

Biophysics

Biophysics is a quantitative science at the intersection of the life and physical sciences. It requires a significant level of competence in physics, chemistry, biology and math as reflected in the concentration requirements. Students should work with their concentration advisor to develop a focused academic plan that complements the required research component of the concentration and allows students to develop analytical and quantitative skills. Students are expected to take courses that will count toward the concentration for a grade (ABC/NC).

Student Goals:

Students in this concentration will:

- Explore the relationship between biological and physical principles by successfully completing foundational courses in biology, physics, math and chemistry
- Gain an in-depth knowledge of the interdisciplinary nature of life and physical sciences by selecting and successfully completing advanced courses in biology, physics, math, chemistry or related fields
- Develop skills to identify and analyze critical questions central to biophysics
- Apply quantitative methods to problems at the interface of life and physical sciences
- Complete a research project with a faculty advisor that focuses on a particular theme or problem in the field of biophysics where students apply knowledge gained throughout the curriculum.

Additional detailed information about the field of Biophysics may be found at: <https://www.brown.edu/academics/biology/undergraduate-education/undergraduate/biophysics> (<https://www.brown.edu/academics/biology/undergraduate-education/undergraduate/biophysics/>)

Standard program for the Sc.B. degree

Requirements

Physics

One of the following series: 2

PHYS 0030 & PHYS 0040 Basic Physics A and Basic Physics B ¹

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

PHYS 0470 Electricity and Magnetism 1

Chemistry

CHEM 0330 Equilibrium, Rate, and Structure 1

CHEM 0350 Organic Chemistry 1

Select one other advanced Chemistry Course 1

Math

MATH 0090 Introductory Calculus, Part I (or equivalent) 1

MATH 0100 Introductory Calculus, Part II (or equivalent) 1

MATH 0180 Intermediate Calculus (or equivalent) 1

Biology

BIOL 0200 The Foundation of Living Systems (or equivalent) 1

Select four additional biology or neuroscience courses chosen with approval of the advisor. 4

Directed Research: Students must take two semesters of research which may be satisfied by any of the opportunities listed below: 2

Directed Research in Biology (BIOL 1950/BIOL 1960), Chemistry (CHEM 0970/CHEM 0980), or Physics (PHYS 1980)

COEX courses

A summer research experience in equivalent scope and scale to an independent study, but this would not count as course credit toward the concentration

Electives: Four electives in biology, physics, math/applied math, chemistry, neuroscience, engineering or computer science; at least 2 courses must be above the introductory level ² 4

Total Credits 20

¹ The PHYS 0050/0060 or 0070/0160 sequences are preferred to PHYS 0030/0040.

² Sample electives can be found on the Biology Undergraduate Education page (<https://www.brown.edu/academics/biology/undergraduate-education/undergraduate/biophysics/>).