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 majors.

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

Student Group

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

Contact

Neuroscience Director, Dr. Jeffrey French: 402.554.2558
jfrench@unomaha.edu

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

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.

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 part 1 of a 2-semester sequence designed for neuroscience majors or students who are contemplating neuroscience as a major. This course will focus on understanding how the nervous system interacts at the cellular and molecular levels: anatomy and function of neurons, communication within and between neurons, and how neurons interact to perceive and process sensory information.

Prerequisite(s)/Corequisite(s):
High school biology and chemistry. 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 part 2 of a 2-semester sequence designed for neuroscience majors or students who are contemplating neuroscience as a major. This course will focus on understanding how the nervous system interacts at the organismal, behavioral and cognitive levels: how the nervous system develops, how the motor system, hormones, and physiology influences behavior, and how cognition and systems neuroscience leads to understanding of the mind.

Prerequisite(s)/Corequisite(s):
NEUR 1520 or permission of instructor. 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 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.

(Cross-listed with GERO 3500, BIOL 3500)
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.

(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 4200 ADVANCED NEUROSCIENCE LABORATORY (3 credits)
This course is designed as a capstone laboratory course for Neuroscience majors. The course will provide students with hands-on experience in collecting data in diverse areas of neuroscience, analyzing these data, interpreting the data, and preparing written and verbal presentations of the data.

Prerequisite(s)/Corequisite(s):
PSYC 3130, PSYC 3140, 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
basis of animal behaviors in a natural context. In this course students
will investigate how behaviors are generated and modulated by specific
neural circuits at both micro and macro scales. They 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,
simple locomotor movements, to more complex behaviors.
Prerequisite(s)/Corequisite(s): NEUR 1500, or NEUR 1520 and
NEUR 1540, or by permission of instructor

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 and 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.