NEUROSCIENCE

Neuroscience confronts fundamental questions about human nature and the natural world. It is an integrative discipline, using knowledge and tools from the sciences, psychology, and philosophy to approach complex challenges. The neuroscience major and minor prepare students to approach these challenges from a foundation of broad-based proficiency in the sciences. Students develop a sophisticated ability to imagine the promise of and analyze the limitations of current neuroscience research. The intellectual coherence of the program is established through intermediate-level core courses that employ integrative, project-based pedagogy; advanced courses that stimulate exploration of the research literature, developing integrative thinking by virtue of the integrative nature of the discipline; and engagement with historical and philosophical perspectives on the conduct and purpose of science.

Alo C. Basu, Ph.D., *Director*, Associate *Professor, Psychology*

Academic Plans within Neuroscience:

- Neuroscience Major (https://catalog.holycross.edu/academic-plans/neuroscience/neuroscience-major/)
- Neuroscience Minor (https://catalog.holycross.edu/academic-plans/neuroscience/neuroscience-minor/)

NEUR 110 — Introduction to Neuroscience Course count: 1
This course is a broad introduction to neuroscience including topics in comparative vertebrate and invertebrate neuroanatomy, neurophysiology, sensory and motor systems, behavioral neurobiology, neuropharmacology, and neural basis of cognition. Important general principles of nervous system structure and function will be emphasized, as well as broad scientific proficiency as a foundation for further interdisciplinary study of the neural basis of behavior.

Students who have taken PSYC 221 or 235 may not enroll in this course.
GPA units: 1
Common Area: Natural Science
Typically Offered: Fall

NEUR 210 — Neuroethology with Physics Course count: 1
How does the nervous system of an organism produce natural, adaptive behaviors? A bat emits ultrasonic sounds and then uses the echoes to map objects in the space around it. A toad detects a specific set of stimulus features to identify a fly as prey and executes a swift, precise predatory behavioral pattern. A species of migratory bird uses cues based on the earth's magnetic field to navigate over continental distances. In the natural world, animals exhibit elegant behaviors in response to relevant sensory phenomena. Neuroethology is the study of the neural mechanisms that serve these behaviors. Learning about these mechanisms in turn informs our understanding of how the human nervous system might produce complex behaviors. Students will be introduced to basic functional neuroanatomy of invertebrate and vertebrate systems, neurophysiology, and relevant topics in physics.

Prerequisite: NEUR 110 or BIOL 161 and permission of the Instructor.
GPA units: 1.5
Common Area: Natural Science
Typically Offered: Alternate Years

NEUR 310 — Adv Seminar in Neuroscience Course count: 1
This seminar will explore important concepts in Neuroscience, beginning with philosophical and historical origins and including readings from contemporary primary literature. Students will be engaged in a series of group projects and an individual final project to delve into controversies and emerging ideas in the field. Course activities will require students to integrate their learning from previous coursework across multiple disciplines and draw upon their unique perspectives. This seminar is intended for 3rd and 4th year students pursuing focused programs of study in Neuroscience.

Prerequisite: 200-level neuroscience course (BIOL 267, BIOL 269, PSYC 220, PSYC221, or PSYC 235).
GPA units: 1
Typically Offered: Annually