NEUROSCIENCE

The study of neuroscience is one of the most rapidly growing areas of life sciences, reflecting the importance of the fundamental and applied interest in how the nervous system is coordinated and regulated. The field of neuroscience examines the physiology, anatomy, pharmacology, development, growth, maintenance, and evolution of nervous system processes.

Students working toward completion of this degree will be able to concentrate in one of two tracks (Molecular/Cellular Neuroscience or Integrative/Behavioral Neuroscience) or take courses that provide a blended combination of these complementary areas of neuroscience. The major provides both content and hands-on experience in various areas of neuroscience, and is an excellent choice for students with interests in pursuing neuroscience-related graduate programs, health careers (for example, students with post-graduate aspirations for attending medical, PA, dental, veterinary, or nursing school), or careers in private industry. Students will emerge from the major with the ability to think across disciplines, to formulate questions and seek answers, to interpret data and draw conclusions, and to effectively communicate the outcome of these processes to a larger audience. This suite of skills makes neuroscience majors eligible for a variety of career opportunities both within and outside the discipline of neuroscience.

Other Information

All coursework taken for the neuroscience major must be completed with a grade of “C-” or better.

Note for Double Majors in Neuroscience and Psychology or Neuroscience and Biology: Beyond the neuroscience fundamentals courses, students cannot use a 3000/4000 level course to count toward both majors.

Note for Students Completing a Neuroscience Major and Psychology Minor: No psychology coursework beyond PSYC 1010 will be allowed to count toward both programs.

Note for Students Completing a Neuroscience Major and Biology Minor: No 3000/4000 level course(s) may count toward both programs.

Writing in the Discipline

All students are required to take a writing in the discipline course within their major. For the Neuroscience major this is fulfilled with the combination of PSYC 3140 and the Advanced Laboratory course (NEUR 4200).

Additional Laboratory Experiences

Students wishing additional laboratory experiences can enroll in PSYC 4234 or PSYC 4280/BIOL 4280, or seek independent research opportunities with faculty conducting neuroscience research at UNO, UNMC, Creighton University, or Boys Town National Research Hospital.

Student Group

Nu Rho Psi - National Honor Society in Neuroscience
http://nurhopsi.org

Contact

Neuroscience Director, Dr. Suzanne Sollars: 402.554.3981
ssollars@unomaha.edu

Website (http://www.unomaha.edu/college-of-arts-and-sciences/neuroscience)

Degrees Offered

- Neuroscience, Bachelor of Science (http://catalog.unomaha.edu/undergraduate/college-arts-sciences/neuroscience/neuroscience-bs)

NEUR 1520 INTRODUCTION TO NEUROSCIENCE I (3 credits)
The nervous system is intricate, complex, and is the subject of one of the most exciting fields in the life sciences. This course is a required course for the Gerontology major. By the end of the course, students will understand major theories, biological methods, and seminal research studies in the biology of aging field. Furthermore, students will learn how to critically analyze and interpret primary research about biological aging. This course provides preparation for students considering graduate school in gerontology or biology, geriatric nursing and social work, geriatric medicine, neuroscience, psychology, and exercise science. (Cr/Grd option; Cross-listed with GERO 3500, BIOL 3500)

Prerequisite(s)/Corequisite(s): PSYC 1010; Sophomore/Junior/Senior Standing. Not open to non-degree graduate students.

NEUR 1540 INTRODUCTION TO NEUROSCIENCE II (3 credits)
The nervous system is intricate, complex, and is the subject of one of the most exciting fields in the life sciences. This course is a required course for the Gerontology major. By the end of the course, students will understand major theories, biological methods, and seminal research studies in the biology of aging field. Furthermore, students will learn how to critically analyze and interpret primary research about biological aging. This course provides preparation for students considering graduate school in gerontology or biology, geriatric nursing and social work, geriatric medicine, neuroscience, psychology, and exercise science. (Cr/Grd option; Cross-listed with GERO 3500, BIOL 3500)

Prerequisite(s)/Corequisite(s): PSYC 1010; Sophomore/Junior/Senior Standing. Not open to non-degree graduate students.

NEUR 3500 BIOLOGICAL PRINCIPLES OF AGING (3 credits)
The Biological Bases of Aging Course provides a survey of the primary topics in the biology of aging field for undergraduate students. This is a required course for the Gerontology major. By the end of the course, students will understand major theories, biological methods, and seminal research studies in the biology of aging field. Furthermore, students will learn how to critically analyze and interpret primary research about biological aging. This course provides preparation for students considering graduate school in gerontology or biology, geriatric nursing and social work, geriatric medicine, neuroscience, psychology, and exercise science. (Cr/Grd option; Cross-listed with GERO 8006)

Prerequisite(s)/Corequisite(s): Sophomore/Junior/Senior Standing. Not open to non-degree graduate students.

NEUR 4000 SYSTEMS NEUROSCIENCE (3 credits)
This is an advanced course for the Neuroscience major designed to provide a solid understanding of the peripheral and central connections that make the systems of the body function. Data and theories of brain-behavior relationships from current research in neuroscience will be discussed. (Cr/Grd option; Cross-listed with NEUR 8006)

Prerequisite(s)/Corequisite(s): NEUR 1500, BIOL 1450, BIOL 1750, and PSYC 1010; or permission. Not open to non-degree graduate students.

NEUR 4050 ADVANCED BIOLOGY OF AGING (3 credits)
This course covers biological aging topics at an advanced level, and is designed for undergraduate and graduate students who have some prior knowledge about biology or aging. The course will be interdisciplinary in nature and focus on topics relevant to gerontology, biology, psychology, and exercise science. Students will learn how to think critically about primary research in the biology of aging. Furthermore, they will apply their knowledge of the biology of aging field by creating a handbook of healthy aging for older adults. (Cross-listed with GERO 4050, GERO 8056)

Prerequisite(s)/Corequisite(s): NEUR 1500, BIOL 1450, BIOL 1750, and NEUR 1500 are prerequisites for the course. Not open to non-degree graduate students.
NEUR 4290  NEUROETHOLOGY (3 credits)
In the field of Neuroethology a major goal is to understand the neural bases of animal behaviors in a natural context. In this course students will investigate how behaviors are generated and modulated by the nervous system in organisms ranging from insects to mammals. We will explore the neural mechanisms underlying a variety of animal behaviors as they interact with their natural environment ranging from sensory perception of the world (e.g. echolocation, electrolocation), to locomotor movements (e.g. flying, swimming), to more complex behaviors (e.g. learning, memory).
(Cross-listed with BIOL 4290, BIOL 8296, PSYC 8296).
Prerequisite(s)/Corequisite(s): NEUR 1520, NEUR 1540 and BIOL 1750; or by permission of instructor. Not open to non-degree graduate students.

NEUR 4330  SOCIAL NEUROSCIENCE (3 credits)
This course will evaluate the biological substrates of sociality and social behavior, and explore the impact of social environments on brain function and development. Students in the course will explore the molecular, cellular, neurotransmitter, and endocrine influences on social behavior, including affiliative care, aggression, social bonding, altruism, and social cognition.
(Cross-listed with PSYC 8336)
Prerequisite(s)/Corequisite(s): PSYC 1010 BIOL 1450, and NEUR 1500.
Not open to non-degree graduate students.

NEUR 4870  MOLECULAR AND CELLULAR NEUROBIOLOGY (3 credits)
This course presents foundational topics in molecular and cellular neurobiology in the context of how the nervous system is functionally organized. Topics include: nervous system cell types and their subcellular organization; electrical properties of neurons and glia; energy metabolism and biochemistry of the brain; intra- and intercellular neuronal signaling; the regulation of gene expression in neuronal cells; synaptic plasticity; and how these are altered in disease. (Cross-listed with BIOL 4870, BIOL 8876, NEUR 8876).
Prerequisite(s)/Corequisite(s): NEUR 1500, or both NEUR 1520 and NEUR 1540, or BIOL 3020, or permission of instructor.

NEUR 4890  GENES, BRAIN, AND BEHAVIOR (3 credits)
This course will evaluate the complex interaction between an organism’s genome and neural activity pattern in the nervous system as related to behavior. In this course students will explore how changes in gene expression (allelic variants, epigenetics, differential regulation) and gene networks within neural tissue can reciprocally influence behaviors such as communication, foraging, reproduction, and cognition. (Cross-listed with BIOL 4890, BIOL 8896, PSYC 8896)
Prerequisite(s)/Corequisite(s): NEUR 1500 and BIOL 2140 or by permission of instructor. Not open to non-degree graduate students.

NEUR 4900  SPECIAL TOPICS IN NEUROSCIENCE (1-3 credits)
A study of designated special topic in neuroscience. Students may repeat this class as long as the specific topic is not duplicated.
Prerequisite(s)/Corequisite(s): NEUR 1500, junior-senior status, instructor permission. Not open to non-degree graduate students.