The information presented here is as of 7/29/2011.

NEUROSCIENCE (Div. III)

Chair, Professor HEATHER WILLIAMS (full semester)
Associate Professor NOAH SANDSTROM (spring semester)

Advisory Committee: Professors: P. SOLOMON*, H. WILLIAMS, ZIMMERBERG, ZOTTOLI**. Associate Professor: N. SANDSTROM. Assistant Professor: LEBESTKY. Senior Essel Fellow: MARVIN. Affiliated faculty: HANE, SWOAP.

Neuroscience is a rapidly growing interdisciplinary field concerned with understanding the relationship between brain, mind, and behavior. The interdisciplinary nature of the field is apparent when surveying those who call themselves neuroscientists. Among these are anatomists, physiologists, chemists, psychologists, philosophers, molecular biologists, computer scientists, linguists, and ethicists. The areas that neuroscience addresses are equally diverse and range from physiological and molecular studies of single neurons, to investigations of how systems of neurons produce phenomena such as vision and movement, to the study of the neural basis of complex cognitive phenomena such as memory, language, and consciousness. Applications of neuroscience research are rapidly growing and include the development of drugs to treat neurodegenerative disorders such as Alzheimer’s disease and Parkinson’s disease, the use of noninvasive techniques for imaging the human brain such as PET scans and MRI, and the development of methods for repair of the damaged human brain such as the use of brain explants and implants. Combining this wide range of approaches and research methods to study a single remarkably complex organ—the brain—requires a unique interdisciplinary approach. The Neuroscience Program is designed to provide students with the opportunity to explore this approach.

THE PROGRAM

The program in neuroscience consists of five courses including an introductory course, three electives, and a senior course. In addition, students are required to take two courses, Biology 101 and Psychology 101, as part of the program. Neuroscience (Neuroscience 201) is the basic course and provides the background for other neuroscience courses. Ideally, this will be taken in the sophomore year. Either Biology 101 or Psychology 101 serves as the prerequisite. Electives are designed to provide in-depth coverage including laboratory experience in specific areas of neuroscience. At least one elective course is required in Biology (Group A) and one in Psychology (Group B). The third elective course may also come from Group A or Group B, or may be selected from other neuroscience related courses upon approval of the advisory committee. Topics in Neuroscience (Neuroscience 401) is designed to provide an integrative culminating experience. Students take this course in the senior year.

THE DEGREE WITH HONORS IN NEUROSCIENCE

The degree with honors in Neuroscience provides students with the opportunity to undertake an original research project under the supervision of one or more of the Neuroscience faculty. In addition to completing the requirements of the Neuroscience Program, candidates for an honors degree must enroll in Neuroscience 493-W31-494 and write a thesis based on an original research project. Presentation of a thesis, however, should not be interpreted as a guarantee of a degree with honors. Students interested in pursuing a degree with honors should contact the Neuroscience Advisory Committee in the spring of their junior year.

REQUIRED COURSES

BIOL 101 The Cell
PSYC101 Introductory Psychology
(Neither of these courses should be completed by the end of the sophomore year.)
NSCI 201/BIOL 212/PSYC 212 Neuroscience
NSCI 401 Topics in Neuroscience

ELECTIVES

Three elective courses are required. At least one elective must be from Group A and at least one elective must be from Group B. The third elective may come from either Group A or Group B or the student may wish to petition the advisory committee to substitute a related course.

Group A

BIOL/NSCI 209T Animal Communication
BIOL 213 Sensory Biology
BIOL/NSCI 304 Neurobiology
BIOL/NSCI 310 Neural Development
BIOL 410 Cell Dynamics in Living Systems
BIOL 407/NSCI 347 Neurobiology of Emotion

Group B

PSYC/NSCI 315 Hormones and Behavior
PSYC/NSCI 316 Clinical Neuroscience
PSYC 317T Nature via Nurture: Explorations in Developmental Psychology
PSYC/NSCI 318/INTR 223 Image, Imaging and Imagining: The Brain and Visual Arts

NSCI 201(F) Neuroscience (Same as Biology 212 and Psychology 212)
A study of the relationship between brain, mind, and behavior. Topics include a survey of the structure and function of the nervous system, basic neurophysiology, development, learning and memory, sensory and motor systems, language, consciousness and clinical disorders such as schizophrenia, Parkinson’s disease, and addiction. The laboratory focuses on current topics in neuroscience. Format: lecture, three hours a week; laboratory, every other week. Evaluation will be based on a lab practical, lab reports, two hour exams and a final exam. Prerequisites: Psychology 101 or Biology 101; open to first-year students with permission of instructor. Enrollment limit: 72 (expected: 72). Preference given to sophomores and to Biology and Psychology majors. Satisfies one semester of the Division III requirement. Not available for the Gaudino option.

Hour: 8:30-9:45 TR Lab: 1-4 M,T,W N. SANDSTROM and H. WILLIAMS (lecture) MARVIN (labs)
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NSCI 304(F) Neurobiology (Same as Biology 304)
(See under BIOL 304 for full description.)

NSCI 310(S) Neural Development and Plasticity (Same as Biology 310)
(See under BIOL 310 for full description.)

NSCI 315(S) Hormones and Behavior (Same as Psychology 315)
(See under PSYC 315 for full description.)

NSCI 316 Clinical Neuroscience (Same as Psychology 316) (Not offered 2011-2012)
(See under PSYC 316 for full description.)

NSCI 318(F) Image, Imaging and Imagining: The Brain and Visual Arts (Same as INTR 223 and Psychology 318)
(See under PSYC 318 for full description.)

NSCI 347(F) Neurobiology of Emotion (Same as Biology 407)
(See under BIOL 407 for full description.)

NSCI 397(F), 398(S) Independent Study

NSCI 401(S) Topics in Neuroscience
Neuroscientists explore issues inherent in the study of brain and behavior. The overall objective of this seminar is to create a culminating senior experience in which previous course work in specific areas in the Neuroscience Program can be brought to bear in a synthetic, interdisciplinary approach to understanding complex problems. The specific goals for students in this seminar are to evaluate original research and critically examine the experimental evidence for theoretical issues in the discipline. Topics and instructional formats will vary somewhat from year to year, but in all cases the course will emphasize an integrative approach in which students will be asked to consider topics from a range of perspectives including molecular, cellular, systems, behavioral and clinical neuroscience. Previous topics have included autism, depression, alcoholism, stress, neurogenesis, novel neuromodulators, retrograde messengers, and synaptic plasticity.
Format: seminar and tutorial meetings. Evaluation will be based on oral presentations, several short papers, and a term paper. Prerequisites: open only to seniors in the Neuroscience program. Enrollment limit: 18 (expected: 14). This course is required of all senior students in the Neuroscience program. Not available for the Gaudino option.

Hour: 1:10-3:50 R
NSCI 493(F)-W31-494(S)  Senior Thesis
Independent research for two semesters and a winter study under the guidance of one or more neuroscience faculty. After reviewing the literature in a specialized field of neuroscience, students design and conduct an original research project, the results of which are reported in a thesis. Senior thesis work is supervised by the faculty participating in the program.