Neuroscience

Overview
The Neuroscience Graduate Group is a unique, diverse PhD training program that offers intensive, integrated training in multiple areas of neuroscience research. The program involves more than 55 faculty from different campus departments, with expertise ranging from molecular and cellular neuroscience to developmental neuroscience, systems and computational neuroscience, and human cognitive neuroscience.

The group provides a highly interdisciplinary, intellectually dynamic training environment of course work, research training, and mentoring within a strong research program that produces fundamental advances in knowledge and cutting-edge techniques. The program welcomes highly qualified applicants to join in better understanding the brain and its functions and disorders.

Faculty in the Neuroscience Graduate Program are involved in three broad research areas: Cellular, Molecular, and Developmental Neuroscience; Systems and Computational Neuroscience; and Cognition, Brain, and Behavior. Individual faculty may be involved in more than one research area.

The Neuroscience Graduate Program also sponsors an annual campuswide Neuroscience retreat, weekly seminar series, and a graduate student Neuroscience Journal Club.

Undergraduate Program
There is no undergraduate program in Neuroscience.

Graduate Program
Neuroscience (http://guide.berkeley.edu/graduate/degree-programs/neuroscience): PhD

Neuroscience

NEUROSC C129 The Aging Human Brain 3 Units
Terms offered: Fall 2015, Fall 2014, Fall 2013
The course will survey the field of the human brain, with introductory lectures on the concepts of aging, and brief surveys of normal neuroanatomy, neurophysiology, neurochemistry, and neuropsychology as well as methods such as imaging, epidemiology, and pathology. The neurobiological changes associated with aging will be covered from the same perspectives: neuropsychology, anatomy, biochemistry, and physiology. Major neurological diseases of aging including Alzheimer's and Parkinson's disease will be covered, as will compensatory mechanisms, neuroendocrine changes with aging, depression and aging, epidemiology of aging, and risk factors for decline.

The Aging Human Brain: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Neuroscience/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Jagust
Also listed as: PB HLTH C129

The Aging Human Brain: Read Less [-]
NEUROSC C217D Biological and Public Health Aspects of Alzheimer’s Disease 3 Units
Terms offered: Spring 2017, Spring 2015, Spring 2014, Spring 2013
This course will survey the field of Alzheimer's disease (AD) from a biological and public health perspective by reading original research papers in the fields of medicine, neuroscience, and epidemiology. The course will begin with a historical survey of the concept of AD, followed by a description of clinical and neuropathological features. Subsequent classes will cover the genetics and molecular biology of the disease, as well as biomarkers, epidemiology, risk factors, treatment, development of new diagnostic approaches, and ethical issues. The course will also serve as a model for the analysis of complex diseases with multiple genetic and environmental causes and late onset neurodegenerative diseases. The course will also serve as a model for the analysis of complex diseases with multiple genetic and environmental causes and late-onset neurodegenerative disease.

Biological and Public Health Aspects of Alzheimer's Disease: Read More [+]

Rules & Requirements
Prerequisites: Graduate standing or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade.
Instructor: Jagust
Also listed as: PB HLTH C217D

Biological and Public Health Aspects of Alzheimer's Disease: Read Less [-]

NEUROSC C261 Cellular and Developmental Neurobiology 3 Units
Terms offered: Fall 2017, Fall 2016, Spring 2016
This course covers the molecular/cellular basis of neuron excitability (membrane potentials, action potential generation and propagation, ion channels), synaptic transmission and plasticity, sensory receptor function, and developmental neurobiology.

Cellular and Developmental Neurobiology: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade.
Instructor: Olshausen
Also listed as: MCELLBI C261

Cellular and Developmental Neurobiology: Read Less [-]

NEUROSC C262 Circuit and Systems Neurobiology 3 Units
Terms offered: Spring 2017, Fall 2015, Fall 2013
Advanced coverage of current research problems in systems-level neuroscience, and experimental and computational techniques used for these studies.

Circuit and Systems Neurobiology: Read More [+]

Rules & Requirements
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade.
Also listed as: MCELLBI C262

Circuit and Systems Neurobiology: Read Less [-]

NEUROSC C265 Neural Computation 3 Units
Terms offered: Prior to 2007
This course provides an introduction to the theory of neural computation. The goal is to familiarize students with the major theoretical frameworks and models used in neuroscience and psychology, and to provide hands-on experience in using these models. Topics include neural network models, supervised and unsupervised learning rules, associative memory models, probabilistic/graphical models, and models of neural coding in the brain.

Neural Computation: Read More [+]

Rules & Requirements
Prerequisites: Calculus, differential equations, basic probability and statistics, linear algebra, and familiarity with high level programming languages such as Matlab

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade.
Instructor: Olshausen
Also listed as: VIS SCI C265

Neural Computation: Read Less [-]
NEUROSC 290 Neuroscience First Year Research 2 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Seminar on the presentation and evaluation of research results for first-year neuroscience graduate students. During the first weeks, faculty present their research (FERPS); later, students present individual research results and evaluate their own and each other’s work. Course enrollment limited to 15.

NEUROSC 290A Neuroscience Research Design and Analysis 1 Unit
Terms offered: Fall 2017, Fall 2016
Professional core competency training for graduate students involved in neuroscience research at Berkeley. Includes survey of modern research methods, and professional skills including principles of experimental design and data reproducibility.

NEUROSC 291A Neuroscience Introduction to Research 4 - 12 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Closely supervised, intensive laboratory experimental research under the direction of an individual faculty member. For first-year neuroscience graduate students, this course will provide an introduction to experimental methods and research approaches in the different areas of neuroscience. Grade awarded on completion of sequence, which includes 3 ten-week laboratory rotations spread out over the fall and spring semesters.

NEUROSC 290B Neuroscience Career Skills 1 Unit
Terms offered: Spring 2017
Professional core competency training for graduate students involved in neuroscience research at Berkeley. Includes training in giving scientific presentations, scientific writing, and project management.
NEUROSC 291B Neuroscience Introduction to Research 4 - 12 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Closely supervised, intensive laboratory experimental research under the direction of an individual faculty member. For first-year neuroscience graduate students, this course will provide an introduction to experimental methods and research approaches in the different areas of neuroscience. Grade awarded on completion of sequence, which includes 3 ten-week laboratory rotations spread out over the fall and spring semesters.

Rules & Requirements
Prerequisites: Graduate standing in Neuroscience Graduate Group; consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 20-40 hours of laboratory per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.

Instructor: Ngai

Neuroscience Introduction to Research: Read Less [-]

NEUROSC 292 Neuroscience Graduate Research 3 - 12 Units
Terms offered: Fall 2017, Summer 2017 10 Week Session, Spring 2017
For graduate students in neuroscience in their second or later years. During the summer, the course will count for 3-6 units. Individual research under faculty supervision. In this course each graduate student conducts basic thesis and dissertation research after successful completion of the first-year laboratory rotation, Neuroscience 291A-291B. Laboratory work provides the basis for students' thesis research, preparation for the preliminary examination, and continued progress toward completion of Ph.D. dissertation.

Rules & Requirements
Prerequisites: Concurrent enrollment in 292; graduate standing in the neuroscience program; consent of instructor
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of seminar per week
Summer:
6 weeks - 5 hours of seminar per week
8 weeks - 3.5 hours of seminar per week
10 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.

Neuroscience Research Review: Read Less [-]

NEUROSC 293 Neuroscience Research Review 2 Units
Terms offered: Spring 2009, Fall 2008, Spring 2008
For graduate students in neuroscience in their second or later years. Two hours of seminar per week which complements the individual laboratory work under faculty supervision. Seminar will review current scientific literature and discuss original research performed by faculty, postdoctoral fellows, scientists, and graduate students in individual faculty laboratories.

Rules & Requirements
Prerequisites: Concurrent enrollment in 292; graduate standing in the neuroscience program; consent of instructor
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.

Neuroscience Research Review: Read Less [-]
NEUROSC 294 Neuroscience Graduate Student Presentation Seminar 1 Unit
Terms offered: Fall 2017, Spring 2017, Fall 2016
This course will encompass three important facets of graduate education in the neurosciences: 1) Development of research presentation skills: fourth and fifth year graduate students will present seminars based on their ongoing dissertation research. Preparation and critiques of presentations will focus on organization of conceptual issues, data presentation, and summarization. 2) Exposure to current topics in neuroscience: faculty speakers will present on current issues and topics relevant to scientific development in the neurosciences, such as technical methods, application of analytical and statistical techniques, and organization and preparation of competitive fellowship and other grant applications. 3) Seminar preparation: a crucial aspect of graduate education is the interaction of students with invited seminar speakers - who are often leaders in their fields. A selected number of class meetings will be devoted to the review of scientific articles published by upcoming seminar speakers and/or other related articles in the field.

Rules & Requirements
Prerequisites: Graduate student standing
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade.

NEUROSC 299 Seminars 1 - 3 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Course that focuses on topical subjects in specific fields of neuroscience.

Rules & Requirements
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of seminar per week

Additional Details
Subject/Course Level: Neuroscience/Graduate
Grading: Letter grade.