

# Neuroscience (NEU)

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## Courses

Expand all course descriptions [+]Collapse all course descriptions [-]

### NEU 24 Freshman Seminar 1 Unit

Terms offered: Fall 2024

The Freshman Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments. Topics vary from department to department and semester to semester. Final assessment to be decided by the instructor when the class is offered.

Freshman Seminar: Read More [+]

#### Rules & Requirements

**Prerequisites:** Open to freshmen only

**Repeat rules:** 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/Undergraduate

**Grading/Final exam status:** The grading option will be decided by the instructor when the class is offered. Final Exam To be decided by the instructor when the class is offered.

Freshman Seminar: Read Less [-]

### NEU 61 Brain, Mind, and Behavior 3 Units

Terms offered: Not yet offered

The human brain is the most complex structure in the known universe. The study of its structure and function and how it figures into our actions and mental experience is among the most exciting projects of modern science. This class begins with molecules and cells, builds up to brains and nervous systems, encompasses neural signaling, sensory perception, memory, language, and emotion, and culminates with the great mystery of how brain processes relate to consciousness and mental experience — that is, how the mind is related to the brain. This is a comprehensive introduction to the exciting subject of contemporary neuroscience, open to all interested students. This course runs in Session A.

Brain, Mind, and Behavior: Read More [+]

#### Rules & Requirements

**Credit Restrictions:** Students will receive no credit for NEU 61 after completing MCELLBI C61, MCELLBI 104, NEU C61, MCELLBI C100A, MCELLBI 110, MCELLBI C130, MCELLBI 136, MCELLBI 160, INTEGBI 132, or PSYCH 110.

#### Hours & Format

**Summer:** 6 weeks - 7 hours of lecture and 2.5 hours of discussion per week

**Online:** This is an online course.

#### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

**Instructor:** Presti

**Formerly known as:** Molecular and Cell Biology W61

Brain, Mind, and Behavior: Read Less [-]

## NEU C61 Brain, Mind, and Behavior 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

The human brain is the most complex structure in the known universe. The study of its structure and function and how it figures into our actions and mental experience is among the most exciting projects of modern science. This class begins with molecules and cells, builds up to brains and nervous systems, encompasses neural signaling, sensory perception, memory, language, and emotion, and culminates with the great mystery of how brain processes relate to consciousness and mental experience — that is, how mind may be related to brain. This is a comprehensive introduction to the exciting subject of contemporary neuroscience, open to all interested students.

Brain, Mind, and Behavior: Read More [+]

### Rules & Requirements

**Credit Restrictions:** Students will receive no credit for NEU C61 after completing CHEM C130, MCELLBI N61, MCELLBI 61, MCELLBI W61, MCELLBI 104, MCELLBI 110, MCELLBI 130, MCELLBI 136, MCELLBI 160, or INTEGBI 132.

### 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/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Presti

**Formerly known as:** Molecular and Cell Biology C61/Psychology C61

**Also listed as:** PSYCH C61

Brain, Mind, and Behavior: Read Less [-]

## NEU C62 Drugs and the Brain 3 Units

Terms offered: Fall 2024, Fall 2022, Fall 2020

The history, chemical nature, botanical origins, and effects on the human brain and behavior of drugs such as stimulants, depressants, psychedelics, analgesics, antidepressants, antipsychotics, steroids, and other psychoactive substances of both natural and synthetic origin. The necessary biological, chemical, and psychological background material for understanding the content of this course will be contained within the course itself.

Drugs and the Brain: Read More [+]

### Rules & Requirements

**Credit Restrictions:** Students will receive no credit for MCELLBI C62L & S C30T\NEU C62 after completing CHEM C130, MCELLBI 136, MCELLBI 160, INTEGBI 132, MCELLBI 104, MCELLBI 62, or PSYCH 119.

### Hours & Format

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

**Summer:** 8 weeks - 4.5 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructor:** Presti

**Formerly known as:** Molecular and Cell Biology C62/Letters and Science C30T

**Also listed as:** L & S C30T

Drugs and the Brain: Read Less [-]

## NEU 63 Introduction to Functional Neuroanatomy 3 Units

Terms offered: Not yet offered

This course aims to introduce students to concepts that are central to the field of Neuroanatomy. The main emphasis of the course will be on the human central nervous system, which includes the brain and spinal cord. Importantly, anatomy will be discussed in relation to the functions of the nervous system. Students will learn topics such as Cell Biology and Physiology, Neurodevelopment, sensory-motor systems, autonomic divisions, and the anatomy responsible for generating some of our higher cognitive functions. There are no prerequisites for this course, but a basic understanding of high school chemistry and biology is recommended.

Introduction to Functional Neuroanatomy: Read More [+]

### Rules & Requirements

**Credit Restrictions:** Students will receive no credit for NEU 63 after completing MCELLBI 104, CHEM C130, MCELLBI 110, MCELLBI C130, MCELLBI 136, MCELLBI 160, NEU 100B, or INTEGBI 132.

### Hours & Format

#### Summer:

4 weeks - 12 hours of lecture per week

6 weeks - 7.5 hours of lecture per week

8 weeks - 6 hours of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Molecular and Cell Biology 63

Introduction to Functional Neuroanatomy: Read Less [-]

## NEU C64 Exploring the Brain: Introduction to Neuroscience 3 Units

Terms offered: Summer 2024 8 Week Session, Summer 2023 8 Week Session, Summer 2022 8 Week Session

This course will introduce lower division undergraduates to the fundamentals of neuroscience. The first part of the course covers basic membrane properties, synapses, action potentials, chemical and electrical synaptic interactions, receptor potentials, and receptor proteins. The second part of the course covers networks in invertebrates, memory and learning behavior, modulation, vertebrate brain and spinal cord, retina, visual cortex architecture, hierarchy, development, and higher cortical centers.

Exploring the Brain: Introduction to Neuroscience: Read More [+]

### Rules & Requirements

**Prerequisites:** High school chemistry or Chemistry 1A; high school biology or Biology 1A. Biology 1AL is not required

**Credit Restrictions:** Students will receive no credit for NEU C64 after completing NEU C61, MCELLBI 104, CHEM C130, MCELLBI 110, MCELLBI C130, MCELLBI 136, MCELLBI 160, or INTEGBI 132.

### Hours & Format

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

**Summer:** 8 weeks - 4 hours of lecture and 2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** Molecular and Cell Biology C64/Psychology C64

**Also listed as:** PSYCH C64

Exploring the Brain: Introduction to Neuroscience: Read Less [-]

## NEU 65 Neuroscience, Film, and Philosophy 3 Units

Terms offered: Not yet offered

Advances in neuroscience are forcing us to confront anew questions concerning the nature of identity, reality, morality, and free will. Scientists can now implant artificial memories, augment natural brain capabilities, and read out intentions from the brain before they are acted upon. This class intends to shine a light on the brave new world enabled by modern neuroscience through three lenses: science, film, and philosophy. Topics to be covered include: the architecture of the brain, AI & the mind body problem, the neural construction of reality, action and free will, memory, the neural basis of morality, mechanisms for brain wiring, mental illness, and brain machine interfaces.

Neuroscience, Film, and Philosophy: Read More [\[+\]](#)

### Hours & Format

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

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Tsao

**Formerly known as:** Molecular and Cell Biology 65

Neuroscience, Film, and Philosophy: Read Less [\[-\]](#)

## NEU 77 Survey of Neuroscience Research 1 Unit

Terms offered: Fall 2024

This course provides a survey of neuroscience research areas represented by faculty members in the Department of Neuroscience. Each week a different faculty member will give a one hour lecture on how their research field contributes to our understanding of the brain and behavior. The course will span molecular, cellular, circuits, systems, behavioral, cognitive, and computational neuroscience, to illustrate how different approaches fit into the overall field of neuroscience. Faculty will also inform students about courses that they teach in neuroscience and related areas. This course gives undergraduates an opportunity to learn about the spectrum of research within the field of neuroscience.

Survey of Neuroscience Research: Read More [\[+\]](#)

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam required.

**Instructor:** Feller

Survey of Neuroscience Research: Read Less [\[-\]](#)

## NEU 98 Directed Group Study 1 - 4 Units

Terms offered: Not yet offered

Lectures and small group discussions focusing on topics of interest, varying from semester to semester.

Directed Group Study: Read More [\[+\]](#)

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Directed Group Study: Read Less [\[-\]](#)

## NEU 99 Supervised Independent Study 1 - 4 Units

Terms offered: Not yet offered

This course provides credit for independent study by undergraduates working in a lab with a faculty member. The student is responsible for finding an instructor to supervise the work and should meet with that instructor regularly throughout the semester. Faculty members must commit to supervising and evaluating the student's work.

Supervised Independent Study: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

### Summer:

6 weeks - 2-10 hours of independent study per week

8 weeks - 2-8 hours of independent study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternative to final exam.

Supervised Independent Study: Read Less [\[-\]](#)

## NEU 100A Cellular and Molecular Neurobiology 4 Units

Terms offered: Fall 2024

This course is a comprehensive introductory survey of cellular and molecular neuroscience, including cellular neurophysiology, membrane biophysics, ion channel function, synaptic transmission and plasticity, sensory transduction, and nervous system development. We will discuss topics at the level of molecules to cells to simple circuits.

Cellular and Molecular Neurobiology: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** BIOLOGY 1A and BIOLOGY 1AL; PHYSICS 8A and PHYSICS 8B (can be taking concurrently)

**Credit Restrictions:** Students will receive no credit for NEU 100A after completing MCELLBI 160.

### 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/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Feller, Kramer, Isacoff

Cellular and Molecular Neurobiology: [Read Less](#) [-]

## NEU 100B Circuit, Systems and Behavioral Neuroscience 4 Units

Terms offered: Not yet offered

This course is a comprehensive survey of circuits and systems neuroscience, including how brain function underlies behavior. Students will learn how brain circuits are organized, how the brain processes sensory information, how it plans and executes movement, and how it stores information during learning. We will discuss brain rhythms and sleep, and brain systems for emotion, reward, attention, and other higher functions. The major focus is on the mammalian brain, but we will also discuss principles from other organisms. By the end of the course, students will have a strong understanding of the biological and computational principles for neural circuit function, and the neurobiological basis of behavior.

Circuit, Systems and Behavioral Neuroscience: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** NEU 100A (or MCELLBI 160)

### 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/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructors:** Tsao, Dan, Feldman

**Formerly known as:** Molecular and Cell Biology 161

Circuit, Systems and Behavioral Neuroscience: [Read Less](#) [-]

## NEU 110 Scientific Logic and Communication 2 Units

Terms offered: Not yet offered

Students in this course will develop competency in scientific communication, including scientific writing and presentation of data. We will use active learning exercises to teach strategies for organizing and presenting scientific ideas and evidence verbally and in writing. Each semester there will be one broad neuroscience topic (such as color vision or memory) that we will study in three different research areas: cellular, circuits/systems and cognitive neuroscience. Throughout the semester, students will read and discuss research articles, practice interpreting graphs, make presentations, and complete scientific writing assignments such as analyzing a research article.

Scientific Logic and Communication: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** BIOLOGY 1A and BIOLOGY 1AL

### Hours & Format

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

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Alternate method of final assessment during regularly scheduled final exam group (e.g., presentation, final project, etc.).

Scientific Logic and Communication: Read Less [\[-\]](#)

## NEU C125 Neuroethology: Complex Animal Behaviors and Brains 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

Neuroethologists study neural systems by combining behavior and neuroscience to understand the neural mechanism that have evolved in various animals to solve particular problems encountered in their environmental niches. This comparative approach that emphasizes how information is processed and transformed by the brain is particularly powerful for understanding neural systems. In this course, you will learn important concepts in ethology, sensory systems, motor systems and neural plasticity and development by studying the behavior and brains of animals such as crickets, lobsters, barn-owls, honey-bees, echolocating bats, electric fishes and songbirds.

Neuroethology: Complex Animal Behaviors and Brains: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** One foundational lower division level in general Biology, Animal Behavior or Neurosciences; UC Berkeley classes that satisfy this requirement are Bio 1A, Bio1B, IB 31, Psych C61/MCB C61, or Psych 110

**Credit Restrictions:** Students will receive no credit for INTEGBI C147 after completing INTEGBI 147. A deficient grade in INTEGBI C147 may be removed by taking INTEGBI 147.

### 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/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Theunissen

**Formerly known as:** Integrative Biology C147/Psychology C115C

**Also listed as:** PSYCH C115C

Neuroethology: Complex Animal Behaviors and Brains: Read Less [\[-\]](#)

## NEU C126 Hormones and Behavior 3 Units

Terms offered: Spring 2022, Spring 2021, Spring 2019

This course provides a comprehensive overview of behavioral endocrinology beginning with hormone production and actions on target tissues/circuits and continuing with an exploration of a variety of behaviors and their regulation/consequences. The course also examines the reciprocal interactions between the neuroendocrine system and behavior, considering the impact of hormones on development and adult behavior, and how behavior regulates physiology. Although non-human vertebrate species will be the primary focus, the relevance of these topics to humans will also be explored. Topics include sexual differentiation and sex differences in behavior, reproductive, parental, and aggressive behavior, biological rhythms, and homeostatic regulation.

Hormones and Behavior: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** Completion of biological prerequisites for the major and consent of instructor; a course in mammalian physiology recommended

### 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:** Kriegsfeld

**Also listed as:** PSYCH C116

Hormones and Behavior: [Read Less](#) [-]

## NEU 164 Neurodevelopment 3 Units

Terms offered: Fall 2024

This course will provide students with insights into the cellular mechanisms underlying development of the nervous system. We will discuss the importance of these mechanisms by highlighting cases where alterations in these processes lead to neurodevelopmental disorders. We will review what is currently known about these topics and the areas of active research. In the lecture, we will refer to figures from research literature, and you will be reading and discussing articles in the discussion section. Reading articles critically is an important skill for all biologists and a great way to learn how research is conducted. By the end of the course, you will have a good background in neural development and the latest methods used to study it.

Neurodevelopment: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** NEU 100A

### 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.

**Instructors:** Feller, Bateup

Neurodevelopment: [Read Less](#) [-]

## NEU 165 Neurobiology of Disease 3 Units

Terms offered: Not yet offered

The course will give insights into the cellular mechanisms underlying neurological diseases. The course is divided into three main sections: neurodevelopmental disorders, psychiatric disorders, and neurodegeneration. We will explore each of these topics at the molecular and cellular levels, reviewing what is currently known and the areas of active research. In lecture we will refer to figures from the research literature, and you will be reading and discussing articles in the discussion section. Reading articles critically is an important skill for all biologists and a great way to learn how research is conducted. By the end, you will have a good background in neurological diseases and a better ability to understand primary literature.

Neurobiology of Disease: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** NEU 100A or equivalent

### 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.

**Formerly known as:** Molecular and Cell Biology 165

Neurobiology of Disease: [Read Less](#) [-]

## NEU 171L Neurobiology Laboratory 4 Units

Terms offered: Fall 2024

In this course you will be introduced to a variety of techniques that are commonly used to study the nervous system including electrophysiology, optogenetics, cell biology, imaging, genetics, and anatomy. Experiments will be done on cells and invertebrates, and will cover molecular channel properties, neuronal cell physiology, development, and behavior. We hope that by analyzing the data from these experiments you will gain a better understanding of key principles in neuroscience. In addition, you will learn how to design experiments, troubleshoot experiments, analyze your data, and present your findings in written reports.

Neurobiology Laboratory: Read More [+]

### Rules & Requirements

**Prerequisites:** BIOLOGY 1A, BIOLOGY 1AL; PHYSICS 8A, PHYSICS 8B; NEU 100A or equivalent (may be taken concurrently)

**Credit Restrictions:** Students will receive no credit for NEU 171L after completing MCELLBI 160L.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 8 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

Neurobiology Laboratory: Read Less [-]

## NEU 172L Cognitive and Computational Lab 4 Units

Terms offered: Not yet offered

In this laboratory course, students will be taught the experimental and analytical techniques used by cognitive and computational neuroscientists. Students will learn how to assess humans' performance in visual and auditory tasks, how to design experiments for testing theories of motor control, and how cognitive processes such as memory and decision-making affect perceptual and motor behavior. Students will also be introduced to computational methods used to analyze the large behavioral and neural data sets that are acquired in systems and cognitive neuroscience. Finally, students will be introduced to the tools of theoretical neuroscience for generating mathematical descriptions of the computations performed by a thinking brain.

Cognitive and Computational Lab: Read More [+]

### Rules & Requirements

**Prerequisites:** NEU 100A and NEU 100B. Basic Concepts in Programming and Data Analysis: DATA C8 or equivalent

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 2 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

Cognitive and Computational Lab: Read Less [-]

## NEU 173L Neuroanatomy Laboratory 4 Units

Terms offered: Not yet offered

This course provides you with a basic understanding of the principles of brain structures and function. Our emphasis is more integrative and broadly-based than in most neuroanatomy courses. In addition to the fundamental structural biology of the central and autonomic nervous systems, we will introduce a variety of techniques that are commonly used to study the nervous system including immunohistochemistry, MRI, and fluorescence imaging. We will address topics in developmental neurobiology, the sensory, motor, and limbic systems, as well as aspects of neurochemistry and neuropathology. You will also learn how to design experiments, troubleshoot experiments, analyze your data, and present your findings in written reports.

Neuroanatomy Laboratory: Read More [+]

### Rules & Requirements

**Prerequisites:** BIOLOGY 1A and BIOLOGY 1AL; PHYSICS 8A and PHYSICS 8B; NEU 100A, NEU 100B, or equivalent (can be taken concurrently)

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of lecture and 6 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructors:** Lammel, Jagust, Feinberg

**Formerly known as:** Molecular and Cell Biology 163L

Neuroanatomy Laboratory: Read Less [-]



## NEU 191 Senior Research Thesis 4 Units

Terms offered: Not yet offered

This course is intended for advanced undergraduates wishing to pursue independent research projects under the mentorship of a Neuroscience faculty member. To apply for NEU 191, the research project must be rigorous and provide significant training in biology.

Senior Research Thesis: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor and departmental adviser

**Credit Restrictions:** Students will receive no credit for NEU 191 after completing NEU H196A, or NEU H196B.

### Hours & Format

**Fall and/or spring:** 15 weeks - 12 hours of independent study per week

### Summer:

6 weeks - 30 hours of independent study per week

8 weeks - 22.5 hours of independent study per week

10 weeks - 18 hours of independent study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

Senior Research Thesis: Read Less [-]

## NEU H196A Honors Research Thesis 1 - 4 Units

Terms offered: Not yet offered

This course is intended for advanced undergraduates wishing to pursue independent research projects under the mentorship of a Neuroscience faculty member. To apply for NEU H196A, the research project must be rigorous and provide significant training in biology, have a major GPA of 3.5 or higher, and a cumulative UC Berkeley GPA of 3.3.

Honors Research Thesis: Read More [+]

### Rules & Requirements

**Prerequisites:** Senior honors status and consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

**Summer:** 8 weeks - 1.5-7.5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternative to final exam.

Honors Research Thesis: Read Less [-]

## NEU H196B Honors Research Thesis 4 Units

Terms offered: Not yet offered

This course is intended for advanced undergraduates wishing to pursue independent research projects under the mentorship of a Neuroscience faculty member. To apply for NEU H196B, the research project must be rigorous and provide significant training in biology, have a major GPA of 3.5 or higher, and have a cumulative UC Berkeley GPA of 3.3.

Honors Research Thesis: Read More [+]

### Rules & Requirements

**Prerequisites:** Senior honors status and consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 12 hours of independent study per week

**Summer:** 8 weeks - 22.5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Letter grade. Alternative to final exam.

Honors Research Thesis: Read Less [-]

## NEU 198 Directed Group Study 1 - 4 Units

Terms offered: Not yet offered

Lectures and small group discussions focusing on topics of interest, varying from semester to semester.

Directed Group Study: Read More [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Final exam not required.

Directed Group Study: Read Less [-]

## NEU 199 Supervised Independent Study 1 - 4 Units

Terms offered: Not yet offered

This course provides credit for independent study by undergraduates working in a lab with a faculty member. The student is responsible for finding an instructor to supervise the work and should meet with that instructor regularly throughout the semester. Faculty members must commit to supervising and evaluating the student's work.

Supervised Independent Study: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of independent study per week

### Summer:

6 weeks - 2-10 hours of independent study per week

8 weeks - 2-8 hours of independent study per week

10 weeks - 1.5-6 hours of independent study per week

12 weeks - 1-5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Neuroscience/Undergraduate

**Grading/Final exam status:** Offered for pass/not pass grade only. Alternative to final exam.

Supervised Independent Study: Read Less [-]

## NEU 210A Neuroscience Research Design and Analysis 1 Unit

Terms offered: Fall 2024

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.

Neuroscience Research Design and Analysis: Read More [+]

### Rules & Requirements

**Prerequisites:** Restricted to 1st year PhD students in Neuroscience-related PhD Programs (Neuroscience PhD Program, MCB PhD Program, Psychology PhD Program, Biophysics PhD Program), or permission of instructor

### Hours & Format

**Fall and/or spring:** 8 weeks - 1.5 hours of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructors:** Feldman, Neuroscience Graduate Advisors, Guest faculty speakers

**Formerly known as:** Neuroscience 290A

Neuroscience Research Design and Analysis: Read Less [-]

## NEU 210B Neuroscience Career Skills 1 Unit

Terms offered: Not yet offered

Professional core competency training for graduate students involved in neuroscience research at Berkeley. Includes training in giving scientific presentations, scientific writing, and project management.

Neuroscience Career Skills: Read More [+]

### Rules & Requirements

**Prerequisites:** Restricted to 1st year PhD students in Neuroscience-related PhD Programs (Neuroscience PhD Program, MCB PhD Program, Psychology PhD Program, Biophysics PhD Program), or permission of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructors:** Feldman, Neuroscience Graduate Advisors, Guest faculty speakers

**Formerly known as:** Neuroscience 290B

Neuroscience Career Skills: Read Less [-]

## NEU C241 Proseminar: Cognition, Brain, and Behavior 3 Units

Terms offered: Not yet offered

A survey of the field of biological psychology. Areas covered are (a) cognitive neuroscience; (b) biological bases of behavior; (c) sensation and perception (d) learning and memory, (e) thought and language.

Proseminar: Cognition, Brain, and Behavior: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor

### 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:** Psychology 210A

**Also listed as:** PSYCH C210A

Proseminar: Cognition, Brain, and Behavior: Read Less [-]

## NEU 242 Reinforcement Learning and Decision-making 3 Units

Terms offered: Not yet offered

The focus of the course is on weekly readings of recent papers in Reinforcement Learning and Decision-Making. The instructors have created a topical list of recent papers published in leading journals. We selected the papers because they sounded important and/or interesting. We have not necessarily read them. This should help you to not only learn about the field, but also learn to spot and critique a bad paper. Typical topics that are covered include: dopamine and temporal difference learning, model-based learning, cognitive maps in the hippocampus and beyond, economic choice, and the role of replay. Reinforcement Learning and Decision-making: Read More [ + ]

### Rules & Requirements

**Prerequisites:** NEU 100B or equivalent undergraduate-level systems and cognitive neuroscience courses

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

Reinforcement Learning and Decision-making: Read Less [ - ]

## NEU 250 Circuit and Systems Neuroscience 3 Units

Terms offered: Not yet offered

This is a graduate-level course on current topics in circuit and systems neuroscience. Topics include sensory coding, neural circuit computations, plasticity and learning, hippocampal function, motor control, and circuits for innate behaviors.

Circuit and Systems Neuroscience: 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.

**Formerly known as:** Molecular and Cell Biology C262/Neuroscience C262

Circuit and Systems Neuroscience: Read Less [ - ]

## NEU 260 Molecular and Cellular Neurobiology 3 Units

Terms offered: Fall 2024

This course covers molecular and cellular aspects of cellular excitability (including membrane potential, action potential generation, spike propagation, and ion channel structure and function), synaptic transmission and plasticity, and sensory systems. Primary reading material will be research papers. We will provide references to textbook chapters for background and review. This will be an interactive course in which you will be expected to be an active participant.

Molecular and Cellular Neurobiology: Read More [ + ]

### Rules & Requirements

**Prerequisites:** NEU 100A or equivalent undergraduate-level molecular and cellular neuroscience course

**Credit Restrictions:** Students will receive no credit for NEU 261 after completing MCELLBI C261.

### 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:** Neuroscience 261

Molecular and Cellular Neurobiology: Read Less [ - ]

## NEU C272 Modern Optical Microscopy for the Modern Biologist 3 Units

Terms offered: Fall 2024, Fall 2023, Spring 2023

This course is intended for graduate students in the early stages of their thesis research who are contemplating using modern microscopy tools as part of their work. It endeavors to cut through the confusion of the wide array of new imaging methods, with a practical description of the pros and cons of each. In addition to providing an intuitive physical understanding how these microscopes work, the course will offer hands on experience with cutting-edge microscopes where students will be able to see firsthand how different imaging modalities perform on their own samples, and where they will be able to access computational tools for the visualization and analysis of their data.

Modern Optical Microscopy for the Modern Biologist: Read More [+]

### Rules & Requirements

**Credit Restrictions:** Students will receive no credit for MCELLBI 205 after completing MCELLBI 205, or MCELLBI 205. A deficient grade in MCELLBI 205 may be removed by taking MCELLBI 205, or MCELLBI 205.

### Hours & Format

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

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Instructors:** Betzig, Ji

**Formerly known as:** Molecular and Cell Biology 205

**Also listed as:** MCELLBI C205/PHYSICS C218

Modern Optical Microscopy for the Modern Biologist: Read Less [-]

## NEU 273 Seminars 2 Units

Terms offered: Not yet offered

This intermediate-level statistics class is tailored for PhD students in neuroscience and related fields, emphasizing a collaborative learning approach. Led by a GSI with faculty oversight, students actively engage in discussions, presentations, and exercises. The course focuses on understanding statistical methods' applications, assumptions, and limitations in neuroscience research, as well as their implementation in Python. Covering traditional statistics and data modeling, students learn to analyze data and design experiments effectively. It's a dynamic format that requires students' active participation and commitment to reading and practical exercises.

Seminars: Read More [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

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

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

Seminars: Read Less [-]

## NEU 290 Seminars 1 - 3 Units

Terms offered: Not yet offered

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

Seminars: Read More [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### 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.

**Formerly known as:** Neuroscience 299

Seminars: Read Less [-]

## NEU 291A Neuroscience Introduction to Research 4 - 12 Units

Terms offered: Fall 2024

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. Course sequence includes 3 ten-week laboratory rotations spread out over the fall and spring semesters. Credit and grade to be awarded upon completion of the full sequence.

Neuroscience Introduction to Research: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Graduate standing in Neuroscience Graduate Group; consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 12-36 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.

**Formerly known as:** Neuroscience 291A

Neuroscience Introduction to Research: Read Less [\[-\]](#)

## NEU 291B Neuroscience Introduction to Research 4 - 12 Units

Terms offered: Not yet offered

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. Course sequence includes 3 ten-week laboratory rotations spread out over the fall and spring semesters. Credit and grade to be awarded upon completion of the full sequence.

Neuroscience Introduction to Research: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Graduate standing in Neuroscience Graduate Group; consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 12-36 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.

**Formerly known as:** Neuroscience 291B

Neuroscience Introduction to Research: Read Less [\[-\]](#)

## NEU 294 Neuroscience Graduate Student Presentation Seminar 1 Unit

Terms offered: Fall 2024

This course provides a holistic approach to graduate neuroscience education, with a focus on three key areas: 1) Improving research presentation skills: Fourth and fifth-year students present seminars on their dissertation research, emphasizing conceptual organization, data presentation, and summarization. 2) Exploring current neuroscience topics: Faculty speakers discuss advanced technical methods, analytical techniques, and preparing grant applications. 3) Seminar readiness: Students engage with seminar speakers during class sessions, reviewing articles authored by upcoming speakers and related publications.

Neuroscience Graduate Student Presentation Seminar: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Graduate student standing

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Formerly known as:** Neuroscience 294

Neuroscience Graduate Student Presentation Seminar: Read Less [\[-\]](#)

## NEU 295 Neuroscience Research Review 2 Units

Terms offered: Fall 2024

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.

Neuroscience Research Review: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** Concurrent enrollment in 292; graduate standing in the neuroscience program; consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### 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.

**Formerly known as:** Neuroscience 293

Neuroscience Research Review: [Read Less](#) [-]

## NEU 296 Neuroscience Colloquium 0.0 Units

Terms offered: Not yet offered

Meetings for the presentation of original work by faculty, visiting lecturers, postdoctoral fellows, and graduate students.

Neuroscience Colloquium: [Read More](#) [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of colloquium per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

Neuroscience Colloquium: [Read Less](#) [-]