

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.

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

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 I 1

Select one other advanced Chemistry Course 1

Math

MATH 0090 Single Variable Calculus, Part I (or equivalent) 1

MATH 0100 Single Variable Calculus, Part II (or equivalent) 1

MATH 0180 Multivariable 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/>).