

NEUROSCIENCE (NEUROSCI)

NEUROSCI 303-0 Molecular Mechanisms of Neuropsychopharmacology (1 Unit)

Advanced seminar focusing on molecular mechanisms and aberrations of synaptic signal transduction and drugs that target them.

Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 304-0 Developmental Neurobiology (1 Unit)

Embryology and cellular/molecular mechanisms of nervous system development. Topics include patterning of the early embryo and nervous system, neurogenesis, neuronal differentiation and cell fate specification, axon guidance and wiring of neural circuits, and activity-, experience-, and sex-dependent neurodevelopment.

Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 308-0 Genetics of Human Behavior (1 Unit)

Covers the genetic determinants of human behavior. We discuss how "nature" (genes) and "nurture" contribute to shape individual behavior and explore the implications of this interaction, from philosophical and ethical aspects to medical and legal considerations.

Prerequisites: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 311-0 Biophysical Analysis of Neurons for ISP (1 Unit)

This course provides an introduction to neurobiology from an electrophysiological perspective, with an emphasis on ion channel biophysics, quantitative electrical properties of neurons, synaptic physiology, and sensory transduction. Its goal is to provide a basis for understanding how information is encoded, transmitted, and decoded in brains, as well as offer an introduction to reading scientific literature. Some facility with simple equations and graphing is suggested.

Prerequisite: Students must be an ISP or NEUROSCI major to enroll.

NEUROSCI 320-0 Animal Behavior (1 Unit)

Animal behavior from the neuroscience perspective. Neurobiological bases of foraging, communication, migration, predator-prey interactions, mating, and parental care.

Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

Natural Sciences Distro Area

NEUROSCI 325-0 Neurobiology of Stress, Adversity, and Resilience (1 Unit)

This is a writing-intensive course based on class lectures and discussion that draws from primary literature on the neurobiology of stress, stress susceptibility and resilience, to explore biological mechanisms by which adversity can influence mental health and other outcomes.

Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

NEUROSCI 360-0 Neuroscience of Brain Disorders (1 Unit)

Survey of brain disorders and differences such as neurodegenerative diseases, developmental disorders, narcolepsy, and migraine with a focus on molecular-genetic mechanisms. Trace progress from the laboratory to the clinic, evaluate the state of knowledge, and understand future directions. Prior review of basic genetics and molecular biology is strongly recommended.

Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

Natural Sciences Distro Area

NEUROSCI 365-0 Neurobiology of Prediction (1 Unit)

This course examines neurophysiological circuit mechanisms that allow prediction to emerge in brains of (mostly) non-human animals. Topics include probability and variance, anticipation of aversive and rewarding

stimuli, temporal and spatial prediction, and how cellular-level studies inform complex questions of human prediction.

Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 366-0 Brain Function Through the Lens of Computation (1 Unit)

This course introduces the basic building blocks of neural computation and their relevance for brain function. It begins with an overview of key principles related to neural network dynamics and neural coding. The course then develops these principles by illustrating how computational neuroscientists have used them to model specific sensory, motor, and cognitive functions of the brain.

Prerequisite: MATH 220-2 or equivalent.

Natural Sciences Distro Area Natural Sciences Foundational Discipline

NEUROSCI 370-0 Genetic and Circuit Analysis of Motivated Behavior (1 Unit)

Animals are driven to engage in behaviors that fulfill essential needs for survival, such as eating, drinking, reproduction, and social interaction.

This course focuses on the neurobiology of eating through lectures, scientific article discussions, and oral presentations.

Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

NEUROSCI 377-0 Neurobiology of Sensation and Perception (1 Unit)

Analysis of the key concepts underlying the neurobiological mechanisms of vision, hearing, taste, smell, touch, and pain. Neural pathways leading to perception and processing of stimuli will also be discussed.

Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

Natural Sciences Distro Area