

### Neuroscience (NEUR)

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The program in neuroscience offers students an interdisciplinary major representing aspects of biology, psychology, animal behavior, chemistry, mathematics, bioengineering, and physics. The neuroscience major is intended to give students opportunities, through coursework and research experience, to study the nervous system, its development and influence on behavior (broadly defined). Our faculty are active and productive scholars who involve students in their research programs, and thus we view research experience as a key aspect to the learning process.

The neuroscience major is offered within the degree of bachelor of science. All students are strongly encouraged to participate in research with faculty, as volunteers in their laboratories, or through independent studies and honors theses. Faculty interests and facilities include cell and molecular wet labs, electroencephalography for studying brain activity and cognitive/affective and perceptual processes, animal behavior labs for studying behavior and development in vertebrates (we house four species of primates, as well as fish, turtles, mice, hamsters, and bats), and invertebrates (e.g., honey bees). We also have facilities for studying vision, cognition (including music perception), and hormones and behavior. Students who succeed in neuroscience will be well-equipped to go on to graduate study in neuroscience, biology, psychology, and medicine, as well as to work in a variety of other disciplines including fields relating to biotechnology, pharmaceuticals, or medical instrumentation.

The **bachelor of science major** in neuroscience requires 12 basic courses, plus four advanced courses that the students can choose from an assemblage of courses. Four additional courses are recommended, but are not required for the completion of the degree program.

Of the 16 total courses taken by neuroscience majors, the following 12 courses are required:

- NEUR 100 Introduction to Neuroscience, BIOL 205 Introduction to Molecules and Cells, BIOL 207 Genetics, PSYC 250 Physiological Psychology, CHEM 211 Organic Chemistry I and CHEM 212 Organic Chemistry II
- CHEM 201 General Chemistry I and CHEM 202 General Chemistry II or CHEM 221 Inorganic Chemistry I and CHEM 231 Analytical Chemistry I
- MATH 201 Calculus I or MATH 205 Accelerated Calculus

- MATH 216 Statistics I or PSYC 215 Psychological Statistics
- BIOL/PSYC 343 Neural Plasticity or BIOL 303 Behavioral Neuroendocrinology or BIOL 342 Neuroethology or BIOL 324 Neurophysiology
- PSYC 203 Learning or PSYC 204 Human Cognition or PSYC 252 Sensation & Perspective or NEUR 248 Developmental Psychobiology

Courses recommended but not required are: BIOL 327 Molecular Biology, MATH 202 Calculus II, PHYS 211 Classical and Modern Physics I, PHYS 212 Classical and Modern Physics II

Further, students must choose four additional courses from the following list of courses. Students are encouraged to become involved in independent study research, such as NEUR 399; however, only one undergraduate research credit can be counted toward the four additional courses required for the major.

**Track 1: *General Neuroscience:*** Students seeking general exposure to neuroscience, or with equal interests in behavioral and cognitive and cellular and molecular neuroscience can select their advanced courses from the entire set of courses in either Group 1, Group 2, Group 3.

**Track 2: *Behavioral and Cognitive Neuroscience:*** If students have a specific interest in behavioral and cognitive perspectives (including developmental psychobiology) within the study of neuroscience, we would recommend that the student choose advanced courses from the behavioral side of the course offerings, as indicated as Group 2.

**Track 3: *Cellular and Molecular Neuroscience:*** For students with particular interests in cellular or molecular perspectives on nervous system structure and function, they may select courses focusing on those aspects of neuroscience by choosing course offerings listed in Group 3.

**Group 1:** ANBE 391, BIOL 318, BIOL 322, BIOL 348, BMEG 300, BMEG 409 or BMEG 410, CHEM 375 or CHEM 376, NEUR 399, PSYC 324, PSYC 329

**Group 2:** BIOL 303, BIOL 342, PSYC 305, PSYC 318, PSYC 339, PSYC 349, PSYC 352

**Group 3:** BIOL 324, BIOL 327, BIOL 331, BIOL 339, BIOL 340, BIOL 352, BMEG 441, CHEM 351

The recommended sequence for the bachelor of science major is as follows:

<b>First Year</b>	<b>First semester:</b> BIOL 205, MATH 201, CHEM 201 or CHEM 211 <b>Second semester:</b> NEUR 100, MATH 216/PSYC 215, CHEM 202 or CHEM 212
<b>Second Year</b>	<b>First semester:</b> BIOL 207, PSYC 203 or PSYC 204 or PSYC 252 or NEUR 248, CHEM 211 or 221 <b>Second semester:</b> CHEM 212 or 231, PSYC 250
<b>Third Year</b>	<b>First semester:</b> BIOL 303 or BIOL 324 or BIOL/ANBE 342 or BIOL/PSYC 343, NEUR elective, PHYS 211 (opt) <b>Second semester:</b> NEUR elective, PHYS 212 (opt)
<b>Fourth Year</b>	<b>First semester:</b> NEUR elective <b>Second semester:</b> NEUR elective

**100. Introduction to Neuroscience (I or II; 3, 0)**

A survey of the study of the nervous system and its structure and function, ranging from molecular analyses of neurons to electrical and other correlates of human cognition.

**248. Developmental Psychobiology (I or II; 3, 0)**

Addresses development in humans from conception through adolescence with some comparative analysis with non-humans. Emphasis on both normal and atypical processes of development, especially neuropsychological and neurobiological development. Prerequisite: PSYC 100 or NEUR 100.

**305. Developmental Psychopathology(I or II; 3, 0)**

Readings and discussion address the behavioral phenotypes (cognitive, social, linguistic) of a variety of neurodevelopmental and neuropsychiatric disorders in childhood in the context of theories and process of typical development. Basic genetic and neurobiological underpinnings of neurodevelopmental and neuropsychiatric disorders also are discussed. Prerequisites: NEUR 248 or PSYC 210 and PSYC 207. Crosslisted as PSYC 305.

**360. Honor Thesis (I or II; R)**

Honor thesis. Prerequisite: permission of the instructor.

**399. Undergraduate Research (I or II; R; 0; 6-12) Half to two courses.**

Research topics may be posed by students or faculty. Prerequisite: permission of the instructor.