Neuroscience

Overview

The Neuroscience Graduate Group at UC Berkeley is a unique, diverse PhD training program that offers intensive, integrated training in multiple areas of neuroscience research. The program involves more than 50 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 coursework, 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 campus-wide 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/archive/2014-15/graduate/degree-programs/neuroscience) : PhD

Neuroscience

NEUROSC C129 The Aging Human Brain 3 Units
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.
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

NEUROSC C217D Biological and Public Health Aspects of Alzheimer's Disease 3 Units
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.
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

NEUROSC C260 Introduction to Neurobiology 4 Units
An introductory course designed to provide a general understanding
of the nervous system including how it functions, how it develops, and
how it changes with learning and memory. Analysis from the level of
molecules to cells to simple circuits to complex networks to higher brain
functions.
Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of
discussion per week

Additional Details

Subject/Course Level: Neuroscience/Graduate

Grading: Letter grade.

Also listed as: MCELLBI C260

NEUROSC C261 Advanced Cellular Neurobiology 3 Units
Physical-chemical basis of membrane potentials, electrotonus, action
potential generation and propagation, synaptic transmission, sensory
receptor function, and volume conductor potentials.
Rules & Requirements

Prerequisites: Molecular and Cell Biology 160

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 C261

NEUROSC C262 Advanced Topics in Systems Neuroscience 3 Units
Advanced coverage of current research problems in systems-level
neuroscience, and experimental and computational techniques used for
these studies.
Rules & Requirements

Prerequisites: 160 or equivalent

Repeat rules: Course may be repeated for credit. Course may be
repeated for credit when topic changes.

Hours & Format

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

Additional Details

Subject/Course Level: Neuroscience/Graduate

Grading: Letter grade.

Formerly known as: IDS 200B

Also listed as: MCELLBI C262

NEUROSC C263 Advanced Developmental Neurobiology 3 Units
Advanced level coverage of current research problems in the embryonic
and post-embryonic development of invertebrate and vertebrate nervous
systems.
Rules & Requirements

Prerequisites: 162 or equivalent

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 C263

NEUROSC C265 Neural Computation 3 Units
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.
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

NEUROSC 290 Neuroscience First Year Research 2 Units
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.
Rules & Requirements

Prerequisites: Graduate standing in Neuroscience Graduate Group; concurrent enrollment in 291A-291B

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: Ngai

NEUROSC 291A Neuroscience Introduction to Research 4 - 12 Units
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 one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.

Instructor: Ngai

NEUROSC 291B Neuroscience Introduction to Research 4 - 12 Units
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

NEUROSC 292 Neuroscience Graduate Research 3 - 12 Units
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: Graduate standing in the Neuroscience Graduate Group; advanced approval from instructor

Repeat rules: Course may be repeated for credit. Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 10-40 hours of laboratory per week

Summer: 10 weeks - 15-60 hours of laboratory per week

Additional Details

Subject/Course Level: Neuroscience/Graduate

Grading: Letter grade.

NEUROSC 293 Neuroscience Research Review 2 Units
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. Course may be repeated for credit when topic changes.

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.

NEUROSC 294 Neuroscience Graduate Student Presentation Seminar 1 Unit
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. Course may be repeated for credit when topic changes.

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
Course that focuses on topical subjects in specific fields of neuroscience.

Rules & Requirements

Repeat rules: Course may be repeated for credit. Course may be repeated for credit when topic changes.

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.