NEUROSCIENCE (NEUR)

Neuroscience Graduate Courses

NEUR 8006 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 4000).
Prerequisite(s): Graduate standing or permission. Not open to non-degree graduate students.

NEUR 8166 NEUROPHARMACOLOGY (3 credits)
Neuropharmacology will introduce students to ligand-receptor interactions and their effects on behavior, cognition, and development. This course will characterize the molecular structure of ligands and how these small molecules or biologics affect central nervous system receptors and transporters. Students will learn about structure-activity relationships and principles of pharmacology: distribution, metabolism, pharmacokinetics, and elimination) and explore the historical milestones in drug development. We'll also discuss the dynamic actions of drugs of abused drugs and the mechanisms of action. For undergraduate Neuroscience Majors, the course counts as a Neuroscience Block 1. (Cross-listed with NEUR 4160, PSYC 4160, PSYC 8166).
Prerequisite(s): Graduate standing

NEUR 8296 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 NEUR 4290, BIOL 4290, BIOL 8296, PSYC 8296).
Prerequisite(s): Graduate Standing. Not open to non-degree graduate students.

NEUR 8336 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 NEUR 4330, PSYC 8336).
Prerequisite(s): Graduate status or permission of Instructor. Not open to non-degree graduate students.

NEUR 8486 NEUROIMMUNOLOGY (3 credits)
The course explores the bi-directional mechanisms by which the brain and the immune system communicate with each other in health and during injury or infection. This course also introduces human immunology as a basis for understanding the advanced content in neuroimmunology. Topics include innate immunity in the central nervous system (CNS), inflammation in neurodegenerative diseases, CNS infections and autoimmune diseases. Reading and evaluating neuroimmunology primary literature, presentation and scientific writing will be emphasized. Counts as a Neuroscience Block 1 course requirement. (Cross-listed with NEUR 4480).
Prerequisite(s): Graduate standing.

NEUR 8646 NEURAL MECHANISMS OF SUBSTANCE USE DISORDERS (3 credits)
This course details how the brain changes during and after the administration of illicit substances. Illicit drugs 'hijack' the natural reward pathways and brain circuits. Material highlights brain regions, neural circuits, and structural alterations that accompany illicit drug use. Modern neuroscience research techniques that measure and manipulate brain function reveal opportunities for therapeutic interventions. The course will explore how therapeutic interventions repair the brain. (Cross-listed with NEUR 4640).
Prerequisite(s): Graduate standing.

NEUR 8846 GLIA IN HEALTH AND DISEASE (3 credits)
While neurons are often highlighted as the primary drivers of brain function, evidence is rapidly growing that a lesser-known class of cells, glia, are intimately involved in virtually all aspects of central nervous system function. This course is designed for students looking for an in-depth discussion on the various glial cells of the central system, with an emphasis on cutting-edge research and the techniques used to study them. Counts as a Block 1 Neuroscience requirement. (Cross-listed with NEUR 4840).
Prerequisite(s): Graduate standing

NEUR 8856 NEUROBIOLOGY OF LEARNING AND MEMORY (3 credits)
This course will evaluate the neurobiology of learning and memory. In this course students will explore how learning and memory processes are encoded and stored at the cellular and molecular neurobiology levels. We will examine both classic and cutting edge studies to see how changes in molecular activity, genetics, and cellular physiology can influence learning and memory processes. Counts as a Block 1 course for Neuroscience Majors. (Cross-listed with NEUR 4850).
Prerequisite(s): Graduate Standing. Not open to non-degree graduate students.

NEUR 8876 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 4870).
Prerequisite(s): NEUR 1500, or both NEUR 1520 and NEUR 1540, or BIOL 3020, or permission of instructor.

NEUR 8896 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 NEUR 4890, BIOL 4890, BIOL 8896, PSYC 8896).
Prerequisite(s): Graduate standing. Not open to non-degree graduate students.