NEUROSCIENCE, PHD

The Neuroscience Doctoral Program is an interdisciplinary graduate program composed of doctoral students and faculty members from departments across five divisions and three campuses of Tulane University. As an educational branch of the Tulane Brain Institute, the program is administered through the School of Science and Engineering and governed by the Neuroscience Doctoral Training Committee. Appointed by the Director of the Tulane Brain Institute, the Committee is composed of a director and five faculty members representing the Main and Medical School campuses. Contributing divisions include the Schools of Science and Engineering, Liberal Arts, Medicine, Public Health and Tropical Medicine, and Primate Center. Faculty research programs are funded through grants competitively awarded by federal, state, and private agencies under four major themes: *Memory and Cognition*; *Neurodegenerative Disease, Neural Injury and Repair*; *Hormone-Brain Interactions*; and *Brain-Body Health*.

Doctoral students conduct cutting-edge research in modern laboratory environments that foster supportive instruction and intensive training in the neurosciences. The Neuroscience Doctoral Program provides graduate students with a broad education in both the theoretical and applied aspects of basic research in the neurosciences. Through their coursework and research, students receive diversified training in neuroanatomy, neurophysiology, neuropharmacology, neuroendocrinology, molecular and cellular neurobiology, behavioral neuroscience, cognitive neuroscience, and research methods. In addition, students have opportunities to present and publish their research findings, and to gain experience in grant writing and teaching pedagogy. The objective of the Neuroscience Doctoral Program is to prepare graduate students for their future postdoctoral training and careers in academia, industry, and related professions.

All students are guaranteed to receive financial support for five years as long as satisfactory and timely progress is made toward the degree. Financial support includes a full tuition waiver and a stipend paid every other week over twelve months of the year. Students are funded during their first two years by teaching assistantships. After the first two years students are supported by research assistantships arranged though their major advisors in their permanent laboratories.

Requirements

Doctoral Degree Requirements

The pursuit of the Ph.D. degree is a journey with five major milestones. (1) Students must successfully complete a curriculum consisting of core and elective courses taken during the first two years of study. (2) Students complete three rotations in different laboratories, each 6-8 weeks in duration, during the first year of study in order to identify a permanent laboratory. (3) Students must pass written and oral components of a qualifying examination in the third year of study administered by the Doctoral Committees. (4) Students must prepare and defend a dissertation prospectus before their Doctoral Committees in the fourth year of study. (5) Students must complete their dissertation research, prepare a written form of the dissertation, orally defend the dissertation, and receive approval from their Doctoral Committees as the final step toward earning the Ph.D. within five years.

Required Course Work

A minimum of 50 course credits are required for the Ph.D. in Neuroscience. Of these 50 credits, 38 credits are fulfilled by completing core courses (20 credits), research rotations (6 credits), and elective courses (12 credits). Up to 12 additional credits may be satisfied by registration in NSCI 7980 Research In Neuroscience-PhD (1-9 c.h.). Credits earned in NSCI 9990 Dissertation Research (3 c.h.) do not count toward the 50 required credits. Course credits taken beyond the 50-credit minimum are included in the tuition waiver. Up to 15 course credits toward the final 50 required credits can be earned in Tulane's Master's Programs in Neuroscience (4+1 and M.S.). However, the following courses taken at the Master's level cannot count toward the Ph.D. degree: (*Brain Institute Seminar*, *Trends in Neuroscience*, *Research in Neuroscience*).

Core Courses

The completion of core courses is required of all doctoral students, which comprise 20 of the 50 total credits required for the Ph.D. in Neuroscience.

NSCI 7110 Graduate Neuroscience I (3 c.h.) – Offered only during fall semesters, this course encompasses the basic principles of neuroscience at the graduate level, focusing on cellular and molecular neurobiology, neurophysiology and plasticity, and developmental neurobiology.

NSCI 7120 Graduate Neuroscience II (3 c.h.) – Offered only during spring semesters, this course encompasses the basic principles of neuroscience at the graduate level, focusing on systems neuroscience and behavioral neuroscience as well as neuroanatomy.

NSCI 6150 Methods in Neuroscience (3 c.h.) – Offered only during fall semesters, this course encompasses experimental design as well as contemporary theories, methodological approaches, and common techniques used in neuroscience research. Basic and translational neuroscience methods are included. Approaches include molecular, cellular, genetic, biochemical, computational, and behavioral.

NSCI 6030 Brain Institute Seminar (1 c.h.) – Offered every semester, this seminar series is designed to provide students with exposure to contemporary research conducted by neuroscientists at Tulane and from other local and national institutions. Students receive academic credit for *Brain Institute Seminar* during their first four semesters of study in the doctoral program, but are expected to attend throughout their period of graduate training.

NSCI 6040 Trends In Neuroscience (1 c.h.) – Offered every semester, this course is designed to allow students to learn to critically read and interpret scientific literature and to present and discuss research with their peers. Students receive academic credit for *Trends in Neuroscience* during their first four semesters of study in the doctoral program.

PSYC 6090 Univariate I (3 c.h.) – Offered only during fall semesters, this course covers experimental design and statistical analyses used in scientific research. Topics include z-distribution, t-distribution, analysis of variance, post-hoc tests subsequent, correlation, simple and multiple linear regression, and chi-square analysis. Students may petition to substitute other graduate-level statistics courses taught at Tulane for *Univariate Statistics I*.

INTD 6010 Responsible Conduct of Researc (0 c.h.) - Offered during the fall semesters by the Tulane University Research Compliance Office, this course is required by the federal funding agencies for students earning doctoral degrees in a biomedical-related science.

Elective Courses

A minimum of 12 course credits (4 elective courses) may be obtained for courses with numbers of 6000 or 7000. A list of some appropriate three-credit elective courses follows. Students should consult other departments and programs for other electives of potential interest, which must be approved by the Director of the Neuroscience Doctoral Program.

Molecular / Cellular	***Systems***	***Skill Courses***
Molecular Neurobiology	*Behavioral Endocrinology*	*Graduate Communications*
Developmental Neurobiology	*Psychopharmacology*	*College Teaching Pedagogy*
General Endocrinology	*Neurobiology of Disease*	*College Teaching Practicum*
Biochemistry	*Neurobiology of Aging*	*Univariate Statistics II*
Genome Biology	*Synaptic Organization of the Brain*	
Neural Microengineering	*Neurobiology of Learning & Memory*	