

An interdepartmental program

# Neuroscience

Courses of Study:  
Major (BA/BS)  
Master of Science  
Doctor of Philosophy

## Objectives

### Undergraduate Major

The major in neuroscience is designed to provide an interdisciplinary program of study of the neural mechanisms involved in the control of human or animal behavior. The major combines a strong foundation in basic science with more specialized courses in biology and psychology. This program is especially appropriate for students wishing to pursue further study in medicine, experimental psychology, or neuroscience.

### Graduate Program in Neuroscience

The graduate program in neuroscience, leading to the MS and PhD degrees, is designed to equip students with the advanced knowledge and training necessary to conduct research in this interdisciplinary field. The program comprises three broadly defined areas: behavioral neuroscience involves work with humans in neuropsychology, with experimental cognitive neuroscience and sensory psychophysics, and with animal behavior and electrophysiology; cellular and molecular neuroscience provides training in electrophysiology, molecular biology, biophysics, and biochemistry appropriate to neurobiology; and computational and integrative neuroscience trains students in the use of experimental and theoretical methods for the analysis of brain function. A typical program for the PhD student will consist of laboratory rotations and dissertation research as well as formal courses. Students pursuing the MS degree typically take graduate-level courses and either do laboratory research or an in-depth library-based thesis.

## How to Become a Major

The neuroscience major requires a strong science course load. There is a meeting each fall at which interested students can discuss the major with neuroscience faculty. Students can schedule an appointment with the undergraduate advising head for further information or to enroll in the major. The requirements are listed below and include many options. It is recommended that each major meet with his or her advisor to determine which options best satisfy each student's needs. Because of the number of basic science requirements, it is recommended that students begin enrolling in these courses early, especially those listed as prerequisites for advanced courses in the major. Students interested in senior research should contact prospective mentors by the spring of their junior year.

## How to Be Admitted to the Graduate Program

The general requirements for admission to the Graduate School, given in an earlier section of this *Bulletin*, apply here. Applicants for admission to the neuroscience program are also required to take the Graduate Record Examination. The student's undergraduate curriculum should include related fundamental science courses.

Students currently enrolled in other programs at Brandeis may elect to switch over to obtain a neuroscience PhD if they have already met or will meet the degree requirements for the neuroscience degree.

## Faculty

### John Lisman, Chair

(Biology; Volen National Center for Complex Systems)

### Jeffrey Agar

(Chemistry; Rosenstiel Center; Volen National Center for Complex Systems)

### Susan Birren, Undergraduate Advising Head

(Biology; National Center for Behavioral Genomics; Volen National Center for Complex Systems)

### Paul DiZio

(Psychology; Volen National Center for Complex Systems)

### Irving Epstein

(Chemistry; Volen National Center for Complex Systems)

### József Fiser

(Psychology; Volen National Center for Complex Systems)

### Paul Garrity

(Biology; National Center for Behavioral Genomics; Volen National Center for Complex Systems)

### Leslie Griffith, Graduate Advising Head

(Biology; National Center for Behavioral Genomics; Volen National Center for Complex Systems)

### Jeffrey Hall

(Biology; Volen National Center for Complex Systems)

### Donald Katz

(Psychology; Volen National Center for Complex Systems)

### James Lackner

(Psychology; Volen National Center for Complex Systems)

### Eve Marder

(Biology; Volen National Center for Complex Systems)

### Christopher Miller

(Biochemistry; Volen National Center for Complex Systems)

### Paul Miller

(Biology; Volen National Center for Complex Systems)

### Sacha Nelson

(Biology; National Center for Behavioral Genomics; Volen National Center for Complex Systems)

### Daniel Oprian

(Biochemistry; Volen National Center for Complex Systems)

### Michael Rosbash

(Biology; National Center for Behavioral Genomics)

### Robert Sekuler

(Psychology; Volen National Center for Complex Systems)

### Piali Sengupta

(Biology; National Center for Behavioral Genomics; Volen National Center for Complex Systems)

### Gina Turrigiano

(Biology; National Center for Behavioral Genomics; Volen National Center for Complex Systems)

### Kalpna White, Senior Honors Coordinator

(Biology; Volen National Center for Complex Systems)

### Arthur Wingfield

(Psychology; Director, Volen National Center for Complex Systems)

## Requirements for the Major

**A.** All students will be required to take the core course in neurobiology, NBIO 140b (Principles of Neuroscience) and at least one core course in quantitative methods: BIOL 51b (Biostatistics), NBIO 136b (Computational Neuroscience), NPHY 115a (Dynamical Systems, Chaos, and Fractals), NPSY 137b (Cognitive Modeling), PSYC 51a (Statistics), PSYC 210a (Advanced Psychological Statistics), QBIO 110a (Numerical Modeling of Biological Systems), or PHYS 105a (Biological Physics). A course taken to satisfy the quantitative method requirement cannot also count as an elective course.

Students must choose one of the two tracks described below—Option I leading to a BA in neuroscience, or Option II leading to a BS in neuroscience.

Among courses offered to fulfill the requirements of this concentration, no course may be taken pass/fail and no more than one grade of D in a semester course will be allowed.

### Option I: The BA Degree in Neuroscience

The standard neuroscience option is designed to provide students with a general background in neuroscience. In addition to the courses required of all candidates (listed above), students must take six semester courses from those courses listed below under neuroscience electives; at least two courses must be selected from Group 1 and two from Group 2. Students must also take at least nine semester courses from the basic science electives.

#### Neuroscience Electives

Group 1: BIOL 42a (Physiology), NBIO 136b (Computational Neuroscience), 143b (Developmental Neurobiology), 145b (Systems Neuroscience), 146a (Neurobiology of Disease), 147a (Neurogenetics), 148b (Cellular Neuroscience), BIOL 149b (Molecular Pharmacology), NBIO 150a (Autism and Human Developmental Disorders), NPHY 115a (Dynamical Systems, Chaos, and Fractals), QBIO 120a (Quantitative Biology Instrumentation Laboratory).

Group 2: NPSY 11b (Introduction to Behavioral Neuroscience), 12a (Sensory Processes), 16a (Motor Control), 22b (Introduction to Cognitive Neuroscience), 120b (Man in Space), 125a (Advanced Topics in Perception and Adaptation), 128b (Motor Control, Orientation, and Adaptation), 137b (Cognitive Modeling), 154a (Human Memory), 159a (Advanced Topics in Episodic Memory), 168b (Electrophysiology of Human Memory), 174a (Visual Cognition), 175a (The Neuroscience of Vision), 196b (Advanced Topics in Cognition), 197a (Advanced Topics in Behavioral Neuroscience), 199a (Human Neuropsychology).

Group 3: BCHM 100a (Introductory Biochemistry), 101a (Advanced Biochemistry: Enzyme Mechanisms), BIOL 22a (Genetics and Molecular Biology), 22b (Cell Structure and Function), 50b (Biology of Behavior), 103b (Mechanisms of Cell Functions), 105b (Molecular Biology), 111a (Developmental Biology).

A student who has completed two courses in both Groups 1 and 2 may petition to substitute NEUR 98a,b (Readings in Neuroscience), or NEUR 99d (Senior Research) for one of the remaining two courses. Students must enroll in all laboratories that accompany electives used to satisfy these requirements (BIOL 18a and b must be taken along with BIOL 22a and b, but no additional concentration credit will be received).

#### Basic Science Electives

The basic science electives include all courses numbered 10 and above in chemistry, computer science, mathematics, and physics. Courses numbered below 10 may not be included in this group. Laboratory courses are counted as one-half of a regular semester course.

#### Double-Counting Electives

BIOL 22a and BIOL 22b may count toward either Group 3 electives or basic science electives, but not both.

### Option II: The BS Degree in Neuroscience

The BS program is an intensive neuroscience option designed to provide students with a strong background in neuroscience and associated areas. In addition to the courses required of all candidates (listed above), students must take seven semester courses from those listed above in neuroscience electives, with at least two courses selected from Group 1 and two from Group 2. Candidates for the BS must also take at least ten semester courses from the offerings given above in basic science electives. Courses numbered below 10 may not be included in this group.

### B. Senior Research and Honors Program

Seniors can receive credit for senior research in neuroscience by petitioning the program committee during the fall of their senior year. Candidates must enroll in NEUR 99d or 99e to carry out a senior research project and submit a thesis. Candidates interested in honors must state this in their petition and also present an oral defense of their thesis.

## Combined BS/MS Program

Candidates for honors in neuroscience may be admitted to a special four-year BS/MS program upon recommendation of the neuroscience program and approval by the Graduate School. Application to the Graduate School must be made by May 1 preceding the senior year. Applications should include a proposed course of study specifying how the degree requirements will be met, a transcript, a letter of recommendation from the research sponsor, and a brief description of the proposed research project. To qualify for the BS/MS degree in neuroscience, students must complete a total of thirty-eight courses. These courses must include those needed to satisfy the requirements for the BS degree, as indicated above, plus three additional electives chosen from the neuroscience electives listed above. Of the ten electives required for the BS/MS degree, at least six must be at the graduate level (and completed with a grade of B– or above). In addition, a substantial research contribution is required and students must submit a research thesis to the neuroscience graduate committee for review. A thesis submitted for the master's degree may also be submitted for honors in neuroscience.

## Special Notes Relating to Undergraduates

It is the policy of the neuroscience program to allow Advanced Placement exams to count for no more than two general science requirements for the neuroscience major. Please refer to the Advanced Placement chart for test score requirements. We recommend students who anticipate pursuing graduate work in neuroscience take additional math courses such as linear algebra or calculus of several variables.

## Requirements for the Degree of Master of Science

Graduate students will be eligible for an MS in neuroscience if they complete six graduate-level courses in neuroscience. The six courses must include NBIO 140b and one laboratory or research-based course, with the balance of courses to be agreed upon with the neuroscience advising head. A grade of B– or better must be obtained in each course. The laboratory or research based course should be chosen from NEUR 298, NEUR 299, NEUR 300, or BIOL 155 and is typically taken in the spring. All students are required to take CONT 300b (Ethical Practice in Health-Related Sciences), usually offered in the spring.

**Residence Requirement**

The minimum residence requirement for the MS degree is one year.

**Requirements for the Degree of Doctor of Philosophy****Program of Study**

NBIO 140b (Principles of Neuroscience) is required along with at least five additional graduate-level courses relevant to the student's area of interest. First- and second-year students shall enroll in NBIO 250d (Neuroscience Proseminar) and all students should enroll in NBIO 306d (Topics in Neurobiology). All students are required to take CONT 300b (Ethical Practice in Health-Related Sciences), typically in the spring of their first year.

The suggested schedule of course work for the first two years is the following:

**First Year**

Fall: NBIO 140b, NBIO 148b, NBIO 250d, NEUR 300d, and NBIO 306d.

Spring: CONT 300b, NBIO 145b, NBIO 146a, NBIO 250d, NEUR 300d, NBIO 306d, and one course selected from the neuroscience electives. If NBIO 146 is not offered, a different neuroscience elective may be substituted.

**Second Year**

Fall: NBIO 250d, NBIO 306d, and one course selected from the neuroscience electives.

Spring: NBIO 250d, NBIO 306d, and one course selected from the neuroscience electives.

**Qualifying Examinations**

This consists of two written propositions with accompanying oral exams. One of these shall be in the field of neuroscience, but not directly related to the student's thesis work (end of first year), and the other takes the form of a formal thesis proposal (beginning of the third year).

**Courses of Instruction****(1-99) Primarily for Undergraduate Students****NPSY 11b Introduction to Behavioral Neuroscience**

[ sn ss ]

*Prerequisite: PSYC 1a or MATH 10a or permission of the instructor. This course may not be repeated for credit by students who have taken PSYC 11b in previous years.*

Data and theories regarding current conceptions of brain-behavior relationships. Begins with an introduction to neural systems as classically defined (sensory, association, motor, autonomic), and moves on to examination of the biological underpinnings of various behaviors, from those relating to basic drives (reproduction, feeding) to those with a cognitive flavor. Throughout, the accent is on interactions between organisms and environment (learning). Usually offered every year.

Mr. Katz

**NPSY 12a Sensory Processes**

[ sn ss ]

*Prerequisite: Sophomore standing or MATH 10a or permission of the instructor.* Examines the human senses, emphasizing sight and hearing, studied from standpoints of anatomy, physiology, and psychophysics. Insights from the study of special observers including developmentally immature humans, members of nonhuman species, and people with abnormal sensory systems. Usually offered every year.

Mr. Sekuler

**NPSY 16a Motor Control**

[ sn ss ]

*Prerequisites: PSYC 1a and MATH 10a, or permission of the instructor. This course may not be taken for credit by students who have previously taken NPSY 127a.*

Surveys control of vertebrate posture and movement from various perspectives including muscle properties, reflex organization, central pattern generation, spatial representations, learning, and development. Emphasizes research in physiology, psychology, biomechanics, and computational theory. Usually offered every second year.

Mr. DiZio

**NPSY 22b Introduction to Cognitive Neuroscience**

[ sn ss ]

*Prerequisites: PSYC 1a or MATH 10a and sophomore standing in psychology or neuroscience.*

Cognitive factors in sensory processes, attention, memory, motor control, plasticity, and language. Experimental and neuroimaging approaches are emphasized. Usually offered every year.

Mr. Sekuler and Staff

**Teaching Requirement**

As part of their PhD training, students act as teaching fellows for two semesters, typically in their second year.

**Residence Requirement**

The minimum residence requirement is three years.

**Dissertation and Final Oral Examination**

A thesis in the field of neuroscience is required for the PhD, normally carried out in the laboratory of one of the members of the neuroscience training faculty. After submission of the dissertation, the candidate gives a public seminar to the university community and then defends the work and its significance in an examination before a thesis committee.

**Requirements for the Degree of Doctor of Philosophy in Neuroscience with Specialization in Quantitative Biology****Program of Study**

Students wishing to obtain the specialization must first gain approval of the graduate program chair. This should be done as early as possible, ideally during the first year of graduate studies. In order to receive the PhD in neuroscience with additional specialization in quantitative biology, candidates must complete (a) the requirements for the PhD described above and (b) the course requirements for the quantitative biology specialization that are described in the quantitative biology section of this *Bulletin*.

Any alteration to the quantitative biology course requirements must be approved by the graduate program chair and by the quantitative biology program faculty advisory committee.

**NEUR 90a Field Study: Neuroscience**  
*Four semester course credits, of which a maximum of two may count toward the major.*

Students proposing to take this course are expected to work out a detailed plan of study for one semester with the help of department faculty members. This plan is to be submitted to the department for its consideration before the end of the semester preceding the one in which NEUR 90a would be taken. Approval depends on the department's resources for supporting the student's plan as well as on the student's competence and the excellence of the plan itself. Usually offered every year.  
 Staff

**NEUR 98a Readings in Neuroscience**  
 Usually offered every year.  
 Staff

**NEUR 98b Readings in Neuroscience**  
 Usually offered every year.  
 Staff

**NEUR 99d Senior Research**  
 A yearlong, two-semester course involving the student in an independent research project conducted under the supervision of a staff member and serving as an intensive introduction to specific methods of neuroscience research. In cases where students are able to do unusually long, intensive work in the laboratory, they may request a third course credit during the petition process; if this request is approved by the senior honors coordinator, students should register for NEUR 99d (fall) followed by NEUR 99e (spring). The combined enrollments for senior research may not exceed three semester course credits. To fulfill the NEUR 99 requirements, students must (1) submit to their research sponsor, at the conclusion of their first NEUR 99 semester, a paper that reviews the literature pertinent to their field of research, and (2) submit to their research sponsor, at the conclusion of their second NEUR 99 semester, a senior thesis that includes an abstract, an introduction, a review of materials and methods, results, discussion, and references. Usually offered every year.  
 Staff

**NEUR 99e Senior Research**  
 See NEUR 99d for course description.  
 Usually offered every year.  
 Staff

## (100-199) For Both Undergraduate and Graduate Students

### **NPHY 115a Dynamical Systems, Chaos, and Fractals**

[ sn ]  
*Prerequisites: PHYS 10a or 15a, MATH 21a, or approved equivalents. This course may not be repeated for credit by students who have taken PHYS 115a in previous years.* Advanced introduction to the theory of nonlinear dynamical systems, bifurcations, chaotic behaviors, and fractal patterns. Concepts and analysis are illustrated by examples from physics, chemistry, and biology. The course will be complemented by a significant number of computer labs. Usually offered every second year.  
 Staff

### **NPSY 120b Man in Space**

[ sn ss ]  
*Prerequisite: PHYS 10a and PSYC 52.* Topics include how orbital flight is achieved, spacecraft life support systems, circulatory dynamics, sensory-motor control and vestibular function in free fall, the physiological and psychological adaptations necessary in space flight, and how astronauts must readapt on return to Earth. Usually offered every year.  
 Mr. Lackner

### **NPSY 125a Advanced Topics in Perception and Adaptation**

[ sn ss ]  
*Prerequisites: MATH 10b, NBIO 104b, and PHYS 10a.* Covers current issues and theories in vision, vestibular function, proprioception, and adaptation to unusual force environments from psychological and biological perspectives. Usually offered every third year.  
 Mr. Lackner

### **NPSY 128b Motor Control, Orientation, and Adaptation**

[ sn ss ]  
*Prerequisite: NBIO 140b.* A seminar critically reviewing and discussing current research about spatially adapted animal movement. The analysis focuses on behavioral properties, biophysics, and neural substrates. Topics include sensorimotor transformations, learning, memory, context specificity, and sensorimotor adaptation. Usually offered every second year.  
 Mr. DiZio

### **NBIO 136b Computational Neuroscience**

[ sn ]  
*Prerequisite: MATH 10a or PHYS 10a or approved equivalents.* An introduction to concepts and methods in computer modeling of neural systems. Topics include the basic biophysics of ion conduction, single and multicompartment neuron models, information representation and processing in the visual system, and models of synaptic plasticity, working memory, and decision making. Usually offered every second year.  
 Mr. Miller

### **NPSY 137b Cognitive Modeling**

[ sn ss ]  
*Prerequisites: MATH 10b and PSYC 51a or NBIO 136b, or permission of the instructor.* A general introduction to the construction and simulation of mathematical models of human cognitive processes. The major emphasis will be on models of human learning and memory. Students will be expected to have some background in computer programming. Usually offered every second year.  
 Mr. Fiser

### **NBIO 139b The Neurobiology of Brain Disorders**

[ sn ]  
*Prerequisite: NBIO 140b.* Explores the basic mechanisms underlying some of the major mental illnesses that have provided insight into normal brain functioning. Primary sources are used to compare ideas about the bases and treatments of these diseases. Special one-time offering, spring 2008.  
 Ms. Grashow

### **NBIO 140b Principles of Neuroscience**

[ sn ]  
*Prerequisite: BIOL 22b or permission of the instructor.* Examines the basic principles of neuroscience. Topics include resting potentials, action potentials, synaptic transmission, sensory systems, motor systems, learning, neural circuits underlying behavior, neurological diseases, and mental illness. Usually offered every year.  
 Mr. Lisman

### **NBIO 143b Developmental Neurobiology**

[ sn ]  
*Prerequisite: BIOL 22b or permission of the instructor.* Discusses the mechanisms used in the development of the nervous system. Topics include determination of neuronal cell fates, neuronal differentiation and pattern formation, neuron survival and growth, and mechanisms responsible for generation of connectivity in the nervous system. Usually offered every second year.  
 Ms. Sengupta

**NBIO 145b Systems Neuroscience**

[ sn ]

*Prerequisite: NBIO 140b.*

A fundamental question in neuroscience is how our brains extract and compute features and functions—such as direction of motion from visual stimuli—and how experience allows the microcircuits within our brains to become better tuned to such features. Understanding these processes requires insight into the cellular and network mechanisms that give rise to them. We will begin by examining the classical literature, and then we will move on to recent advances in understanding the cellular and network properties of brain microcircuits. The course emphasizes reading from original papers, and extensive class discussion. Usually offered every year. Ms. Turrigiano

**NBIO 146a The Neurobiology of Human Disease**

[ sn ]

*Prerequisite: NBIO 140b.*

A lecture- and literature-based overview of the neurobiological underpinnings of neurological and psychiatric disorders including autism, mental retardation, schizophrenia, bipolar disorder, Alzheimer's disease, Parkinson's disease, and other neurodevelopmental and neurodegenerative disorders. Usually offered every second year. Mr. Nelson

**NBIO 147a Neurogenetics**

[ sn ]

*Prerequisites: BIOL 18a and BIOL 22a.*

Development and function of the nervous system and responses of excitable cells studied in neurological and behavioral mutants. Characterization and manipulation of genes, defined by these mutations and using molecular biological tools. Organisms: microbes, roundworms, fruit flies, mammals. Neurobiological areas: embryonic neural development, nerve cell differentiation and pattern formation, membrane excitability, responses to visual and chemical stimuli, biological rhythms, and reproductive behavior. Usually offered every third year. Staff

**NBIO 148b Cellular Neuroscience**

[ sn ]

*Prerequisite: NBIO 140b or permission of the instructor. May be taken concurrently with NBIO 140b.*

Focuses on cellular and molecular mechanisms of excitability and synaptic plasticity. Students examine classic experiments on action potentials and synaptic transmission and the original research literature dealing with the cellular mechanisms of developmental and learning-related plasticity. Usually offered every year. Mr. Nelson

**NBIO 150a Autism and Human Developmental Disorders**

[ sn ]

*Prerequisite: BIOL 22b.*

Autism and other developmental disorders are characterized by abnormal brain development resulting in cognitive and behavioral deficits. Takes an integrative approach to investigate the biological, behavioral, medical, and social aspects of human developmental disorders. Usually offered every second year. Ms. Birren

**NPSY 154a Human Memory**

[ sn ss ]

*Prerequisite: NPSY 22b.*

Presents a systematic analysis of current memory research and theory with an emphasis on visual learning experiments and neural network models. Usually offered every third year. Staff

**NPSY 159a Advanced Topics in Episodic Memory**

[ sn ss ]

*Prerequisites: NBIO 140b or NPSY 154a and permission of the instructor.*

Deals with current topics in the study of episodic memory. Discussions and readings on topics such as memory for temporal order, category learning, associative symmetry, item versus associative recognition, theories of search in free recall, and the memory systems controversy. Usually offered every second year. Staff

**NPSY 168b Electrophysiology of Human Memory**

[ ss sn ]

*Prerequisites: PSYC 51a, NBIO 140b, NPSY 22b.*

Laboratory course covering experimental methods and data analysis of electroencephalographic recordings during memory tasks. Projects involve data collection using a 128-channel EEG system. Topics cover time- and frequency-based methods as well as source modeling. Usually offered every year. Staff

**NPSY 174b Visual Cognition**

[ sn ss ]

*Prerequisite: NPSY 12a or permission of the instructor.*

Higher-order processes in vision. Visual impact of cognitive and other top-down influences, including attention, expectation, plasticity, and learning. Focus on visual recognition, contour formation, segmentation, temporal binding, and face and object perception. Studies of visual perception in brain-damaged individuals. Usually offered every second year. Mr. Sekuler or Mr. Fiser

**NPSY 175b The Neuroscience of Vision**

[ sn ss ]

*Prerequisite: NPSY 12a or permission of the instructor.*

Examines the neural basis of human vision from several complementary perspectives. Relates visual capacities of human observers to the structure and function of the visual system. Considers computational and functional neuroimaging approaches to vision. Usually offered every second year. Mr. Sekuler

**NPSY 196b Advanced Topics in Cognition**

[ ss sn ]

*Prerequisite: NPSY 159a or permission of the instructor.*

This seminar covers current issues and research in memory, speech perception, and processing resource limitations. Emphasis will be placed on the current literature in the field. Usually offered every second year. Mr. Wingfield

**NPSY 197a Advanced Topics in Behavioral Neuroscience**

[ sn ss ]

*Prerequisites: NPSY 11b and NBIO 140b or permission of the instructor.*

Covers current research and issues pertaining to the neurobiology of perception (focusing mainly but not exclusively on perception of chemosensory signals) as well as the neurobiology of simple learning. Usually offered every year. Mr. Katz

**NPSY 199a Human Neuropsychology**

[ sn ss ]

*Prerequisite: NPSY 22b or NBIO 140b or permission of the instructor.*

Designed as an introduction to human neuropsychology. Topics include cerebral dominance, neuroanatomical mapping, and localization of function, with special reference to language, memory, and related cognitive function. Usually offered every year. Mr. Wingfield

**(200 and above) Primarily for Graduate Students****NPSY 207b Seminar in Perception***Prerequisites: MATH 10b, NBIO 140b, and PHYS 10a.*

Examines the various aspects of visual, vestibular, motor, and proprioceptive information by which objects and events in three-dimensional space are perceived by human observers. Current research in psychology and artificial intelligence is considered. Usually offered every second year. Mr. Lackner

**NBIO 250d Neuroscience Proseminar**

*Limited to first- and second-year neuroscience PhD students.*

Required seminar for first- and second-year graduate students in the neuroscience PhD program. Discusses relevant papers from the current literature with an emphasis on increasing oral presentation skills, experimental design, and proposal writing. Usually offered every year.  
Mr. Fiser

**NEUR 298a Readings in Neuroscience**

Usually offered every year.  
Staff

**NEUR 298b Readings in Neuroscience**

Usually offered every year.  
Staff

**NEUR 299a Master's Research Project**

Usually offered every year.  
Staff

**NEUR 299b Master's Research Project**

Usually offered every year.  
Staff

**NEUR 300d Laboratory Rotations**

Staff

**NBIO 306d Topics in Neurobiology**

Usually offered every year.  
Mr. Katz

**NBIO 340d Systems/Computational Neuroscience Journal Club**

Usually offered every year.  
Mr. Miller

**NEUR 401d Dissertation Research**

Independent research for the PhD degree. Specific sections for individual faculty members as requested.  
Staff

**Cross-Listed Courses****QBIO 110a**

Numerical Modeling of Biological Systems

**QBIO 120b**

Quantitative Biology Instrumentation Laboratory

**BIOL 149b**

Molecular Pharmacology

**Required First-Year Graduate Health-Related Science Programs Course****CONT 300b Ethical Practice in Health-Related Sciences**

*Required of all first-year graduate students in health-related science programs. Not for credit.*

Ethics is an essential aspect of scientific research. This course, taught by university faculty from several graduate disciplines, covers major ethical issues germane to the broader scientific enterprise, including areas or applications from a number of fields of study. Lectures and relevant case studies are complemented by public lectures during the course. Usually offered every year.

Mr. Morris

An interdepartmental program

**Peace, Conflict, and Coexistence Studies**

Courses of Study:  
Minor

**Objectives**

Since the end of World War II, peace, conflict, and coexistence studies has emerged as an interdisciplinary area of inquiry drawing on social science, the humanities, the creative arts, and science in efforts to understand reasons for war and possible ways of resolving conflicts without resorting to violence. In the last few years, for many people the primary focus of inquiry is shifting from the cold war and the nuclear threat to conflict resolution in small and large contexts. Along with the larger goal of ending war altogether, the Brandeis program reflects this tendency.

This is a time to examine the many meanings of "security," to investigate the nature of power and political participation, and to develop ideas and ways of addressing conflicts that honor the integrity of all parties involved. This is a time, in other words, to learn alternatives to violence and a time to learn the ways of disarmament and ending of war.

**How to Become a Minor**

Students who wish to take peace, conflict, and coexistence studies (PAX) as a minor in addition to their major can construct an individually tailored minor in consultation with program advisors on the peace, conflict, and coexistence studies committee.

**Committee**

**Gordon Fellman, Chair**  
(Sociology)

**Steven Burg**  
(Politics)

**Cynthia Cohen**  
(International Center for Ethics, Justice, and Public Life)

**David Cunningham**  
(Sociology)

**Judith Eissenberg**  
(Music)

**Reuven Kimelman**  
(Near Eastern and Judaic Studies)

**Richard Parmentier**  
(Anthropology)

**John Schrecker**  
(History)

**Andreas Teuber**  
(Philosophy)

**Daniel Terris**  
(American Studies)

## Requirements for the Minor

Students are to take six required courses, configured this way:

### A. Two **core requirements** (comprehensive course or project).

1. SOC 119a (War and Possibilities of Peace).
2. *Either* PAX 92a (Internship in Peace, Conflict, and Coexistence Studies) *or* a senior honors thesis.

The internship consists of at least ten hours a week in a social-change organization in the Greater Boston area or, if the student is abroad, an appropriate equivalent. The intern is supervised by a PAX professor or staff person, keeps a daily journal, presents and does the reading of a bibliography on the topic of the internship and its larger framework, and writes a paper of fifteen to twenty pages at the end of the internship. The student is expected to meet weekly or biweekly with the supervisor and to e-mail weekly or biweekly if doing the work abroad. Internships are organized around, but not limited to, those we find through the Hiatt Career Center.

The senior thesis is undertaken in the student's major, on a topic central to peace, conflict, and coexistence studies. With the department's permission, a member of the PAX faculty committee will serve on and represent the PAX program on the thesis committee.

### B. Two or more core electives: At least two courses (and up to four) from this list. Core electives must be taken in at least two different departments.

Core electives include courses that offer critical analyses of violence and nonviolence and that consider information, ideas, and examples of productive ways of resisting violence and working toward peace and justice (what in the peace studies field is called "positive peace," as distinct from "negative peace," which is the absence of war but not of conditions that appear to lead to war). These courses offer perspectives on major institutions and possible alternatives, explore some strategies for change, and encourage students to envision and work toward a world based more on positive peace than on negative peace or war.

### C. Maximum of two related electives: No more than two courses from this list can count to meet requirements for the minor, and they must be taken in different departments.

These courses relate directly or indirectly to international, domestic, organizational, intergroup, interpersonal, or personal conflict and also include consideration of perspectives that promote understanding, reconciliation, and transformation. They need not focus on violence and nonviolence, positive peace, or encouraging students to envision positive peace. Students may apply courses from the "core electives" list that they have not taken to fulfill core requirements to this requirement.

### D. Students are urged to take at least one course from a school other than social science to fulfill their PAX requirements.

### E. Students may petition the PAX committee for special consideration of courses not listed here that the student wishes to propose as appropriate for her/his PAX minor.

## Courses of Instruction

### PAX 92a Internship in Peace, Conflict, and Coexistence Studies

Usually offered every year.  
Staff

### PAX 110a International Nonviolent Initiatives

[ ss ]  
Explores the potential of nonviolent struggle and related efforts to reduce violence worldwide. The sociological mechanisms and ethical outlooks of forms of "nonviolence" are studied, as well as the workings of "people power" on five continents.  
Staff

### PAX 120b Inner Peace and Outer Peace

[ ss ]  
Examines the relationship between inner state and effective peacemaking at levels ranging from the self within itself to interpersonal, intergroup, and international relations. Addresses concerns about structural change and the relationship between inner state, peace building, and justice seeking. This course was offered in Spring 2007.  
Staff

### PAX 186a Introduction to Intercommunal Coexistence

[ ss ]  
Investigates the emerging field of intercommunal coexistence, partly through case studies and by analyzing "coexistence," "tolerance," "reconciliation," and related concepts. Investigates methods of intercommunal work including encounter, dialogue, activism, and the arts. Considers tensions between coexistence and values of equity and justice. Usually offered every spring.  
Ms. Cohen

### Core Courses

#### COEX 250a

The Arts of Building Peace

#### PAX 92a

Internship in Peace, Conflict, and Coexistence Studies

#### SOC 119a

War and Possibilities of Peace

### Core Elective Courses

#### ENVS 15a

Reason to Hope: Managing the Global Commons for Peace

#### LGLS 130a

Conflict Analysis and Intervention

#### PAX 110a

International Nonviolent Initiatives

### PAX 186a

Introduction to Intercommunal Coexistence

### PHIL 19a

Human Rights

### PHIL 111a

What Is Justice?

### POL 127b

Seminar: Managing Ethnic Conflict

### POL 161b

Causes and Prevention of War

### POL 163a

Seminar: Human Rights and International Relations

### SOC 112b

Social Class and Social Change

### SOC 153a

The Sociology of Empowerment

### WMGS 5a

Women and Gender in Culture and Society

### Related Elective Courses

#### AAAS 60a

Economics of Third World Hunger

#### AAAS 80a

Economy and Society in Africa

<b>AAAS 123a</b> Third World Ideologies	<b>BUS 70a</b> Business in the Global Economy	<b>PHIL 20a</b> Social and Political Philosophy: Democracy and Disobedience
<b>AAAS 126b</b> Political Economy of the Third World	<b>ECON 57a</b> Environmental Economics	<b>POL 15a</b> Introduction to International Relations
<b>AMST 175a</b> Violence (and Nonviolence) in American Culture	<b>ENVS 17b</b> Global Warming and Nuclear Winter	<b>POL 127a</b> Ending Deadly Conflict
<b>ANTH 139b</b> Language, Ethnicity, and Nationalism	<b>HIST 139b</b> Fascism East and West	<b>POL 144a</b> Latin American Politics I
<b>BIOL 17b</b> Conservation Biology	<b>HIST 186b</b> War in Vietnam	<b>POL 144b</b> Latin American Politics II
<b>BISC 2a</b> Human Reproduction, Population Explosion, Global Consequences	<b>LGLS 120a</b> Sex Discrimination and the Law	<b>POL 178a</b> The Rise of East Asia and the Pacific in the Global Political Economy
	<b>LGLS 124b</b> International Law and Development	<b>SOC 157a</b> Sociology of the Israeli-Palestinian Confrontation
	<b>LGLS 125b</b> International Law and Organizations	
	<b>NEJS 189a</b> The Arab-Israeli Conflict	

## Department of Philosophy

Courses of Study:  
Minor  
Major (BA)

### Objectives

The primary concern of philosophy is to explore ideas that are central to the ways we live and that we commonly use without much reflection, ideas such as truth and justice, the notion of consciousness, and good and evil. In the course of our daily lives, we take the ideas of time, language, knowledge, and our own identity for granted. Philosophy seeks to push our understanding of these ideas deeper. It is the systematic study of ideas fundamental to all the other disciplines taught at the university—the sciences, social sciences, humanities, and the arts.

The skills philosophy helps to develop—critical thinking, sound reasoning, enlightened use of one’s imagination, and the capacity to analyze complex issues—are invaluable in the study of any subject or the pursuit of any vocation. Philosophy is unavoidable: every thoughtful individual is gripped by philosophical questions and is guided by assumptions that the study of philosophy brings explicitly to light and puts into larger perspective.

### How to Become a Major

To become a major in philosophy, students must complete a total of nine required courses and satisfy the distribution requirement (see below) in metaphysics and epistemology; moral, social, and political philosophy; and logic, the history of philosophy. At least four must be upper-level courses. To be a candidate for honors, seniors must complete an honors thesis. For further information, contact the undergraduate advising head.

### Faculty

**Andreas Teuber, Chair**  
Political philosophy. Moral philosophy. Aesthetics. Modern social theory. History of political thought.

**Alan Berger**  
Logic. Philosophy of language. Metaphysics. Philosophy of science. Philosophical logic.

**Robert Greenberg**  
Metaphysics. History of philosophy. Kant.

**Eli Hirsch, Undergraduate Advising Head**  
Metaphysics. Epistemology. Medical ethics.

**Berislav Marusic**  
Theory of knowledge. Philosophy of mind and language. Philosophy of perception. Metaphysics. History of modern philosophy.

**Jerry Samet, Minors Advisor**  
Philosophy of mind. Philosophy of psychology and cognitive science. History of philosophy.

**Marion Smiley, Honors Advisor**  
Moral, social, and political philosophy.

**Palle Yourgrau**  
Philosophy of language. Philosophy of mathematics. Philosophy of time. Greek philosophy.

### Affiliated Faculty

**Richard Gaskins**  
American legal culture. Legal rhetoric. Environmental policy. Law, social policy, and philosophy.

**Jon Levisohn**  
Philosophy of education. Hermeneutics and the epistemology of the humanities. Jewish education.



## Requirements for the Major

**A.** All philosophy majors must satisfactorily complete at least nine (9) semester courses from among philosophy and cross-listed courses. The philosophy department approves cross-listed courses for philosophy credit on a semester-by-semester basis based on the course content and instructor. Please check the current *Schedule of Classes* or contact the philosophy undergraduate advising head to make sure that any course you are considering for philosophy credit is cross-listed in the semester you plan to take it.

**B.** At least five (5) semester courses counted toward the major must be taught by faculty of the philosophy department.

**C.** At least four (4) courses must be upper-level (99 and above), distributed as follows:

1. At least one (1) must be among the following core upper-level courses in moral, social, and political philosophy: PHIL 107–112, 114–116.

2. At least two (2) must be among the following upper-level courses in metaphysics and epistemology: PHIL 130–147. PHIL 99 counts as an upper-level elective, but does not satisfy this distribution requirement.

**D.** At least one (1) course must be in the history of philosophy (PHIL 161a, 162b, 168a, 170a, 174a, 179a, 180a, 181a).

**E.** At least one (1) course must be in logic (PHIL 6a, 106b).

**F.** A maximum of one (1) semester of 98a,b or 99a,b can be counted toward the major. (PEER 94A does not count.)

**G.** No course with a grade below a C will count toward meeting the requirement of nine courses for the major; students may petition the department for waiver of this rule for a maximum of one course.

**H.** No course taken pass/fail may count toward requirements for the major.

**I.** With the approval of the department undergraduate advising head, transfer students and those taking a year's study abroad may apply up to four (4) semester courses taught elsewhere toward fulfilling the requirements for the major. The five-course requirement of (B), above, remains in effect. Unless special approval is given by the undergraduate advising head, transfer and cross-listed courses will count as lower-level electives.

This department participates in the European cultural studies major.

## Requirements for the Minor

**A.** All philosophy minors must complete satisfactorily at least five (5) semester courses from among philosophy and cross-listed courses.

**B.** At least three (3) semester courses counted toward the minor must be taught by faculty of the philosophy department.

**C.** At least one (1) course must be upper-level (100 and above).

**D.** A maximum of one (1) semester of PHIL 98a,b can be counted toward the minor (PEER 94A does not count).

**E.** No course with a grade below a C will count toward meeting the requirement of five courses for the minor; student may petition the department for waiver of this requirement for a maximum of one course.

**F.** No course taken pass/fail may count toward requirements for the minor.

**G.** With the approval of the department minors advisor, transfer students and those taking a year's study abroad may apply up to two (2) semester courses taught elsewhere toward fulfilling the requirements for the minor. The three-course requirement of (B), above, remains in effect. Unless special approval is given by the minors advisor, transfer and cross-listed courses will count as lower-level electives.

## Courses of Instruction

### (1-99) Primarily for Undergraduate Students

#### PHIL 1a Introduction to Philosophy

[ hum ]

*Enrollment varies according to instructor. Refer to the Schedule of Classes each semester for information regarding applicability to the writing intensive requirement.*

A general course presenting the problems of philosophy, especially in the areas of metaphysics, epistemology, ethics, and social and political philosophy. Texts include works of selected philosophers of various historical periods from antiquity to the present. Usually offered every semester. Mr. Berger, Mr. Greenberg, Mr. Hirsch, Mr. Samet, Ms. Smiley, Mr. Teuber, and Mr. Yourgrau

#### PHIL 6a Introduction to Symbolic Logic

[ hum ]

Symbolic logic provides concepts and formal techniques that elucidate deductive reasoning. Topics include truth functions and quantifiers, validity, and formal systems. Usually offered every year.

Mr. Samet

#### PHIL 13b The Idea of the Market: Economic Philosophies

[ hum ]

Historical survey of philosophical assumptions in the defense and critique of market capitalism, starting from Adam Smith's views on value, self, and community. Explores philosophical alternatives in Marx, Weber, Durkheim, Dewey, and Nozick, including debates on justice and individualism. Usually offered every second year.

Mr. Gaskins

#### PHIL 17a Introduction to Ethics

[ hum ]

Explores the basic concepts and theories of ethical philosophy. What makes a life good? What are our moral obligations to other people? Applications of ethical philosophy to various concrete questions will be considered. Usually offered every year.

Ms. Smiley

#### PHIL 18a Philosophy of Race and Gender

[ hum ]

Examines the concepts of race and gender as well as explores the legal and social issues of sexual harassment, educational and workplace affirmative action, and the regulation of hate speech and pornography. Readings are taken principally from the fields of philosophy and law.

Staff

**PHIL 19a Human Rights**

[ hum ]

Examines international human rights policies and the moral and political issues to which they give rise. Includes civilians' wartime rights, the role of human rights in foreign policy, and the responsibility of individuals and states to alleviate world hunger and famine. Usually offered every second year.

Mr. Teuber

**PHIL 20a Social and Political Philosophy: Democracy and Disobedience**

[ hum wi ]

Focuses on the relation of the individual to the state and, in particular, on the theory and practice of nonviolent resistance, its aims, methods, achievements, and legitimacy. Examines the nature of obligation and the role of civil disobedience in a democratic society. Explores the conflict between authority and autonomy and the grounds for giving one's allegiance to any state at all. Examples include opposition to the nuclear arms race, and disobedience in China and Northern Ireland and at abortion clinics. Usually offered every second year.

Mr. Teuber

**PHIL 21a Environmental Ethics**

[ hum ]

Explores the ethical dimensions of human relationships to the natural world. Looks at environmental ethical theories such as deep ecology and ecofeminism and discusses the ethics of specific environmental issues such as wilderness preservation and climate change. Usually offered every year.

Staff

**PHIL 22b Philosophy of Law**

[ hum wi ]

Examines the nature of criminal responsibility, causation in the law, negligence and liability, omission and the duty to rescue, and the nature and limits of law. Also, is the law more or less like chess or poker, cooking recipes, or the Ten Commandments? Usually offered every second year.

Mr. Teuber

**PHIL 23b Biomedical Ethics**

[ hum ]

An examination of ethical issues that arise in a biomedical context, such as the issues of abortion, euthanasia, eugenics, lying to patients, and the right to health care. The relevance of ethical theory to such issues will be considered. Usually offered every second year.

Mr. Hirsch

**PHIL 24a Philosophy of Religion**

[ hum ]

An introduction to the major philosophical problems of religion. Discusses the existence of God, "God-talk," evil and suffering, mystical experiences, life after death, free will and determinism, the relation of religion to morality. Usually offered every year.

Mr. Hirsch

**PHIL 28a Western Philosophical Tradition: Feminist Perspectives**

[ hum ]

Examines the place of gender in the history of Western philosophy and goes on to ask a series of philosophical questions that are informed by contemporary feminism, including "Is there a woman's voice?" and "What is gender equality and is it valuable?" Usually offered every year.

Staff

**PHIL 35a Philosophy of Science**

[ hum ]

Philosophers in the twentieth century have often taken scientific activity to be the ideal source of our knowledge about the world. Discusses the problems involved in the analysis of the principles and methods of scientific activity, with an eye to assessing this claim. Usually offered every second year.

Mr. Berger or Mr. Hirsch

**PHIL 37a Philosophy of Language**

[ hum ]

Theories of meaning, reference, and methodological issues in account of language and translation. Readings from contemporary sources. Usually offered every year.

Mr. Berger, Mr. Hirsch, or Mr. Yourgrau

**PHIL 38b Philosophy of Mathematics**

[ hum ]

*Prerequisite: A course in logic or permission of the instructor.*

Basic issues in the foundations of mathematics will be explored through close study of selections from Frege, Russell, Carnap, and others, as well as from contemporary philosophers. Questions addressed include: What are the natural numbers? Do they exist in the same sense as tables and chairs? How can "finite beings" grasp infinity? What is the relationship between arithmetic and geometry? The classic foundational "programs," logicism, formalism, and intuitionism, are explored. Usually offered every second year.

Mr. Berger or Mr. Yourgrau

**PHIL 39b Philosophy of Mind**

[ hum ]

Topics include the mind-body relation and consciousness, reductionism, and the philosophical implications of recent work in neuroscience, cognitive science, and artificial intelligence. Usually offered every year.

Mr. Samet

**PHIL 66b Contemporary Analytic Philosophy**

[ hum ]

Covers major figures and schools of philosophy in the twentieth century. A basic historical treatment of this period, stressing its continuity with the modern period. Emphasis on the role of logic and language in solving philosophical problems, such as the possibility of doing metaphysics, and whether there are *a priori*, necessary, or analytic truths. Provides both an excellent introduction to the philosophy curriculum, as well as important grounding for graduate work in philosophy. Usually offered every year.

Mr. Berger or Mr. Greenberg

**PHIL 74b Foundations of American Pragmatism**

[ hum ]

Introduction to American instrumentalism as a philosophical movement and cultural force. Special attention to pragmatic imprints on law and science across the twentieth century. Recurring critical debates over ethical relativism, religious skepticism, legal activism, and the cult of scientific and professional expertise. Usually offered every fourth year.

Mr. Gaskins

**PHIL 78a Existentialism**

[ hum ]

An analysis of existential philosophy with special attention to the works from Kierkegaard to twentieth-century figures such as Sartre. Usually offered every fourth year.

Staff

**PHIL 98a Readings in Philosophy**

*Signature of the instructor required. A maximum of one (1) semester of PHIL 98a,b or PHIL 99a,b can be counted toward the major.*

Readings, reports, and discussions on assigned topics. Usually offered every semester.

Staff

**PHIL 98b Readings in Philosophy**

*Signature of the instructor required. A maximum of one (1) semester of PHIL 98a,b or PHIL 99a,b can be counted toward the major.*

Readings, reports, and discussions on assigned topics. Usually offered every semester.

Staff

**PHIL 99a Senior Research I**

*Signature of the instructor required. A maximum of one (1) semester of PHIL 98a,b or PHIL 99a,b can be counted toward the major.*

A senior whose GPA in philosophy courses is 3.50 or above may petition to be admitted to the senior honors program and enroll in this course. The course involves the preparation and beginning of a thesis, under the direction of a member of the faculty, that could serve, in the judgment of the faculty member, as progress toward the completion of a senior honors thesis. Usually offered every year.  
Staff

**PHIL 99b Senior Research II**

*Prerequisite: Satisfactory completion of PHIL 99a. Signature of the instructor required. A maximum of one (1) semester of PHIL 98a,b or 99a,b can be counted toward the major.*

Seniors who are candidates for degrees with honors in philosophy must register for this course and complete a senior honors thesis under the direction of a member of the faculty. Usually offered every year.  
Staff

## (100-199) For Both Undergraduate and Graduate Students

**HUM 125a Topics in the Humanities**

[ hum ]

An interdisciplinary seminar on a topic of major significance in the humanities; the course content and instructor vary from year to year; may be repeated for credit with instructor's permission. Usually offered every third year.  
Staff

**PHIL 106b Mathematical Logic**

[ hum sn ]

*Prerequisite: One course in logic or permission of the instructor.*

Covers in detail several of the following proofs: the Godel Incompleteness Results, Tarski's Undefinability of Truth Theorem, Church's Theorem on the Undecidability of Predicate Logic, and Elementary Recursive Function Theory. Usually offered every year.  
Staff

**PHIL 107a Contested Commodities: Ethics, Bodies, and the Market**

[ hum ]

An introduction to the conceptual tools philosophers bring to bear on ethical questions, in particular, on the question of whether there are limits on the kinds of things that it is morally permissible to buy and sell. Topics include organ procurement, prostitution, surrogate mother contracts, and intellectual property. Usually offered every second year.  
Staff

**PHIL 108a Philosophy and Gender**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 17a.*

Explores the place of gender in the works of particular Western philosophers (e.g., Kant, Hume, and Rousseau) and uses the tools of contemporary analytic philosophy to address questions about gender equality, sexual objectification, and the nature of masculinity. Usually offered every second year.

Ms. Smiley

**PHIL 110a The Good Life or How Should I Live?**

[ hum wi ]

*Prerequisite: Two courses in philosophy or permission of the instructor.*

Much recent philosophy in the English-speaking world has focused on the nature of things and our knowledge and reasoning about such things. But most human mental activity is not theoretical, but practical, less concerned with how the world is than with what is to be done. In the earliest moments of Western philosophy Socrates distinguished himself by asking "How should one live?" Increasingly, however, that question and its variants have taken a back seat in philosophy, abandoned to the best-seller lists and to publications produced by recent graduates of assertiveness training workshops. We reclaim these questions and take them up again from within the discipline of philosophy itself. Questions asked include: "How should I live?" "What are the good things in life?" "Does life have meaning?" Readings include Darwin, Nietzsche, Freud, Murdoch, Dennett, Dawkins, Hacking, Nozick, and Nagel. Usually offered every third year.

Mr. Teuber

**PHIL 111a What Is Justice?**

[ hum ]

*Prerequisite: One course in philosophy or politics or permission of the instructor.*

What is justice, and what does justice require? The course examines theories of justice, both classical and contemporary. Topics include liberty and equality, "who gets what and how much," welfare- and resource-based principles of justice, justice as a virtue, liberalism, multiculturalism, and globalization. Usually offered every second year.

Ms. Smiley

**PHIL 112b Philosophy and Public Policy**

[ hum ]

*Prerequisites: Two courses in philosophy or economics (or one course in each subject) or permission of the instructor.*

The course examines the case that can be made for and against distributing certain goods and services on an open market as the result of free exchange, or through public mechanisms of planning and control. For examples, it discusses the arguments for and against public funding of the arts, fire departments, patents, zoning laws, and national health care. Usually offered every third year.

Mr. Teuber

**PHIL 113b Aesthetics: Painting, Photography, and Film**

[ ca hum wi ]

Explores representation in painting, photography, and film by studying painters Rembrandt, Velazquez, and Vermeer, as well as later works by Manet, Degas, Cezanne, and Picasso; photographers Ansel Adams, Dorothea Lange, Edward Weston, Walker Evans, Alfred Stieglitz, and Diane Arbus; and filmmakers Renoir and Hitchcock. Usually offered every second year.

Mr. Teuber

**PHIL 114b Topics in Ethical Theory**

[ hum ]

*Prerequisite: Phil 1a or one course numbered PHIL 17a-23b or PHIL 110a-121a.*

Is morality something we have reasons to obey regardless of our interests and desires, or do the reasons grow out of our interests and desires? Is the moral life always a personally satisfying life? Is morality a social invention or is it more deeply rooted in the nature of things? This course will address such questions. Usually offered every second year.

Ms. Smiley

**PHIL 115a Relativism, Pluralism, and Social Reform**

[ hum ]

*Prerequisite: One philosophy course or permission of the instructor.*

Explores the ethical implications of moral difference and disagreement. Does the existence of a moral diversity in the world suggest that morality is culturally relative? If so, is there any way to justify cultural criticism and social reform? Usually offered every second year.

Staff

**PHIL 116a Topics in Political Philosophy**

[ hum ]

*Prerequisite: PHIL 1a, PHIL 17a, or POL 10a.*

Explores social contract theories of political obligation, the right to rebel against the state, and the possibility of a global political community. Usually offered every second year.

Ms. Smiley

**PHIL 117b Topics in the Philosophy of Law**

[ hum ]

*Prerequisites: Two courses in philosophy or legal studies, or one course in each, or one in either subject and one of the following: POL 115a,b, POL 116a, or permission of the instructor. Topics vary from year to year. Course may be repeated once for credit.*

Topics include such key issues as privacy, free speech, theories of judicial review, and legal and moral rights.

Staff

**PHIL 119b Chinese Philosophy**

[ hum nw ]

Focuses on the major philosophical schools of Classical China, covering the time between the twelfth century BCE through the unification of China in 221 BCE. Special attention is given to the ethical, religious, and political thought of the Confucian, Mohist, Daoist, and Legalist "schools." No knowledge of Chinese is required; all readings are in translation. Usually offered every third year.

Staff

**PHIL 123b Topics in Biomedical Ethics**

[ hum ]

Examines a number of philosophical, scientific, social, and ethical issues concerning mental illness. Topics include: radical critiques of psychiatry, the concept of mental illness, the nature and problems of psychiatric diagnostic classification, objectivity and the scientific credibility of research concerning mental illness and its treatment, controversial treatments and intervention practices (e.g., electroconvulsive therapy, suicide prevention, involuntary treatment), and psycholegal issues (e.g., duty to warn, competence to stand trial, insanity defense). Readings are drawn from the relevant disciplinary literatures. Usually offered every second year.

Staff

**PHIL 135a Theory of Knowledge**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

An investigation into the nature, sources, and extent of human knowledge, with emphasis on the problem of justifying our beliefs about the existence and character of the external world. Usually offered every second year.

Mr. Hirsch

**PHIL 136a Personal Identity**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

An examination of some major issues involved in the question of personal identity. What am I? What are the conditions of self-identity? How does the identity of the self relate to the identity of a physical object? Is identity an illusion? Usually offered every second year.

Mr. Hirsch or Mr. Greenberg

**PHIL 137a Innateness**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

How much of what we are, what we believe and know, what we think and feel, and how we act, is due to our environment and training and how much is a function of our inherent nature? Analyzes the contemporary debate as well as the main positions in the history of philosophy on this question. Also considers recent research in linguistics and the cognitive sciences. Usually offered every third year.

Mr. Samet

**PHIL 138a Metaphysics**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

Metaphysics is an attempt to describe in a general way the nature of reality and how people fit into the scheme of things. Topics vary from year to year but may include truth, ontology, necessity, free will, causality, temporal passage, and identity. Usually offered every year.

Mr. Berger, Mr. Hirsch, or Mr. Yourgrau

**PHIL 139b Topics in Logic**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

Topics may vary from year to year, and the course may be repeated for credit. Topics in the past have included: Is logic an *a priori* or empirical science? Does it make sense to say that we can revise or adopt our logic? Is logic true by conventional rules of language? Set theory and the paradoxes. Usually offered every year.

Mr. Berger or Mr. Yourgrau

**PHIL 140a Logic and Language**

[ hum ]

*Prerequisite: PHIL 1a, PHIL 6a, or PHIL 106a, or permission of the instructor.*

Covers basic problems and puzzles regarding reference and identity—topics that dominate issues in philosophy of language today. Topics include puzzles about belief, necessity, substitutivity of identity statements, and formal semantics for parts of language that includes modal and intensional notions. Usually offered every second year.

Mr. Berger or Mr. Yourgrau

**PHIL 141b Topics in Philosophy and Cognitive Science**

[ hum ss ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

Explores the various ways in which philosophical ideas are reflected in and illuminate scientific theorizing about the mind and also examines the implications of recent work in the cognitive sciences for traditional philosophical concerns. Topics differ from year to year. Usually offered every second year.

Mr. Samet

**PHIL 142b The Subjective Point of View**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

Explores the relation between the variable and the constant in experience, a relation embraced by what we as subjects bring to our experience, our subjective point of view of the world. Addresses the question of how our experience, with its inherent subjectivity, variable and constant, can provide us with knowledge of reality. Usually offered every second year.

Mr. Greenberg

**PHIL 143a Consciousness and Self**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

The origins of our concept of consciousness can be found among the fundamental ideas of modern philosophy, tied to the concept of self. This connection will be the subject matter of this course. Usually offered every fourth year.

Mr. Greenberg

**PHIL 144a Philosophical Problems of Space and Time**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

An examination of philosophical problems concerning the concepts of space and time as these arise in contemporary physics, modern logic and metaphysics, as well as in everyday life. Specific topics usually include philosophical aspects of Einstein's theory of relativity, the possibility of "time travel," the distinction between space and time, and McTaggart's famous distinction between the "A-series" and the "B-series" of time. Usually offered every second year.

Mr. Berger, Mr. Hirsch, and Mr. Yourgrau

**PHIL 145b Topics in the Philosophy of Language**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

Topics may vary from year to year and course may be repeated for credit. Topics include the relationship between the language we speak and our view of reality, reference, the sense in which language may structure reality, and formal semantics. Usually offered every second year.

Mr. Berger or Mr. Hirsch

**PHIL 146a Idea of God**

[ hum ]

*Prerequisite: PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b.*

Engages in a philosophical investigation, not of religion as an institution but of the very idea of God. Studies the distinction between human being and divine being and addresses the issue of the relation of God's essence to his existence. Usually offered every second year.

Mr. Yourgrau

**PHIL 147b Topics in the Philosophy of Space and Time**

[ hum ]

*Prerequisite:* Either one course in logic or PHIL 35a or permission of the instructor. Examines the notions of space and time in the theories of Aristotle, Galileo, and Einstein. Examines which concepts no longer make sense when we go from one space-time to the other. Students will learn how to read Galilean and Minkowski space-time diagrams. Usually offered every third year.

Mr. Berger

**PHIL 148b Philosophy of the Humanities**

[ hum ]

*Prerequisite:* PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b. Explores the nature of the humanities, their methods and goals, with a particular focus on the discipline of history. Is history a "science," and should it be? What is the nature of the claims to knowledge that historians (and other humanists) make? How does one know a narrative? How does one know an interpretation? And what is the role of power in legitimating the claims to knowledge advanced by scholars, teachers, and students of history? Usually offered every second year.

Mr. Levisohn

**PHIL 149a Leibniz, Hume, and Kant on Necessity**

[ hum ]

*Prerequisite:* PHIL 1a or a course in the history of modern philosophy or analytic philosophy. An investigation into the views of three historical philosophers—Leibniz, Hume, and Kant—on the concept of necessity, with limited reference to contemporary treatment of the concept by W. V. Quine and early David Kaplan. Related concept of *a priori* and analyticity are also discussed. Usually offered every second year.

Mr. Greenberg

**PHIL 150b Topics in Epistemology and Metaphysics**

[ hum ]

*Prerequisite or corequisite:* A course in symbolic logic. Topics vary each year; course may be repeated for credit. Topics for spring 2007 included epistemology naturalized and puzzles about belief. Usually offered every second year.

Mr. Berger

**PHIL 161a Plato**

[ hum ]

*Prerequisite:* PHIL 1a or permission of the instructor. An introduction to Plato's thought through an intensive reading of several major dialogues. Usually offered every year.

Mr. Yourgrau

**PHIL 162b Aristotle**

[ hum ]

*Prerequisite:* PHIL 1a or permission of the instructor.

An introduction to Aristotle's philosophy through an intensive reading of selected texts. Usually offered every second year.

Mr. Yourgrau

**PHIL 168a Kant**

[ hum ]

*Prerequisite:* PHIL 1a or permission of the instructor.

An attempt to understand and evaluate the main ideas of the *Critique of Pure Reason*, the subjectivity of space and time, the nature of consciousness, and the objectivity of the concepts of substance and causality. Usually offered every year.

Mr. Greenberg

**PHIL 170a Special Topics in History of Philosophy: Descartes' Meditations**

[ hum ]

*Prerequisite:* PHIL 1a or PHIL 39b, or permission of the instructor. An advanced seminar focusing on a single philosopher or text, or on the way a number of key figures in the history of philosophy have addressed a philosophical problem or topic. Recent offerings: (1) a close reading of Descartes's *Meditations on First Philosophy*, the essential text of continental rationalism and the foundation stone of modern philosophy, and (2) a close reading of Hume's *Enquiry Concerning Human Understanding*, a central text of eighteenth-century British empiricism. Usually offered every fourth year.

Mr. Samet

**PHIL 171b Problems of A Priori Knowledge**

[ hum ]

*Prerequisite:* One course in philosophy or permission of the instructor. Examines some of the main problems of *a priori* knowledge as seen from a Kantian point of view. Usually offered every second year.

Mr. Greenberg

**PHIL 178b Major Figures in the Christian Faith**

[ hum ]

*Prerequisite:* PHIL 1a. Presents the important theological contributions of the major thinkers of the Western Church, covering the modern period. Usually offered every fourth year.

Mr. Yourgrau

**PHIL 179a Continental Rationalism: Descartes, Spinoza, Leibniz**

[ hum ]

*Prerequisite:* PHIL 1a or PHIL 66b or one PHIL course numbered 35a-39b. Examines the metaphysical and epistemological doctrines of Descartes, Spinoza, and Leibniz, central figures of seventeenth- and eighteenth-century European rationalism, and their contributions to contemporary philosophical debates. Usually offered every second year.

Mr. Samet

**PHIL 180b British Empiricism**

[ hum ]

*Prerequisite:* PHIL 1a or PHIL 66b or one course numbered PHIL 35a-39b. Examines the metaphysical and epistemological doctrines of Locke, Berkeley, and Hume, the central figures of seventeenth- and eighteenth-century British empiricism. Also explores the influence of these figures on contemporary philosophy. Usually offered every second year.

Mr. Samet

**PHIL 181a Schopenhauer and Nietzsche: Art and Politics**

[ hum ]

*Prerequisite:* One course in philosophy or European cultural studies. Examines two philosophers whose subversive ideas and brilliant prose have stirred the deepest human anxieties and hopes for man's relationship to nature, values, aesthetics, religion, law, and society. Their impact on art and politics illustrated through works by Mann and Kafka. Usually offered every third year.

Mr. Gaskins

**PHIL 182a Wittgenstein's Philosophical Investigations**

[ hum ]

An intensive study of Ludwig Wittgenstein's seminal work, *Philosophical Investigations*. This course should be of interest to philosophy and literature students who want to learn about this great philosopher's influential views on the nature of language and interpretation. Usually offered every second year.

Mr. Flesch and Mr. Hirsch

**Cross-Listed Courses**

The department approves cross-listed courses for philosophy credit each semester based on the course content and instructor. If approved, cross-listed courses (irrespective of the number assigned by the home department) count only as lower-level electives and do not satisfy any of the philosophy department's distribution requirements. Please consult the *Schedule of Classes* or contact the undergraduate advising head to confirm whether a particular class is cross-listed for philosophy credit in a given semester.

**ED 159b**

Philosophy of Education

**LING 130a**

Semantics: The Structure of Concepts

**NEJS 159a**

Major Trends in Modern Jewish Philosophy

**POL 186b**

Classical Political Thought