NEUROSCIENCE

Associate Professor: Siddharth Ramakrishnan, Biology, Director
Advisory Committee: Jung Kim, Exercise Science; Susannah Hannaford, Biology; Gary McCall, Exercise Science; Melvin Rouse, Psychology; Justin Tiehen, Philosophy

About the Program
The Neuroscience Program provides a forum for faculty and students interested in the sub-disciplines within the field of neuroscience. This interdisciplinary program offers a general introductory course in neuroscience as an elective for all students, and also offers an interdisciplinary minor or secondary major that may serve as an enhancement of, or complement to, any major of a student’s choice. Participation in the neuroscience program by both faculty and students facilitates involvement in broader neuroscience topics and contributes to a sense of community across departments. Within the Neuroscience Major, five disciplinary concentrations have been identified in Philosophy, Economics, Visual & Performing Arts, Religion & Spirituality and Bioethics.

A key feature of this program is a research or internship experience in the field. Involving students in research not only broadens their knowledge and training in brain sciences, but also kindles an interest in and an appreciation for the methodological, philosophical, artistic, behavioral and ethical issues with which neuroscientists are concerned. This additional experience significantly improves the training of our students as they prepare for entry into careers in basic research, health care, marketing, secondary teaching, and public policy. Additionally, the Neuroscience Program is a part of a consortium of Northwest Liberal Arts Colleges offering Neuroscience experiences.

General Requirements for the Major or Minor
General university degree requirements stipulate that 1) at least four units of the major or three units of the minor be taken in residence at Puget Sound; 2) students earn at least a cumulative GPA of 2.0 in courses taken for the major or the minor; and 3) all courses taken for a major or minor must be taken for graded credit. Any exceptions to these stipulations are indicated in the major and minor degree requirements listed below.

Requirements for the Major in Neuroscience (BA)
1. The Neuroscience major is a secondary major that can be chosen only after a primary major in another field is chosen. A major in Neuroscience cannot be completed unless a primary major in another department or program is also completed.
2. 5 concentrations: NeuroPhilosophy, NeuroEconomics; NeuroSpirituality, NeuroArts or NeuroBioethics.
3. Completion of 8 units:
   a. BIOL 101 or BIOL 111
   b. PSYC 101
   c. NRSC 201: Introduction to Neuroscience
   d. An introductory course in the Concentration:
      • Neuro Philosophy: PHIL 230 Philosophy of Mind
      • Neuro Economics: ECON 102 Introduction to Behavior and Choice
      • Neuro Arts: THTR 200 The Theatrical Experience or ARTS 101 Visual Concepts through Painting and Drawing or ARTS 103 Visual Concepts through Drawing and Print Media
      • Neuro Spirituality: REL 208 Yoga, Psychedelics and Mind Science
      • Neuro Bioethics: REL/BIOE/PHIL 292 Basics of Bioethics
   e. Two courses from within the Concentration
   f. One elective outside the concentration
      • Neuro Philosophy: BIOL 212, BIOL 361, BIOL 434, BIOL 472, CONN 354, CONN 357, CONN 393, CSCI 431, CONN 481, ECON 365, ECON 291, EXSC 221, EXSC 222, EXSC 328, EXSC 424, NRSC 350, PSYC 230, PSYC 310, PSYC 313, PSYC 335, PSYC 351, PSYC 373, REL 301, REL 430, REL 450, STS 318, STS 333
      • Neuro Economics: BIOL 292, BIOL 212, BIOL 361, BIOL 434, BIOL 472, CONN 354, CONN 357, CONN 393, CSCI 431, EXSC 221, EXSC 222, EXSC 328, EXSC 424, NRSC 350, PHIL 102, PHIL 105, PHIL 230, PHIL 250, PHIL 286, PHIL 292, PHIL 333, PHIL 336, PHIL 350, PSYC 230 PSYC 310, PSYC 313, PSYC 335, PSYC 351, PSYC 373, REL 292, REL 301, REL 340, REL 450, STS 318, STS 333
      • Neuro Arts: BIOL 292, BIOL 212, BIOL 361, BIOL 434, BIOL 472, CONN 354, CONN 357, CONN 393, CSCI 431, ECON 365, ECON 291, EXSC 221, EXSC 222, EXSC 328, EXSC 424, NRSC 350, PHIL 102, PHIL 105, PHIL 230, PHIL 250, PHIL 286, PHIL 333, PHIL 336, PHIL 350, PSYC 230 PSYC 310, PSYC 313, PSYC 335, PSYC 351, PSYC 373, REL 292, REL 301, REL 340, REL 450, STS 318, STS 333
      • Neuro Spirituality: BIOL 212, BIOL 361, BIOL 434, BIOL 472, CONN 354, CONN 357, CONN 393, CSCI 431, ECON 365, ECON 291, EXSC 221, EXSC 222, EXSC 328, EXSC 424, NRSC 350, PHIL 102, PHIL 105, PHIL 230, PHIL 250, PHIL 286, PHIL 292, PHIL 333, PHIL 336, PHIL 350, PSYC 230 PSYC 310, PSYC 313, PSYC 335, PSYC 351, PSYC 373, REL 292, REL 301, REL 340, REL 450, STS 318, STS 333
      • Neuro Bioethics: BIOL 212, BIOL 361, BIOL 434, BIOL 472, CONN 354, CONN 357, CONN 393, CSCI 431, ECON 365, ECON 291, EXSC 221, EXSC 222, EXSC 328, EXSC 424, NRSC 350, PHIL 102, PHIL 105, PHIL 230, PHIL 250, PHIL 286, PHIL 292, PHIL 333, PHIL 336, PHIL 350, PSYC 230 PSYC 310, PSYC 313, PSYC 335, PSYC 351, PSYC 373, REL 292, REL 301, REL 340, REL 450, STS 318, STS 333
4. Completion of either an internship, performance, or research experience in the disciplinary concentration and approved in advance by the steering committee. (Note: students must meet with a neuroscience advisor and submit an application for internship/research prior to the end of the second semester of their junior year.)

Notes
a. No more than one elective course may be used to fulfill the student’s primary major and the Neuroscience secondary major.
b. Except for the restriction in Note 1 above, courses that satisfy Neuroscience major requirements may also apply to core, minor, and other major requirements.

c. Selection of elective courses should be made in consultation with a neuroscience advisor.

d. Course credit earned from an internship or research experience does not count toward the required eight units of coursework outlined above. However students can count internships towards both their primary major and Neuroscience, with approval from the director.

Requirements for the Minor in Neuroscience

1. Completion of five units to include:
   a. NRSC 201, Introduction to Neuroscience (prerequisite: BIOL 111 or BIOL 101 with permission of instructor or permission of instructor).
   b. Completion of three units of elective courses from the list below at least two from outside the student’s major. Electives: BIOL 212, BIOL 361, BIOL 434, BIOL 472, CONN 354, CONN 357, CONN 393, CONN 481, CSCI 431, ECON 365, ECON 291, EXSC 221, EXSC 222, EXSC 328, EXSC 424, NRSC 350, PHIL 102, PHIL 250, PHIL 286, PHIL 333, PHIL 336, PHIL 350, PSYC 230, PSYC 310, PSYC 313, PSYC 335, PSYC 351, PSYC 373, REL 292, REL 301, REL 450, REL 336, REL 340, STHS 318, STHS 333.
   c. NRSC 450 Senior Seminar

2. Completion of either an internship or research experience in the discipline and approved in advance by the steering committee. (Note: students must meet with a neuroscience advisor and submit an application for internship/research prior to the second semester of their junior year.) Course credit earned from an internship or research experience does not count toward the required five units of course work outlined above.

Notes

a. Only one elective in the Neuroscience minor can apply also to a requirement in the student’s first major.

b. Courses taken to fulfill the Neuroscience minor requirements can also fulfill Core, other minor, second major, and university graduation requirements.

c. Internship/research may be taken for credit through the Neuroscience Internship Program or the student’s major department.

Course Offerings

Unless otherwise specified, each course carries 1 unit of credit and is offered at least once each academic year. Please see “Frequency of Course Offerings” on page 20.

Seminars in Scholarly Inquiry. See Seminars in Scholarly Inquiry in the Core Curriculum section of this Bulletin for course descriptions.

SS12 103 Understanding Brain Function

Other courses taught by Neuroscience faculty. See Connections in the Core Curriculum section of this Bulletin for course descriptions.

CONN 303 Art-Science: Inquiry into the Intersection of Art, Science, and Technology

Satisfies the Connections core requirement.

Neuroscience (NRSC)

201 Introduction to Neuroscience This course provides a survey of the structure and function of the nervous system, neurophysiology, and sensorimotor systems, including examples of neuropathologies (e.g., spinal cord injury, neuropathic pain, and Parkinson’s disease). Students also explore selected topics in depth, such as motivation (e.g., eating and sexual behavior), memory processes, and clinical disorders (e.g., post traumatic stress, schizophrenia, and dementia). Prerequisite: BIOL 111, OR BIOL 101 with permission of the instructor, OR permission of the instructor.

350 Methods in Neuroscience This course offers students an introduction to various methods in the field of Neuroscience. Neuroscience is an interdisciplinary field that spans a range of topics from basic biology to psychology to therapeutics in the clinical setting. This course provides a flavor of a few of the techniques used currently in the field of neurosciences and explore methods from historical, futuristic and ethical perspectives. Hands-on training on a range of methodologies with scope for independent projects is provided. Prerequisite: NRSC 201. Offered occasionally.

450 Senior Seminar: Special Topics in Neuroscience This course provides a capstone experience for students earning a Neuroscience Emphasis and is designed for senior undergraduates who have completed all other course requirements in the emphasis. This course offers students in the program the opportunity to explore and discuss more sophisticated theories and complex methods in neuroscience than was possible at the introductory level. This seminar features student-led discussions of advanced topics in the discipline, including nervous system organization, neurochemistry, brain plasticity, neural bases of learning and memory, diseases and injury of the nervous system, and neuropharmacology. Also includes evening presentations by guest experts. Prerequisite: Senior neuroscience emphasis or minor, or permission of the instructor.

490 Advanced Topics in Neuroscience Neuroscience is a rapidly evolving field with new technologies and practices advancing yearly. In this course, experts in the field who are at the forefront of research in neuroscience teach in-depth current research and advanced technologies used for cutting-edge investigations and the future of neuroscience. Postdoctoral researchers from the University of Washington and the Fred Hutchinson Cancer Research Center team teach the course, offering insight into neuroscience within a highly advanced research context. Prerequisite: NRSC 201.

495 Independent Study Variable credit up to 1.00 unit. Independent study is available to those students who wish to continue their learning in an area after completing the regularly offered courses in that area. May be repeated for credit up to 4.00 units. Cannot be audited. Cannot be taken Credit/No Credit.