# Neuroscience Program

*Director:* Christelle Sabatier (Biology)

*Assistant Director:* Patti Simone (Psychology)

*Faculty*: Lang Chen (Psychology), Laura Cocas (Biology), Lindsay Halladay (Psychology)

Neuroscience examines the bidirectional relationship between the nervous system and behavior from the perspective of a variety of disciplines including biology, psychology, chemistry, computer science, philosophy, and engineering. The neuroscience curriculum at Santa Clara is structured so that students learn to analyze the complexities of human and non-human behavior using multiple approaches. Students learn how individual neurons produce and process electrochemical signals required for cellular communication (cellular and molecular neuroscience). Students study neural circuits that process sensory information from the environment and produce motor behavior and other adaptive output (systems neuroscience). Students study thought, emotion, and behavior by looking at the structure and function of brains in normal and diseased states (behavioral and cognitive neuroscience). Majoring in neuroscience prepares students for graduate work and careers in a variety of fields that seek to better understand and impact the nervous system, cognition, and mental health.

## Requirements for the Major

In addition to fulfilling the undergraduate Core Curriculum requirements for the bachelor of science degree, students majoring in neuroscience must complete the following requirements:

* NEUR 1, 10, 150, 190
* BIOL 1A, 1B, 1C, 122, 160
* CHEM 11, 12, (or 14) 31, 32, 33
* MATH 35 or 11 (35 recommended)
* MATH 36 or 12 or CSCI 10
* PHIL 32 (recommended)
* PSYC 1, 165, 169
* One from BIOL 110, 120, 123, 165, 172, 174, 175, 178; CHEM 143
* One from PSYC 120, 166, 167, 196
* One additional course from: BIOL 110, 119, 120, 123, 123A, 124, 165, 171, 172, 174, 175, 178; CHEM 141
* One additional course from: COMM 176A; PHIL 113, 117, 153, 158, 160, 161; PSYC 120, 130, 138, 166, 167, 196
* Recommended courses for students intending to pursue graduate work in Neuroscience: PHYS 11, 12, 13 or PHYS 31, 32, 33

## Lower-Division Courses

### 1. Introduction to Neuroscience

This course introduces fundamental concepts in neuroscience. Students will consider the importance of biological and environmental factors on brain function and behavior. Students will examine interdisciplinary approaches to problems in neuroscience and engage with important ethical and societal issues in neuroscience (e.g., Alzheimer’s disease, cognition, addiction). (4 units)

### 10. Explorations in Neuroscience

A course with a focus on foundational knowledge essential to the field (e.g., neurons, neuroanatomy, neurophysiology) with an introduction to research methodologies to be able to understand and conduct neuroscience research. Lecture and lab. Prerequisite: NEUR 1 and Neuroscience major or permission of instructor. (5 units)

## Upper-Division Courses

### 150. Neuroscience Research Seminar

Junior-level course using journal readings and invited neuroscientists from on- and off-campus to discuss research from several disciplines (e.g., biology, chemistry, engineering, ethics, psychology). An opportunity for majors to explore potential career paths and strategies, discuss the scientific merit of original research and and be introduced to neuroscientists in a variety of fields and professions. Course may be repeated multiple times. Prerequisite: NEUR 10. Recommended but not required: ENVS 110/BIOL 160. (2 units)

### 190. Neuroscience Capstone

This senior-level capstone experience examines the breadth and depth of the neuroscience discipline, using in-class primary research presentations, career exploration and preparation projects, as well as a final capstone project to investigate both theory and practice to answer new questions in neuroscience today.. Prerequisites: BIOL 122, NEUR 150 and ENVS 110/BIOL 160. (5 units)

### 198. Neuroscience Internship

A course where students can learn how they can best apply classroom instruction to their career objectives through an academically supported work or volunteer experience outside of Santa Clara University. Internships should encourage career skills and professional growth and serve to introduce the student to the range of opportunities afforded a degree in the discipline. To be eligible for this course, students must present an outline of their projected work as part of the internship to the Neuroscience program director no later than the sixth week of the term preceding the start of the project. Number of units will be determined based on the expected time commitment. Prerequisite: departmental and University permission. P/NP grading. (1-5 units)