Neuroscience

Neuroscience investigates the molecular, cellular, and genetic aspects of nervous system functioning as well as their influences on behavior. The major in neuroscience allows for the exploration of the brain from primarily a biological, chemical, and psychological perspective. The understanding of neuroscience requires knowledge about the function of neurons and the function of various brain regions and their relation to behavior. It also requires a grasp of the methodology behind neuroscientific research, including development, analysis, and interpretation of empirical studies. The major places a strong emphasis on scaffolded, directed research experiences within neuroscience. In addition, the neuroscience major creates an environment where faculty and students work collaboratively on neuroscience-related research questions.

Any student with an interest in pursuing the neuroscience major should consult with the program chair. Students are encouraged to declare their major by the end of the sophomore year. Students should also seek an adviser, whether formal or informal, from participating faculty.

Learning Outcomes

- At the completion of the Neuroscience major, students will be able to explain the key concepts in neuroscience including, biochemical interactions, cellular mechanisms, anatomical structures, sensory and perceptual processes, animal behavior, and/or the concept of the mind.
- At the completion of the Neuroscience major, students will be able to identify, locate, and evaluate Neuroscience-related primary literature.
- At the completion of the Neuroscience major, students will be able to develop evidence-based arguments related to concepts in Neuroscience.
- At the completion of the Neuroscience major, students will be able to design studies using the scientific method to address a problem in Neuroscience.
• At the completion of the Neuroscience major, students will be able to use appropriate statistical and methodological approaches to analyze data.
• At the completion of the Neuroscience major, students will be able to construct an organized written product that conveys scientific information at a level appropriate to the audience.
• At the completion of the Neuroscience major, students will be able to effectively orally communicate research ideas to a cross-disciplinary audience.
• At the completion of the Neuroscience major, students will be able to work collaboratively with other students and faculty members on classwork and in the laboratory.

Degree Requirements for the Major

General College Requirements
General College Requirements, including the following requirements to satisfy the major. At least 54 credit hours as specified in a., b., and c. below. A grade of C or better must be received in each course and the cumulative grade point average of courses used to satisfy the major must be at least 2.00. Courses taken for credit/no credit may not be used to satisfy requirements.

Required Courses: (30 credits)
• BIOL 105: Principles of Biology I
• BIOL 105L: Principles of Biology I Lab
• BIOL 106: Principles of Biology II
• BIOL 106L: Principles of Biology II Lab
• CHEM 103: General Chemistry I
• CHEM 106: General Chemistry II (Must co-enroll in CHEM 106L)
• PSYC 101: Introduction to Psychology
• NEUR 201: Introduction to Neuroscience
• NEUR 310: Special Topics in Neuroscience

Required Statistics Course(s): (4-8 credits)
• PSYC 204: Psychological Research, Analysis, and Writing
• PSYC 206: Psychological Research, Analysis, and Writing II

OR
• BIOL 311: Biostatistics *(Must co-enroll in BIOL 311L)*

Elective courses (12 Credits)

1. 12 credit-hours of upper-level elective credits selected from the following list and not used to fulfill any other NEUR major requirement. Electives must originate from at least two disciplines (BIOL, CHEM, NEUR, PHIL, PSYC). At least two courses must have a laboratory component.

- BIOL 305: Animal Behavior *(Must co-enroll in BIOL 305L)*
- BIOL 330: Human Anatomy and Physiology *(Must co-enroll in BIOL 330L)*
- BIOL 380: Topics in Biology*
- BIOL 387: Sensory Biology *(Must co-enroll in BIOL 387L)*
- BIOL 419: Neurobiology *(Must co-enroll in BIOL 419L)*
- BIOL 436: Comparative Animal Physiology *(Must co-enroll in BIOL 436L)*
- BIOL 438: Cancer Cell Biology *(Must co-enroll in BIOL 438L)*
- CHEM 420: Biochemistry I *(Must co-enroll in CHEM 420L)*
- CHEM 425/BIOL 425: Biochemistry II
- CHEM 480: Topics in Chemistry*
- NEUR 302: Neuroscience Research and Seminar
- NEUR 310: Special Topics in Neuroscience (cannot take the same topic more than once)
- PHIL 382: Meditation and the Mind
- PSYC 322: Biological Psychology *(Must co-enroll in PSYC 322L)* or PSYC 323: Laboratory Seminar in Biological and Sensory Processes
- PSYC 414: Drugs, Brains, and Behavior
- PSYC 484: Special Topics in Biological Psychology*

* Each Topics course under point c. must be approved by the Neuroscience Program for content relevance.

Capstone (8 Credits)

- NEUR 493: St. Mary’s Project *(Will accept an SMP in any discipline)*
- NEUR 494: St. Mary’s Project *(Will accept an SMP in any discipline)*

Degree Requirements for the Minor
General College Requirements

General College requirements.

- Must include CHEM 101 or CHEM 106 or CHEM 105 (no longer offered). CHEM 106 is strongly recommended. (Meets Core Curriculum requirement Natural Sciences with Laboratory.)
- Must take PSYC 101 (Meets Core Curriculum requirement in Social Sciences.)

Course Requirements

All requirements in a major discipline of study. At least 18 credit hours in courses approved for the neurosciences, with a grade of C or above, including:

**Required courses (8 Credits)**
- NEUR 201: Introduction to Neuroscience (4S)
- NEUR 310: Special Topics in Neuroscience (4S)

**Elective courses (12 Credits)**

12 credit hours of upper-level elective credits selected from the following list. Electives must originate from at least two disciplines (BIOL, CHEM, NEUR, PHIL, PSYC).

- BIOL 305: Animal Behavior
- BIOL 330: Human Anatomy and Physiology
- BIOL 387: Sensory Biology
- BIOL 419: Neurobiology
- BIOL 436: Comparative Animal Physiology
- BIOL 438: Cancer Cell Biology
- CHEM 420: Biochemistry I
- CHEM 425/BIOL 425: Biochemistry II
- NEUR 302: Neuroscience Research and Seminar
- NEUR 310: Special Topics in Neuroscience (cannot take the same topic more than once)
- PHIL382: Meditation and the Mind
- PSYC 322: Biological Psychology or PSYC 323: Laboratory Seminar in Biological and Sensory Processes
- PSYC 414: Drugs, Brains, and Behavior
- Upper-level Special Topics Courses in Biology, Chemistry, or Psychology, or other disciplines, specifically approved for Neuroscience

A completed neuroscience St. Mary’s Project or neuroscience internship may be substituted for NEUR 302 with the approval of the Coordinator.
Faculty

Torry Dennis, Assistant Professor of Neuroscience and Psychology, Coordinator, Aileen Bailey, Professor of Psychology, Gina Fernandez, Assistant Professor of Psychology, Sarah Latchney, Assistant Professor of Neuroscience and Biology, James Mantell, Associate Professor of Psychology, Pamela Mertz, Professor of Chemistry and Biochemistry