

- 96A,B. Electronic Music Studio.** *Mr. Flaherty.* Laboratory course designed to develop electronic compositions using techniques of analog and digital synthesis. Permission of instructor required. 96B may be repeated once for credit. 96A, each fall; 96B, each spring.
- 190. Senior Seminar.** *Mr. Beeks.* Directed study for majors who are completing the senior exercise (expanded description available in Music Department main office). A seminar for review and discussion of major topics in music theory, history, performance and ethnomusicology, culminating in a paper. Required of senior majors. Each fall.
- 191. Senior Thesis.** *Staff.* Required for the history concentration and written under faculty guidance in the senior year. Each semester.
- 192. Senior Project.** *Staff.* Half- or full course, depending on concentration. Prepared under faculty guidance. 1) Half-course: senior recital; required for Performance concentration. 2) Full course: senior composition; required for Composition concentration. 3) Full course: senior research project; required for Ethnomusicology or Special Research concentration. Each semester.
- 99/199. Reading and Research.** *Staff.* Self-directed study of advanced topics under faculty guidance. Open to sophomores, juniors and seniors whose written project proposals have been submitted to the department chair at least one week prior to pre-enrollment and have been approved by the Music Department. Prerequisite: permission of instructor. 99, lower-level; 199, advanced work. Course or half-course. May be repeated. Each semester. (Summer Reading and Research taken as 98/198.)

NEUROSCIENCE PROGRAM

Associate Professor Rachel Levin, coordinator

Assistant Professor Jonathan King, director

Steering Committee: Karl Johnson, Jonathan King, Rachel Levin, Richard Lewis, Jonathan Matsui, Karen Parfitt, Nicole Weekes

Neuroscience is the study of the nervous system and its relationship to mental processes and behavior. The study of neuroscience has revolutionized the fundamental way in which we think about what it means to be human. Because many of the emerging approaches to understanding brain function require a firm foundation in biology, chemistry, physics, psychology, mathematics and computer science, students majoring in neuroscience are required to take basic courses in a wide variety of science disciplines.

Neuroscience not only serves as an intersection between traditional disciplines but has become a discipline in its own right. As such, it changes the way in which we approach those disciplines on which it was founded. Neuroscientists study such issues as the molecular and cellular basis of neuronal function, nervous system structure, how systems of neurons process information, the way in which functions are represented in the brain, the evolutionary development of the nervous system, neural correlates of behavior and mechanisms of nervous system disorders. The Neuroscience Major prepares students for graduate study in neuroscience, medicine and for other careers that benefit from a solid foundation in science.

Requirements for the Major in Neuroscience

1. Neuroscience majors are required to take the following basic science courses.
 - a. BIOL 40 and 41C
 - b. CHEM 1A,B or 51
 - c. MATH 30 or any one higher-level course depending upon placement
 - d. MATH 58 or HM BIOL 153
 - e. PSYC 51
2. Majors are required to take Introductory Neuroscience, NEUR 101. This is ordinarily taken in the fall of the sophomore year.

3. Majors must select two additional basic science courses from the list below in consultation with a faculty advisor in the Neuroscience Program. No more than one course can be from the same department (with the exception of chemistry) without approval from the coordinator of the Neuroscience Program.
 - a. BIOL 41E, Ecological and Evolutionary Biology with Lab; 109, Molecular Evolution with Lab; 140, Animal Physiology with Lab; 144, Comparative Endocrinology; 163, Cell Biology with Lab; 169, Developmental Biology with Lab.
 - b. CHEM 110A, B Organic Chemistry with Lab; 115, Biochemistry with Lab; 174 and 175, Bio-Organic Chemistry and Introduction to Medicinal Chemistry.
 - c. CSCI 30, Computation and Cognition with Lab; 51, Introduction to Computer Science; 52, Fundamentals of Computer Science.
 - d. MATH 31, Calculus II; 32, Calculus III.
 - e. PHYS 51A, B, General Physics with Laboratory
 - f. PSYC 108, Child Psychology; 131, Abnormal Psychology; 154, Social Psychology; 160, Perception and Cognition; 162, Memory and Language with Lab; 180J, Seminar on Language, Memory and the Brain.
4. Majors must take a core course from each of the following three areas of Neuroscience.
 - a. Cell and Molecular Neuroscience
 - 1) BIOL 178, Neurobiology with Lab.
 - 2) NEUR 110, Developmental Neuroscience with Lab
 - b. Comparative Systems Neuroscience
 - 1) BIOL 125, Animal Behavior with Lab
 - 2) NEUR 102, Neuroethology with Lab
 - 3) NEUR 130, Vertebrate Sensory Systems with Lab
 - c. Human Neuroscience
 - 1) NEUR 143, The Human Brain: From Neuron to Behavior with Lab
5. Majors must select one additional course from the following list of neuroscience electives. (Neuroscience core courses can also be used to satisfy the neuroscience elective requirement.)
 - a. JS BIOL 039, Analysis of Human Motor Skills
 - b. CSCI 151, Artificial Intelligence; 152, Neural Networks
 - c. NEUR 103, Neuropharmacology
 - d. PSYC 150, Social Brain; 180W, Biological Basis of Psychopathology; JS 133, Introduction to Mathematical Physiology; 180C Cultural Neuroscience
6. Majors are required to complete the following senior activities.
 - a. NEUR 190, Senior seminar in the fall of their senior year
 - b. NEURO 191 or 194 A,B: Either a one-semester library thesis (191) in either the fall or spring semester or a two-semester experimental thesis (194 A,B) during their senior year

All courses counting toward the major must be taken for a letter grade. With prior approval from the program coordinator, students may receive credit toward their major for coursework completed at neighboring Claremont Colleges. Students planning on attending graduate school in neuroscience should consult with an advisor in neuroscience regarding course selection. Pomona College offers a specialized study abroad program in neuroscience at University College London. In consultation with a neuroscience faculty member at Pomona, Neuroscience majors can choose a curriculum at the UCL Study Abroad Program in which they receive up to two credits toward the major, including one for a core course.

Please refer to the Study Abroad Website (www.pomona.edu/administration/study-abroad) for the program description and information on eligibility.

Courses

Full-credit Neuroscience (NEUR) courses satisfy Area 4 of the Breadth of Study Requirements.

- 101. Introduction to Neuroscience with Laboratory.** *Mr. King, Mr. Matsui.* An introduction to the field of neuroscience. Basic principles of neuroscience are covered including how the cells in the nervous system process signals and transmit information, basic brain anatomy and an introduction to human and comparative systems neuroscience. Prerequisite: two semesters of Biology. Letter grade only. Each fall.
- 102. Neuroethology: Mechanisms of Behavior with Laboratory.** *Ms. Levin.* A comparative approach to examining how the nervous system supports behavior. Topics include the evolution and organization of the nervous system, neural-endocrine interactions and mechanisms underlying the detection and recognition of behavioral signals and the generation of a behavioral response to them. Prerequisites: NEUR 101. Fall 2009; offered alternate years.
- 103. Neuropharmacology.** *Ms. Parfitt.* Introduction to neuropharmacology. Overview of the major neurotransmitter systems, drug-receptor interactions and synaptic transmission. Emphasis on the mechanisms and actions of psychoactive drugs, including drugs of abuse, the biology of addiction and treatment of psychiatric illness and neurodegenerative disease. Prerequisite: 101. Fall 2009; offered alternate years.
- 110. Developmental Neurobiology with Laboratory.** *Mr. Matsui.* Focuses on the developing nervous system. Topics include neural differentiation, cell birth and death, axon guidance, establishing the appropriate connections in the developing brain and adult neurogenesis and repair. Emphasis will be placed on critically evaluating readings from the primary literature, experimental design and scientific writing. Prerequisite: 101. Letter grade only. Each spring.
- BIOL 125. Animal Behavior with Laboratory.** *Ms. Levin.* Prerequisite: BIOL 41E. Spring 2010; offered alternate years, usually in fall.
- 130. Vertebrate Sensory Systems with Laboratory.** *Mr. Johnson.* Vertebrates possess remarkable adaptations for exploring their external environment. We will examine the senses of smell, taste, touch, vision and hearing at molecular, cellular and systems levels, with particular focus on the development of these systems. Topics will also include comparative anatomy, physiology, neural coding and exotic sensory systems. Prerequisite: 101. Each spring.
- 143. The Human Brain: From Cells to Behavior with Laboratory.** *Mr. Lewis, Ms. Weekes.* An advanced laboratory course in the relationships between structure and function that exist in the human nervous system. We will critically analyze methods of exploring the human nervous system including lesion, electrophysiological, neurochemical and neuroimaging approaches. Topics will include sensation and perception, cognition and emotion, movement, regulatory systems and social behavior. Prerequisite: 101. Each spring.
- BIOL 178. Neurobiology with Laboratory.** *Ms. Parfitt.* Prerequisite: NEUR 101. Each spring.
- PSYC 180C. Cultural Neuroscience.** *Ms. Goto, Mr. Lewis.* Spring 2010.
- PSYC 180W. Biological Basis of Psychopathology.** *Ms. Weekes.* Each fall.
- PSYC 180Z. The Social Brain.** *Mr. Lewis.* Next offered 2010-11.
- 190. Senior Seminar.** *Staff.* Critical analysis and discussion of the current research literature in neuroscience. Discussion of senior thesis exercise. Topics vary each year. Half-course. Senior majors only. Each fall.
- 191. Senior Library Thesis.** *Staff.* A non-empirical thesis in which students design a research protocol to answer an original question. Written in the form of a grant proposal. Half-course. May be taken in either semester of the senior year. Prerequisite: permission of instructor required.

194A,B. Senior Experimental Thesis. *Staff.* An empirical thesis in which students undertake an experimental project that addresses an original question. Half-course each semester. 194A, each fall; 194B, each spring.

99/199. Reading and Research. *Staff.* Prerequisite: permission of instructor. 99, lower-level; 199, advanced work. Course or half-course. May be repeated. Each semester. (Summer Reading and Research taken as 98/198.)

PHILOSOPHY DEPARTMENT

Associate Professor Peter Thielke, department chair

Professors Atlas, Davis, Erickson, McKirahan

Associate Professor Thielke

Assistant Professors Green, Kung, Perini, Tannenbaum

Philosophy Department courses are designed to enable the student to understand the philosophic tradition and to cultivate critical thinking. The program serves the needs of those interested in philosophy as part of a liberal education and prepares philosophy majors for work in graduate programs. Most courses numbered 101 and below are suitable as first courses in philosophy. The philosophy program is offered in cooperation with the other Claremont Colleges.

Requirements for the Major in Philosophy (PHIL)

The Philosophy Major requires a minimum of nine courses, including:

1. One of 31, History of Ethics; 32, Ethical Theory; or 35, Normative Ethics
2. 30, Knowledge, Mind and Existence
3. 60, Logic
4. Two of the three courses from our core history sequence—40, Ancient; 42, Modern; and 43, Continental Thought
5. At least one course from the 185 and 186 series
6. 191 (Senior Thesis, taken over both semesters of the senior year)
7. It is recommended that philosophy majors complete 30, 31, 32 or 35, 60 and two of the three courses in our core history sequence (40, 42, 43) before the senior year.

Requirements for a Minor in Philosophy

Any student who is not a major in philosophy, politics and economics (PPE), or a special major including coursework in philosophy is eligible for a philosophy minor. The requirements of such a minor are the completion of six philosophy courses, including no more than two courses numbered below 10 and at least one course numbered 185 or 186.

Other Information

Students interested in graduate study in philosophy are strongly recommended to take both History of Modern and Ancient Philosophy. Reading knowledge of French, German, Greek or Latin is an asset for graduate study. For more specific information concerning particular graduate programs, consult members of the faculty.

Courses

Philosophy (PHIL) courses (except 60) satisfy Area 3 of the Breadth of Study Requirements.