## Engineering and Physics

The Sc.B. program in Engineering and Physics is sponsored jointly by the School of Engineering and the Department of Physics. The program is designed to ensure that students take a significant portion of the usual curriculum in Engineering and in Physics, obtain substantial laboratory experience, and take several upper-level elective courses, focusing on applied science. Students may take either the standard Physics or Engineering programs during their freshman and sophomore years and then switch to this combined program. The Sc.B. degree program in Engineering and Physics is not accredited by ABET.

The following standard program assumes that a student begins mathematics courses at Brown with MATH 0170 or its equivalent. Students who begin in MATH 0200 can substitute an additional science, engineering or higher-level mathematics course for the MATH 0170 or MATH 0190 requirement. To accommodate the diverse preparation of individual students, variations of the following sequences and their prerequisites are possible with permission of the appropriate concentration advisor and the instructors involved. We recommend that each student’s degree program be submitted for prior approval (typically in semester four) and scrutinized for compliance (in semester seven) by one faculty member from the Department of Physics and one faculty member from the School of Engineering.

Select one of the following two course sequences:

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ENGN 0030 &amp; ENGN 0040</td>
<td>Introduction to Engineering and Dynamics and Vibrations (ENGN 0031 may be substituted for ENGN 0030)</td>
</tr>
<tr>
<td></td>
<td>PHYS 0050 &amp; PHYS 0060</td>
<td>Foundations of Mechanics and Foundations of Electromagnetism and Modern Physics</td>
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<tr>
<td></td>
<td>PHYS 0070 &amp; PHYS 0160</td>
<td>Analytical Mechanics and Introduction to Relativity and Quantum Physics</td>
</tr>
<tr>
<td></td>
<td>MATH 0190</td>
<td>Advanced Placement Calculus (Physics/Engineering)</td>
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<tr>
<td>or MATH 0170</td>
<td>Advanced Placement Calculus</td>
<td></td>
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<tr>
<td></td>
<td>MATH 0200</td>
<td>Intermediate Calculus (Physics/Engineering)</td>
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<tr>
<td>or MATH 0180</td>
<td>Intermediate Calculus</td>
<td></td>
</tr>
<tr>
<td>or MATH 0350</td>
<td>Honors Calculus</td>
<td></td>
</tr>
</tbody>
</table>

Select three additional higher-level math, applied math, or mathematical physics (PHYS 0720) courses.

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CSCI 0040</td>
<td>Introduction to Scientific Computing and Problem Solving</td>
</tr>
<tr>
<td>or CSCI 0150</td>
<td>Introduction to Object-Oriented Programming and Computer Science</td>
</tr>
<tr>
<td>or CSCI 0170</td>
<td>Computer Science: An Integrated Introduction</td>
</tr>
<tr>
<td>or CSCI 0190</td>
<td>Accelerated Introduction to Computer Science</td>
</tr>
<tr>
<td>ENGN 0510</td>
<td>Electricity and Magnetism</td>
</tr>
<tr>
<td>or PHYS 0470</td>
<td>Electricity and Magnetism</td>
</tr>
<tr>
<td>ENGN 1560</td>
<td>Optics</td>
</tr>
<tr>
<td>or PHYS 1510</td>
<td>Advanced Electromagnetic Theory</td>
</tr>
<tr>
<td>PHYS 0500</td>
<td>Advanced Classical Mechanics</td>
</tr>
<tr>
<td>or ENGN 1370</td>
<td>Advanced Engineering Mechanics</td>
</tr>
<tr>
<td>PHYS 1410</td>
<td>Quantum Mechanics A</td>
</tr>
<tr>
<td>PHYS 1420</td>
<td>Quantum Mechanics B</td>
</tr>
<tr>
<td>PHYS 1530</td>
<td>Thermodynamics and Statistical Mechanics</td>
</tr>
<tr>
<td>or ENGN 0720</td>
<td>Thermodynamics</td>
</tr>
<tr>
<td>ENGN 1620</td>
<td>Analysis and Design of Electronic Circuits</td>
</tr>
<tr>
<td>CHEM 0330</td>
<td>Equilibrium, Rate, and Structure</td>
</tr>
<tr>
<td>or ENGN 0310</td>
<td>Mechanics of Solids and Structures</td>
</tr>
<tr>
<td>or ENGN 0810</td>
<td>Fluid Mechanics</td>
</tr>
</tbody>
</table>

or PHYS 1600 | Computational Physics |
| ENGN 0410 | Materials Science |
| or ENGN 1690 | Phoirtics and Applications |
| or PHYS 0560 | Experiments in Modern Physics |
| PHYS 1560 | Modern Physics Laboratory |
| or ENGN 1590 | Introduction to Semiconductors and Semiconductor Electronics |

or an approved 2000-level engineering or physics course.

A thesis under the supervision of a physics or engineering faculty member:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PHYS 1990</td>
<td>Senior Conference Course</td>
</tr>
<tr>
<td>or ENGN 1970</td>
<td>Independent Studies in Engineering</td>
</tr>
<tr>
<td>or ENGN 1971</td>
<td>Independent Study in Engineering</td>
</tr>
</tbody>
</table>

* Students are also encouraged to take courses dealing with the philosophical, ethical, or political aspects of science and technology.

Total Credits: 19
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Helvetica was used instead of Arial.
The editor may contact Leepfrog for a draft with the correct fonts in place.