

# NEUROSCIENCE (NRSC)

## NRSC 6210 - Translational Research - Alzheimer's Disease/Dementias (4 Credits)

The course will facilitate a solid understanding of translational research in Alzheimer's Disease and Alzheimer's Disease Related Dementias, including neuropsychological and neuropathological disease features, genetic risk factors, biomarkers and brain imaging tools, statistical analyses, therapeutical approaches and clinical trial design.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

## NRSC 7501 - Introduction to Neuroscience (1 Credit)

Introduction to study of the nervous system from the level of the brain to an understanding of how neurons are specialized for communication and information processing. This course is a prerequisite for NRSC 7600 series courses.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

## NRSC 7600 - Cellular & Molecular Biology (3 Credits)

A comprehensive, in-depth, discussion-based course intended for candidates for the Ph.D. in Neuroscience. Topics include ion channel structure and function, ionic basis of the resting and action potential, and the biochemistry and physiology of direct and synaptic transmission.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

## NRSC 7610 - Fundamentals of Neurobiology (3 Credits)

This course will provide basic knowledge on the structure and function of the nervous system. The lectures will be supplemented by discussion of primary research literature in neurobiology. Prereq: NRSC 7600 or equivalent at the discretion of the instructors.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

## NRSC 7612 - Nervous System Modeling with NEURON (1 Credit)

The objective of this course is to introduce students to biophysically accurate modeling of single neurons and neuronal networks with NEURON simulation environment. Students will implement NEURON in a project of their choice, possibly related to their primary 'wet' research.

Grading Basis: Letter Grade

Typically Offered: Spring.

## NRSC 7614 - Biological Basis of Psychiatric & Neurological Disorders (2 Credits)

This elective, for basic sciences graduate students and medical students, provides a survey of current clinical and molecular aspects of human neuropsychiatric disorders. Both movement disorders and DSMIV diagnoses will be covered. Contact Course Director for a list of topics.

Prereq: IDPT 7812 or BMGN 5000/CSBI 5001.

Grading Basis: Letter Grade

Typically Offered: Spring.

## NRSC 7615 - Developmental Neurobiology (3 Credits)

This course will cover fundamental principles regarding development of the nervous system. The format of the course will consist of lecture plus reading of primary literature.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

## NRSC 7616 - Introduction to Biomedical Photonics (3 Credits)

The course introduces several principles of applying optical techniques to biomedical applications. Current development of biophotonic research, such as microscopy, optical coherence tomography, optical spectroscopic techniques in tissues, will be discussed. Prereq: EE 5802 Optical Engineering. Crosslisted: Electrical Engineering EE 5804.

Grading Basis: Letter Grade

Typically Offered: Spring.

## NRSC 7617 - The Biophysics of Ion Channels (1 Credit)

Examination of the mechanisms of ion channel gating. Covers basic of bioelectricity, kinetic analysis of channel gating, microscopic and macroscopic gating, thermodynamics, ion channel structure, ion channel pharmacology, and channelopathies.

Grading Basis: Letter Grade

Typically Offered: Spring.

## NRSC 7618 - Biology of the Eye (1 Credit)

Crosslisted with OPHT 6610 (for medical students). The objective of this course is to familiarize students with the core concepts and challenges in ophthalmology and vision research. The course integrates cutting-edge basic science with translational research and clinical advances. Pre-req: Must be a graduate student (not a medical student).

Grading Basis: Letter Grade

Typically Offered: Fall.

## NRSC 7619 - Functional MRI: Brain Imaging from Design to Analysis (1 Credit)

This course focuses on learning about functional and structural magnetic resonance brain imaging (MRI) research strategies and implementation, with an emphasis on functional MRI (fMRI). Focuses of this course cover a broad range of topics to help researchers better understand how to design and implement MRI research in these modalities.

Grading Basis: Letter Grade with IP

Typically Offered: Fall.

## NRSC 7650 - Research in Neuroscience (1-10 Credits)

Research work in neuroscience. Prereq: Consent of instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

## NRSC 7657 - Workshop in Advanced Programming for Neuroscientists (1 Credit)

MATLAB is an accessible programming environment that is widely used by scientists and engineers and offers powerful tools for data acquisition and data analysis. Students will develop their own MATLAB programs that are relevant to their particular line of research.

Grading Basis: Letter Grade

Typically Offered: Summer.

NRSC 7661 - Grant Proposal Writing Workshop (1 Credit)

Course is practical workshop in grant-writing culminating in a mock review panel including course participants. Students will examine various proposal types/formats, then write their own proposal in the format of NRSA fellowship application. Restriction: Students with adequate neuroscience background. Prereq: NRSC 7610.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

NRSC 7662 - Survey of Neuroscience (1 Credit)

Designed to expose first year graduate students to current topics in neuroscience.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

NRSC 7670 - Advanced Topics in Neuroscience (1-2 Credits)

This course will consist of discussion of manuscripts relevant to a specific topic in Neuroscience. Prereq: NRSC 7600 or consent of instructor.

Grading Basis: Letter Grade

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

NRSC 7675 - Neuroscience, Ethics, & Philosophy (1 Credit)

Elective course provides overview of issues at the intersection of philosophy/ethics/neuroscience. Format involves lecture, student presentations, and relies heavily on student discussion. Topics focus on arguments relevant to the philosophy of mind along with their implications for the individual /society. Prereq: Successful completion of first year graduate courses.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

NRSC 7700 - Drugs and the Brain (1 Credit)

This graduate level course, Drugs and the Brain, will introduce students to the field of addiction. The focus will be on how different drugs of abuse work on brain cells and systems to produce their unique physiological and behavioral consequences.

Grading Basis: Letter Grade

Typically Offered: Spring.

NRSC 7800 - Teaching Neuroscience (1-3 Credits)

Students will be guided in developing two class sessions in systems neuroscience to be presented in the Systems Neuroscience course, NRSC 7610. Each session will include a practice presentation and post-mortem critique. Prereq: NRSC 7610. Restrictions: Second year students in neuroscience or above. Note: Meets 1 - 3 hours a week for 15 weeks depending on credits signed up for.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

NRSC 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in neuroscience. Prereq: Consent of instructor.

Grading Basis: Letter Grade with IP

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.