# Neuroscience

Neuroscience is an interdisciplinary field that seeks to understand the functions and diseases of the nervous system. It draws on knowledge from neurobiology as well as elements of psychology and cognitive science, and mathematical and physical principles involved in modeling neural systems. Through the Neuroscience concentration, students develop foundational knowledge through courses in biology, chemistry, and mathematics as well as three core courses in neuroscience. They are also required to develop facility with research methodologies (through courses in statistics and laboratory methods) before moving into specific topics in the field (e.g., visual physiology, neurochemistry and behavior, and synaptic transmission and plasticity). Members of the Neuroscience faculty are affiliated with the Brown Institute for Brain Science, a multidisciplinary program that promotes collaborative research about the brain. Prospective concentrators should contact Elyse_Netto@brown.edu in order to have a faculty advisor assigned to them.

## Standard program for the Sc.B. degree

The concentration combines a general science background with a number of specific courses devoted to the cellular, molecular, and integrative functions of the nervous system. The concentration allows considerable flexibility for students to tailor a program to their individual interests. Elective courses focus on a variety of areas including molecular mechanisms, cellular function, sensory and motor systems, neuropharmacology, learning and memory, animal behavior, cognitive function, bioengineering, theoretical neuroscience and computer modeling.

The concentration in neuroscience leads to an Sc.B. degree. The following background courses, or their equivalent, are required for the degree:

### Background Courses:
- **MATH 0090** Introductory Calculus, Part I
- **MATH 0100** Introductory Calculus, Part II
- **PHYS 0030** Basic Physics A
- **PHYS 0040** Basic Physics B
- **BIOL 0200** The Foundation of Living Systems
- **CHEM 0330** Equilibrium, Rate, and Structure
- **CHEM 0350** Organic Chemistry

### Core Concentration Courses:
- **NEUR 0010** The Brain: An Introduction to Neuroscience
- **NEUR 1020** Principles of Neurobiology
- **NEUR 1030** Neural Systems

### One critical reading course
- **NEUR 1440** Mechanisms and Meaning of Neural Dynamics
- **NEUR 1530** Communication In the Brain: What We Know and How We Know It
- **NEUR 1560** Developmental Neurobiology
- **NEUR 1970** Independent Study
- **CLPS 1760** The Moral Brain
- **PHP 1890** The Craving Mind
- **1930/40 Topics in Neuroscience**

### One statistics course
- **PHP 1501** Essentials of Data Analysis
- **PHP 1510** Principles of Biostatistics and Data Analysis
- **PHP 2510** Principles of Biostatistics and Data Analysis
- **APMA 0650** Essential Statistics
- **APMA 1650** Statistical Inference I
- **CLPS 0900** Statistical Methods

### One lab method
- **NEUR 0680** Introduction to Computational Neuroscience
- **NEUR 1600** Experimental Neurobiology
- **NEUR 1630** Big Data Neuroscience Lab
- **NEUR 1650** Structure of the Nervous System
- **NEUR 1660** Neural Computation in Learning and Decision-Making
- **NEUR 1670** Neuropharmacology and Synaptic Transmission
- **NEUR 1680** Computational Neuroscience
- **NEUR 1970** Independent Study
- **CLPS 1194** Sleep and Chronobiology Research
- **CLPS 1490** Functional Magnetic Resonance Imaging: Theory and Practice
- **CLPS 1491** Neural Modeling Laboratory
- **CLPS 1492** Computational Cognitive Neuroscience
- **BIOL 0800** Principles of Physiology
- **BIOL 1880** Comparative Biology of the Vertebrates

### Four electives related to neuroscience
- **NEUR 0650** Biology of Hearing
- **NEUR 0680** Introduction to Computational Neuroscience
- **NEUR 1040** Introduction to Neurogenetics
- **NEUR 1440** Mechanisms and Meaning of Neural Dynamics
- **NEUR 1540** Neurobiology of Learning and Memory
- **NEUR 1560** Developmental Neurobiology
- **NEUR 1600** Experimental Neurobiology
- **NEUR 1630** Big Data Neuroscience Lab
- **NEUR 1650** Structure of the Nervous System
- **NEUR 1660** Neural Computation in Learning and Decision-Making
- **NEUR 1670** Neuropharmacology and Synaptic Transmission
- **NEUR 1740** The Diseased Brain: Mechanisms of Neurological and Psychiatric Disorders
- **NEUR 1970** Independent Study
- **NEUR 2110** Statistical Neuroscience
- **All NEUR 1930/1940 Seminar Course**
- **CLPS 0120** Introduction to Sleep
- **CLPS 1150** Memory and the Brain
- **CLPS 1193** Laboratory in Genes and Behavior
- **CLPS 1400** The Neural Bases of Cognition
- **CLPS 1478** Translational Models of Neuropsychiatric Disorder
- **CLPS 1480C** Cognitive Control Functions of the Prefrontal Cortex
- **CLPS 1490** Functional Magnetic Resonance Imaging: Theory and Practice

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<th>Course Code</th>
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<tbody>
<tr>
<td>SOC 1100</td>
<td>Introductory Statistics for Social Research</td>
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<tr>
<td>BIOL 0495</td>
<td>Statistical Analysis of Biological Data</td>
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<td>Affective Neuroscience</td>
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<td>The Nature of Attention</td>
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<td>BIOL 1100</td>
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<td>BIOL 1545</td>
<td>Human Genetics and Genomics</td>
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<td>COST 1020</td>
<td>Cognitive Neuroscience of Meditation</td>
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**Total Credits** 17

1 Independent study and honors research projects are encouraged.