

# 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 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: Open to all ISP students. With the approval of the director of undergraduate studies in Neurobiology, Neuroscience majors with NEUROSCI 202-0 may be eligible.

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

Animals are programmed to behave strongly towards activities that satisfy our basic needs and enhance our chances of survival. This includes eating, drinking, sex, and social interaction. Focusing on neurobiology of eating, we will read scientific articles, learn about cutting edge experimental techniques, discuss concepts, and hone oral presentation skills.

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*