

**NEUR 0680. Introduction to Computational Neuroscience.**

An introductory class to computational neuroscience. Students will learn the main tools of the trade, namely differential equations, probability theory and computer programming, as well as some of the main modern neural-modeling techniques. Assignments will include the writing of simple Matlab code.

Fall NEUR0680 S01 16282 MW 3:00-4:20(17) (L. Bienenstock)

**NEUR 1020. Principles of Neurobiology.**

A lecture course covering fundamental concepts of cellular and molecular neurobiology. Topics include structure of ion channels, synaptic transmission, synaptic development, molecular mechanisms of synaptic plasticity, learning and memory and neurological diseases. Prerequisite: NEUR 0010. Strongly recommended: BIOL 0200 or equivalent.

Spr NEUR1020 S01 24728 TTh 9:00-10:20(01) (C. Aizenman)

**NEUR 1030. Neural Systems.**

This lecture course examines key principles that underlie the function of neural systems ranging in complexity from peripheral receptors to central mechanisms of behavioral control. Prerequisite: NEUR 0010 or the equivalent. First year and Graduate students require instructor approval.

Fall NEUR1030 S01 16265 TTh 10:30-11:50(13) (M. Linden)

**NEUR 1040. Introduction to Neurogenetics.**

Recent advances in molecular biology and molecular genetics have allowed researchers to test specific hypotheses concerning the genetic control of behavior and neurological disease. This course will familiarize you with the relatively new and exciting field of neurogenetics. We will cover basic topics, new ideas, and unsolved problems in neurogenetics primarily through the two assigned texts. However, neurogenetics is essentially a "frontier" area in neuroscience, and the best way to approach this topic is by scientific literature, which will be covered in some lectures.

Spr NEUR1040 S01 24729 TTh 10:30-11:50(09) (K. Kaun)

**NEUR 1540. Neurobiology of Learning and Memory.**

Exploration of learning and memory from the molecular to the behavioral level. Topics will include declarative and procedural memory formation and storage, associative and non-associative learning, cellular and molecular mechanisms for learning, and disorders affecting learning and memory. Examples will be drawn from numerous brain areas and a variety of model systems, including humans. Students will gain experience interpreting experiments from primary literature. Prerequisite: NEUR 1020.

Spr NEUR1540 S01 24731 MWF 11:00-11:50(04) (M. Linden)

**NEUR 1560. Developmental Neurobiology.**

The course will explore core concepts of developmental biology in the context of the developing nervous system. Topics will include: neuronal specification, cell migration, axon guidance, synapse formation, and neural plasticity. Students will gain experience with the primary literature and learn about cellular and molecular mechanisms of brain development and the tools and model organisms used to study them. To express interest, please add this course to your primary cart. The decision will be made based on a variety of factors including: seniority, concentration requirement, etc.

Spr NEUR1560 S01 24732 W 3:00-5:30(10) (A. Jaworski)

**NEUR 1600. Experimental Neurobiology.**

Intensive laboratory experience in neuroscience appropriate for students with basic background in Neurobiology. Learn and employ the classical neurophysiological techniques of extracellular recording, intracellular recording and receptive field mapping using a variety of animal species. Experiments will include recording of sensory signals in the cockroach leg; frog sciatic nerve and sciatic nerve/muscle preparation; intracellular recording of neurons in Aplysia; receptive field mapping in frog skin; and visual field mapping in the frog tectum. Instruction on and practice of effective science writing is another component to this course. Labs are supplemented by informal lectures. Enrollment limited to 18.

Spr NEUR1600 S01 24733 W 1:00-5:50 (J. Stein)

**NEUR 1650. Structure of the Nervous System.**

Combined lecture and laboratory course on the anatomy of the central nervous system. Lectures survey the circuitry of the major neural systems for sensation, movement, cognition, and emotion. Laboratory exercises (Mon. 10:30-12:30) include brain dissections, microscopy of neural tissue, and discussion of clinical cases. Prerequisites: NEUR 0010, NEUR 1020, and NEUR 1030. Please request an override through C@B. Please keep in mind that decisions on overrides may not be made until the first meeting of the course.

Fall NEUR1650 S01 16272 TTh 2:30-3:50(03) (D. Berson)

**NEUR 1670. Neuropharmacology and Synaptic Transmission.**

Synaptic transmission will be studied from a biochemical and pharmacological point of view. We will explore the factors regulating neurotransmitter synthesis, storage, release, receptor interaction, and termination of action. Proposed mechanisms of psychoactive drugs and biochemical theories of psychiatric disorders will be examined. Prerequisites: NEUR 0010 and BIOL 0200 or the equivalent.

Fall NEUR1670 S01 16273 TTh 9:00-10:20(02) (R. Patrick)

**NEUR 1740. The Diseased Brain: Mechanisms of Neurological and Psychiatric Disorders.**

The goals of this course are to illustrate what basic science can teach us about neurological disorders and how these pathologies illuminate the functioning of the normal nervous system. Consideration will be given to monoallelic diseases (e.g. Fragile X Syndrome, Duchenne Muscular Dystrophy and Tuberous Sclerosis) as well as genetically complex disorders, such as Autism, Schizophrenia and Alzheimer's Disease. Emphasis will be on the cellular and molecular basis of these disorders and how insights at these levels might lead to the development of therapies. Prerequisites: NEUR 1020. BIOL 0470 suggested.

Spr NEUR1740 S01 24734 MW 8:30-9:50(02) (J. Fallon)

**NEUR 1930G. Disease, Mechanism, Therapy: Harnessing Basic Biology for Therapeutic Development.**

The recent surge in understanding the cellular and molecular basis of neurological disease has opened the way for highly targeted drug discovery and development. In this course we will use several case studies to illuminate how mechanistic insights are being translated into novel therapeutic approaches. Please request an override through C@B. Please keep in mind that decisions on overrides may not be made until the first meeting of the course.

Fall NEUR1930CS01 16280 Arranged (J. Fallon)

**NEUR 1930N. Region of Interest: An In-Depth Analysis of One Brain Area.**

An in-depth exploration of one region of the brain. Topics will include: cell types and properties; synaptic properties; plasticity; connections to other brain areas; sub-divisions within the area; the region's role in sensation and perception; the region's role in action and behavior; the region's role in learning and memory; and diseases and disorders. Students will gain a deeper understanding of concepts and principles that apply throughout the brain. Students will gain experience with primary literature and learn about techniques for studying the area. Topic Fall 2019: Amygdala. Please request an override through C@B. Please keep in mind that decisions on overrides may not be made until the first meeting of the course.

Fall NEUR1930NS01 16276 W 12:30-3:00 (M. Linden)

**NEUR 1940G. Drugs and the Brain.**

This is a seminar course devoted to the reading and analyzing of original research articles dealing with the interaction between drugs and the brain. This will include drugs used to analyze normal brain function, as well as drugs of abuse and drugs used for therapeutic purposes. This course is intended for undergraduate and graduate students with a strong background in neuropharmacology. To express interest, please add this course to your primary cart. The decision will be made based on a variety of factors including, but not limited to seniority, concentration requirement. Limited to 15.

Spr NEUR1940CS01 24738 Arranged (R. Patrick)

**NEUR 1970. Independent Study.**

Laboratory-oriented research in neuroscience, supervised by staff members. A student, under the guidance of a neuroscience faculty member, proposes a topic for research, develops the procedures for its investigation, and writes a report of the results of his or her study. Independent study may replace only one required course in the neuroscience concentration. Prerequisites include NEUR 0010, 1020 and 1030. Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course. Permission must be obtained from the Neuroscience Department.

**NEUR 2010. Graduate Proseminar in Neuroscience.**

A study of selected topics in experimental and theoretical neuroscience. Presented by neuroscience faculty, students, and outside speakers. A required course for all students in the neuroscience graduate program.

Fall NEUR2010 S01 16277 Arranged (G. Barnea)

**NEUR 2020. Graduate Proseminar in Neuroscience.**

See Graduate Pro-Seminar In Neuroscience (NEUR 2010) for course description.

Spr NEUR2020 S01 24735 Arranged (G. Barnea)

**NEUR 2030. Advanced Molecular and Cellular Neurobiology I.**

Focuses on molecular and cellular approaches used to study the CNS at the level of single molecules, individual cells and single synapses by concentrating on fundamental mechanisms of CNS information transfer, integration, and storage. Topics include biophysics of single channels, neural transmission and synaptic function. Enrollment limited to graduate students.

Fall NEUR2030 S01 16278 Arranged (K. O'Connor-Giles)

**NEUR 2040. Advanced Molecular and Cellular Neurobiology II.**

This course continues the investigation of molecular and cellular approaches used to study the CNS from the level of individual genes to the control of behavior. Topics include patterning of the nervous system, generation of neuronal diversity, axonal guidance, synapse formation, the control of behavior by specific neural circuits and neurodegenerative diseases. Enrollment is limited to graduate students.

Spr NEUR2040 S01 24736 Arranged (G. Barnea)

**NEUR 2050. Advanced Systems Neuroscience.**

Focuses on systems approaches to study nervous system function. Lectures and discussions focus on neurophysiology, neuroimaging and lesion analysis in mammals, including humans. Cognitive neuroscience approaches will become integrated into the material. Topics include the major sensory, regulatory, and motor systems. Enrollment limited to graduate students.

Fall NEUR2050 S01 16279 Arranged (T. Desrochers)

**NEUR 2060. Advanced Systems Neuroscience.**

Focuses on cognitive approaches to study nervous system function. Lectures and discussions focus on neurophysiology, neuroimaging and lesion analysis in mammals, including humans. Computational approaches will become integrated into the material. Topics include the major cognitive systems, including perception, decisions, learning and memory, emotion and reward, language, and higher cortical function. Instructor permission required.

Spr NEUR2060 S01 24737 Arranged 'To Be Arranged'

**NEUR 2970. Preliminary Examination Preparation.**

For graduate students who have met the tuition requirement and are paying the registration fee to continue active enrollment while preparing for a preliminary examination.

Fall NEUR2970 S01 15321 Arranged (D. Sheinberg)

Spr NEUR2970 S01 24207 Arranged (D. Sheinberg)

**NEUR 2980. Graduate Independent Study.**

Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course. S/NC

**NEUR 2990. Thesis Preparation.**

For graduate students who have met the residency requirement and are continuing research on a full time basis.

Fall NEUR2990 S01 15322 Arranged (D. Lipscombe)

Spr NEUR2990 S01 24208 Arranged (D. Lipscombe)

## Medical Education

**MED 2980. Independent Study in Population Medicine.**

For students enrolled in the Primary Care-Population Medicine program at Alpert Medical School, this course is structured to allow students to conduct research focused on population health with a mentor at Brown University.

## Program in Liberal Medical Education

**PLME 0400. Introduction to Medical Illustration.**

This semester course explores the field of medical illustration and its many facets. Depiction of diseases, anatomy, medical practices and surgical procedures has been around since antiquity. Not only has medical illustration evolved over the centuries, it has played the role of historian, documenting the beliefs and knowledge of its time. Today, medical illustration is as present as ever despite the advent of other methods of medical documentation, including photography and videography.

Fall PLME0400 S01 17461 Arranged (F. Luks)

**PLME 0600. Convergence of Medicine, Technology and Public Policy in the US, As Told by the Failing Kidney.**

Technological advances, public policy, and corporate interests are assuming ever-expanding roles in US health care. This course explores the conjunction of the introduction of hemodialysis, a unique 1972 expansion of the Medicare program to cover the costs of end-stage renal disease (ESRD) and the simultaneous spread of corporate-run, for-profit dialysis centers.

This course explores how the concurrence of technological advances, public policy initiatives, and corporate consolidation led to major consequences in the treatment advanced kidney disease. The course reviews the history, treatment, implications of the technological imperative and the evolution of the medical-industrial complex through ESRD in American medicine.

Fall PLME0600 S01 15375 T 4:00-6:30(09) (A. Cohen)

**PLME 1000. PLME Senior Seminar in Scientific Medicine.**

This course is an interdisciplinary and integrative science course that will supplement the preparation of both PLME and pre-medical students for the study of medicine in the 21st century. The course will use a case-based approach to relevant and contemporary subjects in medicine and health care, such as: biological systems and their interactions; diagnosis and therapy optimization; and the humanistic aspects of patient care. The course is intended for seniors interested in attending medical school but will preferentially enroll PLME students. Prerequisite: PLME competency in Biology, Chemistry (inorganic and organic), Physics, and introductory calculus. Enrollment limited to 40. S/NC

Fall PLME1000 S01 16478 MW 8:30-9:50(01) (J. Ip)

## Business, Entrepreneurship and Organizations

**BEO 1930A. BEO Capstone I: Organizational Studies Track.**

The first in a two-semester Capstone for BEO Organizational Studies track seniors, open to all BEO seniors. Capstone builds upon concepts covered in BEO courses, specifically concepts from SOC 1311 and 1315. Students will synthesize knowledge at several levels: across disciplines, across theoretical understanding and practical application, and across private and public sector experiences of entrepreneurship and innovation. Students will be organized into client-mentored teams for social entrepreneurship and social innovation projects. BEO 1930A (fall) required; 1940A (spring) strongly advised for all Organizational Studies track seniors. Application required to match students to projects. Project team meetings required outside scheduled lectures.

Fall BEO1930A S01 16966 TTh 1:00-2:20(08) (L. DiCarlo)