

# NEUROSCIENCE

The Neuroscience minor provides students with an introduction to the foundations of neuroscience, a discipline which focuses on the study of the nervous system from a range of levels. Study of the nervous system is a relatively new discipline, and discoveries in this area have great promise to illuminate the roots of our mental experience, and to provide the tools to preserve and reverse the effects of injury and disease. Neuroscience is fundamentally interdisciplinary, and draws on techniques from diverse fields including biology, psychology, chemistry, physics, mathematics, and philosophy. The courses included in the Neuroscience minor focus on the fundamentals of the biology and function of the nervous system. The minor is open to any major, and should be of interest to students with professional interests in the biomedical or health sciences, as well as anyone with an interest in an organ system that is critical to our identity. The courses included in the minor focus on the organization and function of the nervous system, from the specializations of single neurons and glia to the function of large networks of neurons which support perception, movement, memory, emotion, and more.

## Student Learning Goals

Develop students' foundational knowledge of neuroscience through interdisciplinary coursework.

Build critical thinking & analytical skills in students.

Strengthen students' communication skills.

Provide students with a cohesive capstone experience in neuroscience.

Cultivate attitudes and habits of mind in students.

## Requirements for the Minor

| Code  | Title                                 | Credits    |
|---|---------------------------------------|------------|
| <b>Introductory</b>                                   |                                       | <b>1</b>   |
| NSC-204   | Principles of Neuroscience            |            |
| <b>Biology</b>  |                                       | <b>1</b>   |
| BIO-212   | Cell Biology                          |            |
| <b>300 Level Elective</b>                             |                                       | <b>0.5</b> |
| Any 300-level course in NSC                           |                                       |            |
| <b>Capstone</b>                                       |                                       | <b>0</b>   |
| NSC-400   | Senior Capstone                       |            |
| <b>Electives</b>                                      |                                       | <b>2.5</b> |
| Any additional credits in NSC, or from the following: |                                       |            |
| BIO-315   | Organismal Physiology                 |            |
| BIO-371   | Special Topics (when in Neuroscience) |            |
| PSY-232   | Sensation and Perception              |            |
| PSY-233   | Behavioral Neuroscience               |            |
| PHI-279   | Topics Logic & Philosophy of Science  |            |
| PSY-235   | Cognitive Neuropsychology             |            |

## Additional Course Work

It is recommended that students interested in pursuing neuroscience at the graduate level also complete Organic Chemistry I (CHE 221). Additional coursework in physics and math may be considered. Students should consult with an advisor in Neuroscience on their particular paths.

Some special topics courses listed below may have individual offerings that will apply to distribution requirements. See the Curriculum Outline (<http://bulletin.wabash.edu/curriculum/curriculum-outline/>) section of this Bulletin for more information.

### NSC-204 Principles of Neuroscience

An introduction to the study of the nervous system, with a focus on basic anatomy and physiology. Students will learn about the basic organization of the nervous system, neurophysiology, sensory processing, movement, development, and neuroplasticity through a systems approach to brain function. Several laboratory experiences will be built into the course to reinforce the principles discussed in class. This course is offered in the spring semester.

**Prerequisites:** none

**Credit:** 1

**Equated Courses:** NSC-104

### NSC-210 Intermediate Special Topics

Since the content of this course varies from semester to semester, it may be repeated for credit upon the instructor's approval. Topics vary with each scheduled offering. Refer to Student Planning's section information for descriptions of individual offerings, and applicability to distribution requirements.

**Prerequisites:** none

**Credits:** 0.5-1

### NSC-269 Topics in Metaphys and Epistemology

Seminar discussion of a topic or area in metaphysics or the theory of knowledge. Refer to the Course Descriptions document on the Registrar's webpage for topics and descriptions of current offerings.

**Prerequisites:** none

**Credits:** 0.5-1

### NSC-287 Special Problems

Topics vary with each scheduled offering. Refer to Student Planning's section information for descriptions of individual offerings, and applicability to distribution requirements.

**Prerequisites:** none

**Credits:** 0.5-1

### NSC-310 Special Topics

Topics vary with each scheduled offering. Refer to Student Planning's section information for descriptions of individual offerings, and applicability to distribution requirements.

**Prerequisites:** none

**Credits:** 0.5-1

### NSC-332 Research in Sensation and Perception

In this course, students will conduct experiments involving at least two sensory systems, obtaining experience with psychophysical experimental methods. Students will write complete APA-style scientific papers for each experiment, including a clearly stated hypothesis, a brief literature review, a clear explanation of the methodology, application of the proper statistical techniques, an analysis of how the results supported or failed to support the hypothesis, and an abstract summarizing the experimental findings. This course is offered in the spring semester.

**Prerequisites:** PSY-232

**Credits:** 0.5

**Distribution:** Behavioral Science

**Equated Courses:** PSY-332

**NSC-333 Research in Behavioral Neuroscience**

Students in this course will become involved with research in an area of behavioral neuroscience. The topic covered will reflect contemporary research issues in the field and may differ in different years. Major course components will be discussion of primary literature in neuroscience and collaboration with the professor in conducting and writing up an experiment that is directed toward possible publication. Recent topics have focused on memory and drug addiction, and how neural recordings are used to understand how information is encoded by the brain. This course is offered in the fall semester.

**Prerequisites:** PSY-233 or BIO-112

**Credits:** 0.5

**NSC-400 Senior Capstone**

Students will enroll in the fall semester of the senior year and meet with the instructors approximately once every two weeks for journal article discussions focused on seminal publications in neuroscience.

**Prerequisites:** none

**Credits:** 0

## **Neuroscience Committee**

Karen Gunther, Psychology, chair

Neil Schmitzer-Torbert, Psychology

Heidi Walsh, Biology