

Engineering and Physics

The program is designed to ensure that students take a significant portion of the usual curriculum in Engineering and Physics (<https://engineering.brown.edu/undergraduate/concentrations/engineering-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 first and second years and then switch to this combined program. The Sc.B. degree program in Engineering and Physics is not accredited by ABET and is mostly intended to prepare students for graduate study in applied science and engineering. Since the requirements include both quantum mechanics with the physics concentrators and analog electronics with EE concentrators, as well as more mathematics than either Physics or Engineering, it is one of the more demanding programs at Brown.

The following standard program assumes that a student begins mathematics courses at Brown with MATH 0100 or MATH 0190. Students who begin in MATH 0200 can substitute an additional science, engineering or higher-level mathematics course for the 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: 2

ENGN 0040 & ENGN 0030 or ENGN 0031 or ENGN 0032	Engineering Statics and Dynamics and Introduction to Engineering Honors Introduction to Engineering Introduction to Engineering: Design	
PHYS 0050 & PHYS 0060	Foundations of Mechanics and Foundations of Electromagnetism and Modern Physics	
PHYS 0070 & PHYS 0160	Analytical Mechanics and Introduction to Relativity, Waves and Quantum Physics	
MATH 0190 or MATH 0100	Single Variable Calculus, Part II (Physics/ Engineering) Single Variable Calculus, Part II	1
MATH 0200 or MATH 0180 or MATH 0350	Multivariable Calculus (Physics/ Engineering) Multivariable Calculus Multivariable Calculus With Theory	1
Select three additional higher-level math, applied math, or mathematical physics (PHYS 0720) courses.		3
CSCI 0111 or APMA 0160 or CSCI 0150 or CSCI 0170 or CSCI 0190	Computing Foundations: Data Introduction to Scientific Computing Introduction to Object-Oriented Programming and Computer Science Computer Science: An Integrated Introduction Accelerated Introduction to Computer Science	1
ENGN 0510 or PHYS 0470	Electricity and Magnetism Electricity and Magnetism	1
ENGN 1690 or PHYS 1510	Photonics Devices and Sensors Advanced Electromagnetic Theory	1
PHYS 0500 or ENGN 1370	Advanced Classical Mechanics Advanced Engineering Mechanics	1
PHYS 1410	Quantum Mechanics A	1
PHYS 1420	Quantum Mechanics B	1
PHYS 1530	Thermodynamics and Statistical Mechanics	1

or ENGN 0720	Thermodynamics	
ENGN 1620	Analysis and Design of Electronic Circuits	1
CHEM 0330 or ENGN 0310 or ENGN 0810 or PHYS 1600	Equilibrium, Rate, and Structure Mechanics of Solids and Structures Fluid Mechanics Computational Physics	1
ENGN 0410 or ENGN 1690 or PHYS 0560	Materials Science Photonics Devices and Sensors Experiments in Modern Physics	1
PHYS 1560 or ENGN 1590	Modern Physics Laboratory Introduction to Semiconductors and Semiconductor Electronics	1
or an approved 2000-level engineering or physics course.		
A thesis under the supervision of a physics or engineering faculty member:		1
PHYS 1990 or ENGN 1970 or ENGN 1971 or ENGN 1972 or ENGN 1973	Senior Conference Course Independent Studies in Engineering Independent Study in Engineering Independent Study in Engineering Design Independent Study in Engineering Design	
* Students are also encouraged to take courses dealing with the philosophical, ethical, or political aspects of science and technology.		

Total Credits 19