; CHEM 2203</td>
<td>Organic Chemistry I</td>
<td>PHYS 1062 &amp; PHYS 1962</td>
<td>Elementary Classical Physics II</td>
</tr>
<tr>
<td>CHEM 2211 &amp; CHEM 2213</td>
<td>Organic Chemistry for Majors I (F)</td>
<td>PHYS 2022</td>
<td>General Physics II</td>
</tr>
<tr>
<td>CHEM 2921 &amp; CHEM 2923</td>
<td>Organic Chemistry for Honors I (F)</td>
<td>PHYS 2922</td>
<td>Honors General Physics II (S)</td>
</tr>
<tr>
<td>MATH 2043 or 2943</td>
<td>Calculus III</td>
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<td><strong>General Education/Elective Credits</strong></td>
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<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
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<tr>
<td>PHYS 1961</td>
<td>Honors Elementary Classical Physics I (F)</td>
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<tr>
<td>PHYS 2021</td>
<td>General Physics I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 2921</td>
<td>Honors General Physics I (F)</td>
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**Term Credit Hours** 15
<table>
<thead>
<tr>
<th>Year 4</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>BIOL 3096</td>
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<tr>
<td>PHYS 4101</td>
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<tr>
<td>2000+ Biophysics Elective¹</td>
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<tr>
<td>General Education/Elective Credits</td>
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<td><strong>Term Credit Hours</strong></td>
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<table>
<thead>
<tr>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 2296</td>
</tr>
<tr>
<td>2000+ Biophysics Elective¹</td>
</tr>
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<td>General Education/Elective Credits</td>
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<tr>
<td><strong>Term Credit Hours</strong></td>
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<tr>
<td><strong>Total Credit Hours:</strong></td>
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</table>

(F) - Fall only course
(S) - Spring only course

¹ Four electives must be chosen in consultation with the physics advisor. All courses must be 2000-level or above. At least two electives must be Physics courses. Choose courses in Physics, Biology (Neurobiology, Genetics, Cell Structure, Physiology), Chemistry (Physical Chemistry), Biochemistry and Biophysics. Recommended for graduate school in Physics: PHYS 2101, PHYS 3302, PHYS 3701 and PHYS 4796 and as much of the B.S. program in Physics as time allows. Students planning to go to medical school should complete BIOL 1111 Introduction to Biology I.