

## NEUROSCIENCE IN THE COLLEGE OF ARTS AND SCIENCES

<https://www.uvm.edu/cas/neuro> (<https://www.uvm.edu/cas/neuro/>)

Neuroscience is the study of the function of the nervous system and how it regulates behavior. Often described as one of the "last frontiers," neuroscience is an exciting and challenging interdisciplinary field in which scientists share an interest in studying the anatomy, physiology, and function of the nervous system. Psychological science and biology have been traditional disciplines that share this interest, but fields such as communication sciences, physics, computer science, and other diverse fields are also intensely interested in neuroscience. The interdisciplinary nature of neuroscience requires an understanding of a broad range of methods of inquiry, ranging from laboratory methods associated with basic "bench" sciences such as cell and molecular biology to clinical methods associated with the study of medical disorders or disease states.

### COLLEGE OF ARTS AND SCIENCES NEUROSCIENCE B.A. AND B.S.

The neuroscience program at UVM is a cooperative effort by faculty in the Departments of Biology, Psychological Sciences, Communication Sciences and Disorders, Neurological Sciences, and neuroscientists in other departments throughout UVM. The challenging curriculum of both majors is driven by the nature of the breadth of the field of neuroscience, the unique opportunities provided by course offerings and by faculty expertise. It features a strong life science foundation, research methods and experiences, and a strong core of neuroscience courses that span cellular and molecular to behavioral and cognitive content. These include many courses in at multiple levels of neuroscience that are unique to UVM and offered by multiple departments in three different colleges. The curriculum gives students the freedom to select advanced courses that will prepare them for a wide variety of post-graduation career options, including (but certainly not limited to) graduate study, medical school and other health-care career options, laboratory technician positions, science writing, and more. The Bachelor of Arts is designed for students who wish to double major or minor in programs outside neuroscience, and the Bachelor of Science is designed for students who want to go deeper into the field of neuroscience by diving into more upper-level electives.

### NEUROSCIENCE MINOR

The neuroscience minor was created for students who have a core interest in another major and are interested in neuroscience as either a supplement to their major or as simply a field of inquiry that they enjoy studying. The minor was designed to introduce students from multiple backgrounds to the interdisciplinary field of neuroscience.

## MAJORS

### NEUROSCIENCE MAJOR

Neuroscience B.A. (<http://catalogue.uvm.edu/undergraduate/artsandsciences/neuroscience/neuroscienceba/>)

Neuroscience B.S. (<http://catalogue.uvm.edu/undergraduate/artsandsciences/neuroscience/neurosciencebs/>)

## MINORS

### NEUROSCIENCE MINOR

Neuroscience (<http://catalogue.uvm.edu/undergraduate/artsandsciences/neuroscience/neuroscienceminor/>)

## GRADUATE

Neuroscience M.S.

Neuroscience Ph.D.

See the online Graduate Catalogue (<http://catalogue.uvm.edu/graduate/>) for more information.

### Courses

#### **NSCI 030. First-Yr Neuroscience Seminar. 1 Credit.**

Introduces first-year neuroscience majors to the field of neuroscience by introducing students to different perspectives and subfields through researchers and students at UVM.

#### **NSCI 090. Internship. 1-3 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

#### **NSCI 092. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

#### **NSCI 095. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

#### **NSCI 096. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

#### **NSCI 111. Exploring Neuroscience. 3 Credits.**

In-depth survey of neuroscience topics, including neuron function, the anatomical and functional organization of the nervous system, and diseases of the nervous system. Prerequisites: PSYS 001; and one of the following: (BIOL 001 and BIOL 002) or (BCOR 011 and BCOR 012) or BCOR 021 or (ANPS 019 and ANPS 020). Pre/Co-requisites: CHEM 023 or CHEM 031.

**NSCI 112. Exploring Neurosci Laboratory. 1 Credit.**

Laboratory course in neuroscience designed to provide hands-on experience with methods of inquiry in neuroscience. Goals of this course include the development of problem-solving skills, data analysis, the scientific method, and science communication. Neuroscience majors only. Prerequisites: PSYS 001; CHEM 023 or CHEM 031; and one of the following: (BIOL 001 and BIOL 002) or (BCOR 011 and BCOR 012) or BCOR 021 or (ANPS 019 and ANPS 020).

**NSCI 190. Internship. 1-18 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

**NSCI 192. Teaching Assistantship. 1-3 Credits.**

Undergraduate student service as a teaching assistant, usually in an introductory level course in the discipline, for which credit is awarded. Offered at department discretion.

**NSCI 193. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**NSCI 195. Intermediate Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**NSCI 196. Intermediate Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**NSCI 197. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**NSCI 198. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**NSCI 210. Model Systems in Neuroscience. 3 Credits.**

Provides students with a deeper level of scientific fluency with guidance on how to critically read and understand primary scientific literature and how to communicate those findings, using model systems as our guide. Prerequisites: BCOR 101 and (BCOR 103 or NSCI 111). Cross-listed with: BIOL 210.

**NSCI 222. Cellular Neurophysiology. 3 Credits.**

Fundamentals of cellular neurophysiology through lecture, independent student reading and faculty-led group discussions of journal articles. Prerequisites: NSCI 110 or, NSCI 111 and NSCI 112, or Instructor Permission.

**NSCI 225. Human Neuroanatomy. 0 or 3 Credits.**

Functional anatomy of the human nervous system on both the microscopic and macroscopic scales. Focuses on the structures of the peripheral nervous system, spinal cord, and brain, and how they work together to achieve behavior. Lectures and a required laboratory (gross and microscopic anatomy). Prerequisite: NSCI 111.

**NSCI 230. Comparative Neurobiology. 3 Credits.**

Examination of the cellular mechanisms that underlie selective motor and sensory abilities, and unique behaviors that have evolved in various species. Discussion and student presentations. Prerequisite: ASCI 141 or BIOL 106 or NSCI 111 or PSYS 115 or Instructor permission.

**NSCI 255. Neuroregeneration. 3 Credits.**

Clinical neuroscience of injury and healing in the human nervous system, factors leading to different outcomes, and the impact of successful and failed repair on functional recovery. Explores cutting-edge approaches to treating neurological disease. Prerequisite: NSCI 111 or BIOL 261.

**NSCI 261. Neurobiology for Majors. 3 Credits.**

Exploration of the fundamental concepts in neurobiology. Topics include cell biology of the nervous system, electrical signaling/synaptic transmission, signal transduction, plasticity, and motor and sensory systems, and behavioral neuroscience. Credit not awarded for both BIOL 261 and NSCI 261. Prerequisites: BCOR 101, NSCI 111.

**NSCI 270. Diseases of the Nervous System. 3 Credits.**

Senior level, seminar-style capstone course in which students bring together information learned in other courses for an in-depth study of disease states of the nervous system. Pre/co-requisites: NSCI 110 and Senior standing.

**NSCI 280. Glia: Not Just Neuron Glue. 3 Credits.**

Interdisciplinary course in which students engage in a focused, in-depth exploration of how glial cells contribute to neurological and psychiatric disorders. Prerequisites: NSCI 111; Course director approval. Pre/Co-requisites: NSCI 111; Course Director permission.

**NSCI 290. Internship. 1-18 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

**NSCI 292. Teaching Assistantship. 1-3 Credits.**

Undergraduate student service as a teaching assistant, usually in an introductory level course in the discipline, for which credit is awarded. Offered at department discretion.

**NSCI 293. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**NSCI 295. Advanced Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**NSCI 296. Advanced Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**NSCI 297. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team specific student, which occurs outside the traditional, for which credit is awarded. Offered at department discretion.

**NSCI 298. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.