

# NEUROSCIENCE PROGRAM

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## Programs

### Undergraduate

#### Major

- Neuroscience Major (<https://catalog.tulane.edu/science-engineering/neuroscience-program/neuroscience-major/>)

### Graduate

- Neuroscience, MS (<https://catalog.tulane.edu/science-engineering/interdisciplinary-graduate-programs/neuroscience-ms/>)
- Neuroscience, PhD (<https://catalog.tulane.edu/science-engineering/interdisciplinary-graduate-programs/neuroscience-phd/>)

## Courses

### Neuroscience (NSCI)

#### NSCI 1015 Introductory Neuroscience with Laboratory (3)

Introduction for high school students enrolled in the TSSP summer program.

#### NSCI 1940 Transfer Coursework (0-20)

Transfer Coursework at the 1000 level. Department approval may be required.

**Maximum Hours:** 99

#### NSCI 2660 Special Topics (3)

Special topics in Neuroscience. Topic varies by semester.

**Maximum Hours:** 99

#### NSCI 2890 Service Learning (0-1)

Students complete a service activity in the community in conjunction with the content of a three-credit co-requisite course. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

#### NSCI 2940 Transfer Coursework (0-20)

Transfer Coursework at the 2000 level. Department approval may be required.

**Maximum Hours:** 99

#### NSCI 3300 Brain and Behavior (3)

Lectures cover the function and structure of the nervous system and the role of brain activity in the regulation of behavior. This course provides Neuroscience majors with a first exposure to the biological bases of behavior and should be taken prior to other Neuroscience courses at the 3000-level and above.

**Prerequisite(s):** PSYC 1000 or 1100.

#### NSCI 3310 Cellular Neuroscience (3)

In-depth coverage of the basic principles of cellular neuroscience, including the biophysical basis of the membrane potential, action potential generation and propagation, and synaptic signaling. Students also will be introduced to the synaptic organization of higher neural systems, such as the visual, auditory and somatic sensory systems.

**Prerequisite(s):** CELL 1010 and (NSCI 3300 or PSYC 3300).

#### NSCI 3315 Cellular Neuroscience Lab (1)

This is an interactive lab class giving students hands-on experience working with techniques used in the study of cellular neuroscience. Techniques include: behavioral testing using invertebrates, tissue staining, immunocytochemistry, and intracellular electrophysiological recordings.

**Prerequisite(s):** CELL 3310 or NSCI 3310.

**NSCI 3320 Systems Neuroscience (3)**

The subject of this course is the human nervous system, its anatomy, connectivity and function. Discusses the normal structure of the nervous system and the relationship of that structure to physiological function. The course is taught from a practical, clinical point of view and is intended to prepare students for further study in the neurosciences.

**Prerequisite(s):** CELL 1010 and (CELL 3310 or NSCI 3310).

**NSCI 3325 Neuroanatomy Lab (1)**

The subject of this course is the anatomy of the human nervous system. Students will learn to identify and map the structure and position of nuclei, pathways, and anatomical divisions of the brain and spinal cord. The course is a practical correlate to Systems Neuroscience (NSCI 3320), and is intended to prepare students for further study in the neurosciences.

**Prerequisite(s):** CELL 3320\* or NSCI 3320\*.

\* May be taken concurrently.

**NSCI 3330 Experiential Learning in Neuroscience (0)**

Zero-credit add-on to 3 credits of NSCI/SCEN 4910 (Research/Lab); or 3 credits of SCEN 4570 (Internship); or another appropriate experience formally approved by the Neuroscience Curriculum Committee. S/U graded.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 3360 Neuroanatomy & CNS Dissection (3)**

The course emphasis is extracting intact Central Nervous System (CNS) structures with connecting peripheral nerves. The course will look at specific pathways (afferent, efferent, dermatomes) and discuss related clinical manifestations associated with lesions to the individual CNS and peripheral nerve structures. Team dissection will attempt to save substantial segments of cranial nerves and will explore the structures with which they communicate. As student progress through the dissection they will: 1) identify structures that surround and or cover the CNS; 2) log them in a course notebook and then dissect appropriate structures. Grading will be based upon participation, complete notebooks and final dissection results. (e.g., did you remove the brain, spinal cord, and peripheral nerves as a single unit in reasonable condition?)

**NSCI 3660 Special Topics (1-4)**

Courses offered by visiting professors or permanent faculty primarily for undergraduates. For description, consult department.

**NSCI 3665 Special Topics Lab (1-3)**

Special Topics Lab.

**NSCI 3770 Sensation & Perception (3)**

Course provides the student with an appreciation for the different senses and the psychological phenomena associated with each sense. Topics include the major theories and experimental methods and findings associated with each of the sensory systems. Emphasis is placed on understanding sensory functions from an evolutionary perspective. The objective is for the student to obtain a firm understanding of the sensory functions and psychological phenomena associated with each sense.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 3775 Sensation & Percptn Lab (1)**

Course provides the student with hands on activities in order to gain a deeper understanding for the different senses and the methods used to study psychological phenomena associated with each sense. Satisfies neuroscience laboratory requirement.

**Prerequisite(s):** NSCI 3770\* or PSYC 3770\*.

\* May be taken concurrently.

**NSCI 3780 Sex, Gender, and the Brain (3)**

How do we define sex? How do we define gender? How do we communicate research on sex differences with the public? Using an inclusive framework, we will learn the basics of sexual development and differentiation, including prenatal, adolescent, and beyond. Then, with a critical lens, we will explore current neuroscience research regarding gender/sex differences in humans and animal models.

**Prerequisite(s):** (NSCI 3300 or PSYC 3300).

**NSCI 3890 Service Learning (0-1)**

Students complete a service activity in the community in conjunction with the content of a three-credit co-requisite course. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 3940 Transfer Coursework (0-20)**

Transfer Coursework at the 3000 level. Department approval may be required.

**Maximum Hours:** 99

**NSCI 3942 Neuroscience Lecture Elective Transfer Credit Behav Cog (0-20)**

Credit for Neuroscience lecture course taken at another institution of higher learning that counts to fulfill the Behavioral/Cognitive neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 3943 Neuroscience Lecture Elective Transfer Credit Cell Molec (0-20)**

Credit for Neuroscience lecture course taken at another institution of higher learning that counts to fulfill the Cellular/Molecular neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 3944 Neuroscience Lecture Elective Transfer Credit other (0-20)**

Credit for Neuroscience lecture course taken at another institution of higher learning that counts to fulfill the "other" neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 3945 Transfer Course Work Lab (1-3)****NSCI 4060 Behavioral Endocrinology (3)**

An introduction to the roles of steroid and peptide hormones in physiology and behavior. Lectures focus on the hormonal mechanisms that control reproductive and regulatory functions in human and infrahuman species.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 4065 Behavioral Endocrinology Lab (1)**

Laboratories provide demonstration and hands-on experience in research methods used in contemporary neuroendocrinology including hormonal manipulation, behavioral measurement, data analysis, and manuscript preparation.

**Prerequisite(s):** (NSCI 3300 or PSYC 3300) and (NSCI 4060\* or PSYC 4060\*).

\* May be taken concurrently.

**NSCI 4080 Computational Neurochemistry (3)**

Introduction to 3D computational modeling of electrochemical signaling, including laws of diffusion, electrochemistry, resting and action potentials, synaptic communication between neurons, and synaptic plasticity.

**Prerequisite(s):** CHEM 1080 and (CELL 3310 or NSCI 3310).

**NSCI 4110 Brain and Language (3)**

The goal of this course is to learn how the brain is organized to produce and comprehend language and to understand linguistic disorders attendant on brain damage. There is an optional service learning component in which students can work with a speech therapist at a local health-care provider.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 4130 Sport Rel Brain Injury (3)**

This course will provide students with a conceptual and practical appreciation of contemporary neuroscience techniques that are utilized for the assessment and rehabilitation of athletes that suffer sport related concussion(s), including both strengths and limitations. The course will provide an innovative and engaging environment within the community for supervised exploration of specific components of sport concussion management including education/prevention and baseline testing. The students will also communicate research findings in oral and written formats. Course grades will be determined by the students' performance on test(s), scientific article critiques, student lead class discussions, and a group project. In lieu of a final exam, students will submit a group project that will simulate the process to complete a clinical research project.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 4200 General Endocrinology (3)**

This course explains the basics of hormone action and hormone interactions with their receptors, with an emphasis on the molecular mechanisms by which homeostasis is maintained in multicellular organisms. Physiological outcomes of hormone actions on different organs, as well as aberrant hormone action will be covered.

**Prerequisite(s):** CELL 1010 and 2050.

**NSCI 4260 Methods for Functional MRI (3)**

This course will cover methods for noninvasive functional imaging of the human brain using magnetic resonance imaging (fMRI). The course will include both lectures and computer lab sessions involving hands-on analysis of fMRI data. Topics include physical basis of the MRI signal, image encoding, data preprocessing, statistical analysis, multivoxel pattern analysis, and functional connectivity.

**Prerequisite(s):** PSYC 3300 or NSCI 3300.

**NSCI 4330 Neurobiol Learn & Memory (3)**

An introduction to the study of the neural mechanisms involved in learning and memory. The course involves detailed study of the memory systems of the brain as well as historical trends, theoretical perspectives and empirical findings that are associated with the neurobiology of learning and memory.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 4340 Neurobiology of Disease (3)**

Advanced course on the higher neural functions of the nervous system and neurological diseases resulting from disruption of these functions. An emphasis is placed on the physiology of the nervous system and neural dysfunction caused by inherited and acquired diseases. Topics range from motor control and neuromuscular diseases to high cognitive function and dementia. Clinical interventions as well as current research are discussed.

**Prerequisite(s):** CELL 3310 or NSCI 3310.

**NSCI 4350 Developmental Neurobiology (3)**

A broad overview of the different stages of neural development. Examination of the molecular aspects of developmental neurobiology, with reference to some important signaling pathways involved in neural growth and specification. Particular attention will be given to those active research fields, such as growth cone guidance and collapse and activity-dependent development, and applications of these to injury and disease.

**Prerequisite(s):** CELL 2050, 3310 or NSCI 3310.

**NSCI 4370 Molecular Neurobiology (3)**

Introduction to the molecular biology of neurons and neuronal function. Topics of study will include: the molecular composition of nerve cells, and how this provides a basis for their functional properties; their synaptic connectivity; how they receive, transmit and retain information at a molecular level. Studies will focus on current research in the field of molecular neurobiology.

**Prerequisite(s):** CELL 3310 or NSCI 3310.

**NSCI 4380 Cognitive Neuroscience (3)**

An introduction to the study of human behavior and cognition using neuroscience methods. The course will examine the neural basis of perception, attention, memory, language, motor control, and emotions.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 4385 Cognitive Neuroscience Lab (1)**

A laboratory course that provides training in experimental design and ethical issues, data collection, analysis, and manuscript preparation for cognitive neuroscience experiments. Methods used in cognitive neuroscience research, such as event-related potentials, structural and functional MRI, also will be discussed. Students will conduct their own studies using behavioral and brain electrical activity measures. Note: Satisfies psychology and neuroscience laboratory requirement. Fulfills college laboratory requirement. Prerequisite(s): (NSCI 3300, 3670, PSYC 3300 or 3670) and NSCI 380\*. \* May be taken concurrently.

**Prerequisite(s):** (NSCI 3300, 3670, PSYC 3300 or 3670) and NSCI 4380\*.

\* May be taken concurrently.

**NSCI 4450 Genome Biology (3)**

Genome-level science is changing the pace of biomedical research and medicine. This course will examine how whole genomes, transcriptomes, and proteomes are studied, and what we are learning about the biology of multiple organisms using these novel techniques. Epigenetics, genomics, and proteomics will be covered in the context of disease and the development of novel therapeutics. NOTE: Cross-listed as CELL/NSCI 4450/ 6450/ 7450.

**Prerequisite(s):** NSCI 4370, CELL 4370 or 3030.

**NSCI 4500 Advanced Molecular Neurobiology (3)**

This course provides detailed description and in-depth discussion of current techniques and experimental topics in the field of molecular neurobiology.

**Prerequisite(s):** NSCI 4370 or CELL 4370.

**NSCI 4510 Biological Psychology (3)**

A survey of biological psychology with an emphasis on neuroanatomy and research methods used to study mechanisms of learning and memory, mental disorders, emotion, stress, and other psychological phenomena.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**NSCI 4513 Music and Brain (3)**

An introduction to current research linking music education to brain development and function. Fulfills writing intensive and service-learning requirements. NOTE: Cross-listed with PSYC 4513.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

**Corequisite(s):** NSCI 4890.

**NSCI 4515 Biological Psychology Lab (1)**

A laboratory course providing training in behavioral and neurobiological methods, experimental design, data collection and analysis and preparation of research reports. Fulfills the writing intensive requirement.

**Prerequisite(s):** PSYC 4510\* or NSCI 4510\*.

\* May be taken concurrently.

**NSCI 4530 Psychopharmacology (3)**

An introduction to the effects of psychoactive agents on the nervous system. Lectures emphasize the mechanisms by which drugs regulate neurotransmitter systems to alter psychological and physical states.

**Prerequisite(s):** NSCI 3300 or PSYC 3300.

Enrollment limited to students in the Neuroscience or Psychology departments.

**NSCI 4535 Psychopharmacology Lab (1)**

Optional laboratory that fulfills laboratory requirement for Neuroscience and Psychology majors.

**Prerequisite(s):** NSCI 4530\* or PSYC 4530\*.

\* May be taken concurrently.

**NSCI 4570 Service Learning Internship (3)**

An experiential learning process coupled with pertinent academic course work. Apply and register through the Center for Public Service for the three credit internship that fulfills the Second Tier service requirement.

**Maximum Hours:** 99

**NSCI 4580 Internship (1-3)**

An experiential learning process coupled with pertinent academic course work. Registration is completed in the department. S/U graded. Does not count towards any major requirements, but does count as required credits for graduation.

**Maximum Hours:** 3

**NSCI 4590 Internship (1-3)**

An experiential learning process coupled with pertinent academic course work. Registration is completed in the department. S/U graded. Does not count as credits required for graduation.

**NSCI 4622 Neuroscience Special Topics Behavior Cognition (3)**

Credit for Neuroscience special topics course that counts to fulfill the "behavior/cognitive" neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 4660 Special Topics in Neuroscience (1-4)**

Various topics in Neuroscience based on faculty and student interest.

**Maximum Hours:** 99

**NSCI 4661 Special Topics in Neuroscience (1-4)**

Various topics in Neuroscience based on faculty and student interest.

**NSCI 4662 Neuroscience Special Topics Behavior Cognition (3)**

Credit for Neuroscience special topics course that counts to fulfill the "behavior/cognitive" neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 4663 Neuroscience Special Topics Cell Molec (3)**

Credit for Neuroscience Special Topics course that counts to fulfill the "cell/molecular" neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 4664 Neuroscience Special Topics Other (3)**

Credit for Neuroscience special topics course that counts to fulfill the "other" neuroscience lecture elective requirement for the neuroscience major.

**Maximum Hours:** 99

**NSCI 4665 Special Topics Lab (1-3)**

Special Topics Lab.

**NSCI 4730 Neurodevelopment and Disease (3)**

The assembly of a functional nervous system is one of the most complex developmental processes in nature. This course provides advance knowledge on the mechanisms controlling nervous system development, at the cellular, circuit, and functional levels, and how failure on these mechanisms underlie neurodevelopmental disorders. Also, this course will introduce the student to most current techniques and research topics on neurodevelopment.

**Prerequisite(s):** CELL 3310 or NSCI 3310.

**NSCI 4890 Service Learning (0-1)**

Students complete a service activity in the community in conjunction with the content of a three-credit co-requisite course. Course may be repeated up to unlimited credit hours.

**Corequisite(s):** NSCI 4513.

**Maximum Hours:** 99

**NSCI 4891 Service Learning (0-1)**

Students complete a service activity in the community in conjunction with the content of a three-credit co-requisite course. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 4892 Service Learning (0-1)**

Students complete a service activity in the community in conjunction with the content of a three-credit co-requisite course. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 4910 Independent Study (1-3)**

Laboratory research under direction of a faculty member. Registration is completed with the Neuroscience Program. A three-credit independent study may be used to fulfill a neuroscience laboratory requirement. Course may be repeated for up to 6 credits.

**Maximum Hours:** 6

**NSCI 4920 Independent Study (1-3)**

Laboratory research under direction of a faculty member. Registration is completed with the Neuroscience Program. Graded S/U.

**Course Limit:** 99

**NSCI 4940 Transfer Coursework (0-20)**

Transfer coursework at the 4000 level. Departmental approval required.

**Maximum Hours:** 99

**NSCI 4945 Transfer Course Work Lab (1-3)**

Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 4950 Special Projects In NSCI (1-3)**

Individual projects supervised by program faculty members. Open to qualified students with approval of instructor and advisor. Registration is completed with the Neuroscience Program.

**NSCI 4990 Honors Thesis (3)**

Honors thesis research, first semester. Register in department.

**NSCI 5000 Honors Thesis (4)**

For especially qualified seniors with approval of the faculty director and the Office of Academic Enrichment. Students must have a minimum of a 3.400 overall grade-point average and a 3.500 grade-point average in the major.

**Prerequisite(s):** NSCI 4990.

**NSCI 5380 Study Abroad (1-20)**

Courses taught abroad by non-Tulane faculty. Does not count toward Tulane GPA. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 6030 Brain Institute Seminar (1)**

Students attend weekly departmental seminars as an introduction to research hypotheses, techniques and presentations. For Graduate Students Only. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 6040 Trends In Neuroscience (1)**

Students select, analyze, present, and discuss recent empirical articles in the field of Neuroscience. During most weeks, an article authored by a neuroscientist who is presenting a departmental colloquium will be selected to facilitate understanding of the presentation. For Graduate Students Only. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 6060 Behavioral Endocrinology (3)**

An introduction to the roles of steroid and peptide hormones in physiology and behavior. Lectures focus on the hormonal mechanisms that control reproductive and regulatory functions in human and infrahuman species.

**NSCI 6070 Neurobiology of Aging (3)**

This course will survey the current literature in clinical and research journals regarding the Neurobiology of the aging process. Emphasis is placed on the state of research in aging, looking at experimental design issues as well as published results. Connections will be drawn between the research literature and current clinical practice, as well as what the research literature says regarding aging and lifestyle.

**NSCI 6080 Computational Neurochemistry (3)**

Introduction to 3D computational modeling of electrochemical signaling, including laws of diffusion, electrochemistry, resting and action potentials, synaptic communication between neurons, and synaptic plasticity.

**Prerequisite(s):** CELL 6310 or NSCI 6310.

**NSCI 6105 Philosophy of Neuroscience (3)**

This course will introduce students to interdisciplinary research at the intersection of philosophy and neuroscience. The course will cover both historical and current material. Topics will include the relationship between neuroscience and psychology, neuroscience and the "self," the neural correlates of consciousness, and the localization of function in the brain.

**NSCI 6110 Brain and Language (3)**

The goal of this course is to learn how the brain is organized to produce and comprehend language and to understand linguistic disorders attendant on brain damage. There is an optional service learning component in which students can work with a speech therapist at a local healthcare provider.

**NSCI 6130 Sport Rel Brain Injury (3)**

This course will provide students with a conceptual and practical appreciation of contemporary neuroscience techniques that are utilized for the assessment and rehabilitation of athletes that suffer sport related concussion(s), including both strengths and limitations. The course will provide an innovative and engaging environment within the community for supervised exploration of specific components of sport concussion management including education/prevention and baseline testing. The students will also communicate research findings in oral and written formats. Course grades will be determined by the students performance on test(s), scientific article critiques, student lead class discussions, and a group project. In lieu of a final exam, students will submit a group project that will simulate the process to complete a clinical research project.

**NSCI 6170 Psychedelics (3)**

This course will examine the pharmacology, neuroscience, and sociological impacts of psychedelic drugs. Emphasis will be on the actions of these agents at the cellular and neuronal network level. Potential therapeutic applications and existing published data will be examined. Cross-listed with CELL 6170. Open to Graduate Students only.

**NSCI 6200 General Endocrinology (3)**

This course explains the basics of hormone action and hormone interactions with their receptors, with an emphasis on the molecular mechanisms by which homeostasis is maintained in multicellular organisms. Physiological outcomes of hormone actions on different organs, as well as aberrant hormone action will be covered. Open to undergraduates by petition who plan to transfer credit to the 4+1 Program in Neuroscience.

**NSCI 6220 Neural Microengineering (3)**

In recent years, a number of technologies have been developed and utilized for probing the nervous system. This course will focus on microscale tools, technologies, and techniques employed for the control, manipulation, and study of the nervous system in vitro. Course material will be presented primarily by students who prepare presentations from extensive background literature review. A number of projects will be assigned as design challenges in which multiple interdisciplinary groups will research and present proposed solutions to the same challenge. No background in engineering or math is required. Generally offered every other Spring.

**NSCI 6260 Methods for Functional MRI (3)**

This course will cover methods for noninvasive functional imaging of the human brain using magnetic resonance imaging (fMRI). The course will include both lectures and computer lab sessions involving hands-on analysis of fMRI data. Topics include physical basis of the MRI signal, image encoding, data preprocessing, statistical analysis, multivoxel pattern analysis, and functional connectivity.

**NSCI 6310 Cellular Neuroscience (3)**

In-depth coverage of the basic principles of cellular neuroscience, including the biophysical basis of the membrane potential, action potential generation and propagation, and synaptic signaling. Students also will be introduced to the synaptic organization of higher neural systems, such as the visual, auditory and somatic sensory systems. In addition, a term paper is required. Open to graduate students only.

**NSCI 6320 Systems Neuroscience (3)**

The subject of this course is the human nervous system, its anatomy, connectivity and function. Discusses the normal structure of the nervous system and the relationship of that structure to physiological function. The course is taught from a practical, clinical point of view and is intended to prepare students for further study in the neurosciences. In addition, a term paper is required.

**Prerequisite(s):** CELL 6310 or NSCI 6310.

**NSCI 6325 Neuroanatomy Lab (1)**

The subject of this course is the anatomy of the human nervous system. Students will learn to identify and map the structure and position of nuclei, pathways, and anatomical divisions of the brain and spinal cord. The course is a practical correlate to Systems Neuroscience, and is intended to prepare students for further study in the neurosciences.

**Prerequisite(s):** NSCI 3320\*, 3320, 3320, 3320, CELL 3320\*, 3320, 3320 or 3320.

\* May be taken concurrently.

**NSCI 6330 Neurobiol Learn & Memory (3)**

An introduction to the study of the neural mechanisms involved in learning and memory. The course involves detailed study of the memory systems of the brain as well as historical trends, theoretical perspectives and empirical findings that are associated with the neurobiology of learning and memory. Open to undergraduates by petition who plan to transfer credit in Neurobiology of Learning and Memory to the 4+1 Program in Neuroscience.



**NSCI 6340 Neurobiology of Disease (3)**

Advanced course on the higher neural functions of the nervous system and neurological diseases resulting from disruption of these functions. An emphasis is placed on the physiology of the nervous system and neural dysfunction caused by inherited and acquired diseases. Topics range from motor control and neuromuscular diseases to high cognitive function and dementia. Clinical interventions as well as current research are discussed. In addition, a term paper is required. Open to undergraduates by petition who plan to transfer credit in Neurobiology of Disease to the 4+1 Program in Neuroscience.

**NSCI 6350 Developmental Neurobiol (3)**

A broad overview of the different stages of neural development. Examination of the molecular aspects of developmental neurobiology, with reference to some important signaling pathways involved in neural growth and specification. Particular attention will be given to those active research fields, such as growth cone guidance and collapse and activity-dependent development, and applications of these to injury and disease. In addition, a term paper is required. Open to undergraduates by petition who plan to transfer credit to the 4+1 Program in Neuroscience.

**NSCI 6362 Neuroscience & CNS Dissection (3)**

The course emphasis is extracting intact Central Nervous System (CNS) structures with connecting peripheral nerves. The course will look at specific pathways (afferent, efferent, dermatomes) and discuss related clinical manifestations associated with lesions to the individual CNS and peripheral nerve structures. Team dissection will attempt to save substantial segments of cranial nerves and will explore the structures with which they communicate. As student progress through the dissection they will: 1) identify structures that surround and or cover the CNS; 2) log them in a course notebook and then dissect appropriate structures. Grading will be based upon participation, complete notebooks and final dissection results. (e.g., did you remove the brain, spinal cord, and peripheral nerves as a single unit in reasonable condition?) Notes: Satisfies neuroscience laboratory requirement. Cross-listed with NSCI 3360.

**NSCI 6365 Comparative Neuroanatomy Lab (1)**

This course focuses on the relevant similarities and differences of model systems in the neurosciences. Students in the laboratory will engage in an intensive comparative study of the structural and functional anatomy of commonly used living model systems. Hands-on dissections of the nervous system from various species is utilized to reinforce learning, demonstrate how the nervous system is modified to match body type and lifestyle, and to give students experience in practical skills for neuroscience research. In addition, students will pursue an independent project on a protein of their choice. Students will use a literature search to try to map the relative expression of this protein across the nervous system.

**NSCI 6370 Molecular Neurobiology (3)**

Introduction to the molecular biology of neurons and neuronal function. Topics of study will include: the molecular composition of nerve cells, and how this provides a basis for their functional properties; their synaptic connectivity; how they receive, transmit and retain information at a molecular level. Studies will focus on current research in the field of molecular neurobiology. In addition, a term paper is required. Open to undergraduates by petition who plan to transfer credit to the 4+1 Program in Neuroscience.

**NSCI 6380 Cognitive Neuroscience (3)**

An introduction to the study of human behavior and cognition using neuroscience methods. The course will examine the neural basis of perception, attention, memory, language, motor control, and emotions. Open to undergraduates by petition who plan to transfer credit to the 4+1 Program in Neuroscience.

**NSCI 6400 Neuroscience Applied (3)**

This course is designed for neuroscience graduate students to help them utilize and apply their skills and knowledge of neuroscience and to help prepare them for their future professions. The course consists of individual and group presentations, discussion of selected readings, career preparation activities, invited speakers, evaluation/feedback, and a final project as students develop their critical thinking, analytical, and communication skills. For Graduate Students only.

**NSCI 6450 Genome Biology (3)**

Genome-level science is changing the pace of biomedical research and medicine. This course will examine how whole genomes, transcriptomes, and proteomes are studied, and what we are learning about the biology of multiple organisms using these novel techniques. Epigenetics, genomics, and proteomics will be covered in the context of disease and the development of novel therapeutics. NOTE: Cross-listed as CELL/NSCI 4450/ 6450/ 7450.

**Prerequisite(s):** NSCI 4370 or CELL 3030.

**NSCI 6530 Psychopharmacology (3)**

An introduction to the effects of psychoactive agents on the nervous system. Lectures emphasize the mechanisms by which drugs regulate neurotransmitter systems to alter psychological and physical states. Open to graduate students. Open to undergraduates by petition who plan to transfer credit in Psychopharmacology to the 4+1 Program in Neuroscience.

**NSCI 6550 Synaptic Organization of the Brain (3)**

The goal of this course is to discuss and understand functional connections within and between areas of the brain to lead to a greater understanding of brain function and behavior. We will focus on limbic and memory systems. A strong emphasis will be placed on in-class discussions and student presentations to enhance critical thinking and oral presentation skills.

**Prerequisite(s):** CELL 3310 or NSCI 3310.

**NSCI 6660 Special Topics (1-3)**

Courses offered by visiting professors or permanent faculty primarily for graduates. For description, consult department.

**Maximum Hours:** 99

**NSCI 6661 Special Topics in NSCI (0-3)**

Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 6665 Special Topics Lab (1-3)**

Special Topics Lab.

**NSCI 6730 Neurodevelopment and Disease (3)**

The assembly of a functional nervous system is one of the most complex developmental processes in nature. This course provides advance knowledge on the mechanisms controlling nervous system development, at the cellular, circuit, and functional levels, and how failure on these mechanisms underlie neurodevelopmental disorders. Also, this course will introduce the student to most current techniques and research topics on neurodevelopment.

**NSCI 6900 Graduate NSCI Internship (1-3)**

Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 6940 Transfer Coursework (0-20)**

Transfer coursework at the 6000 level. Departmental approval required.

**Maximum Hours:** 99

**NSCI 7030 Cognitive Neuroscience (3)**

This course provides an introduction to the study of human behavior and cognition using neuroscience methods. The course will describe methods used to study human systems neuroscience and examine the neural basis of perception, attention, memory, language, motor control, and emotions.

**Prerequisite(s):** PSYC 7090.

**NSCI 7100 Special Projects In NSCI (1-3)**

Individual studies in a selected field with approval of instructor and advisor. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 7110 Graduate Neuroscience I (3)**

An advanced survey of cellular neuroscience team-taught by members of the Tulane Neuroscience Program faculty. Topics covered include, among others: neuronal electrogenic properties, synaptic transmission and neuromodulation, signal transduction, neurotransmitter systems, synaptic plasticity, blood-brain barrier, glia, and neuropsychiatric disorders. The objective of the course is to achieve a fluency in neuroscience that will provide a foundation for pursuing further graduate-level neuroscience study and research. Restrictions: Open only to graduate students in Neuroscience

**NSCI 7120 Graduate Neuroscience II (3)**

This course is concerned with the structure and function of the human nervous system. In addition to lectures, this course provides hands-on examination of neuroanatomical structures. Most neuroscience research requires a working knowledge of the structural components of the nervous system as the basis of understanding conceptual aspects of nervous system function. This course is designed to provide a clear and concise account of the anatomy of the human nervous system in sufficient detail to understand the main functions and common disorders which impact the nervous system. This method will demonstrate how knowledge of neuroanatomy can aid in understanding clinical symptoms and emphasizes those areas of neuroanatomy which are particularly relevant to human neurological disorders. In addition, this course will focus on some broad aspects of human neuroscience and how they are rooted in the structure of the nervous system. Restrictions: Open only to graduate students in Neuroscience.

**Prerequisite(s):** NSCI 7110, CELL 6310 or NSCI 6310.

**NSCI 7130 Research Rotations (3)**

First-year doctoral students in Neuroscience complete research rotations in three different laboratories lead by faculty members of the Tulane Brain Institute before placement in a permanent laboratory to pursue doctoral training. The research objectives of each rotation are outlined by the supervising faculty member at the beginning of the rotation, typically 6-8 weeks in length. Three credits are earned for the first research rotation completed during the fall semester in the doctoral program and three additional credits are earned for the two research rotations completed during the spring semester. Course may be repeated 2 times for credit. Restrictions: Open only to first-year doctoral students in Neuroscience

**Course Limit:** 2

**NSCI 7140 Scientific Communications (3)**

This course will cover fundamental principles of scientific communication. The course will be workshop-based, with students creating communication products and receiving peer and instructor feedback. Topics include fellowship grant writing, oral presentations, poster presentations, figure making, and public engagement.

**NSCI 7240 College Teaching Pedagogy (3)**

The objective of Teaching Pedagogy is to provide a structured learning experience for doctoral students in Psychology and Neuroscience to facilitate their preparation to teach at the collegiate level and to increase their competitiveness on the job market. The course focuses on strategies and techniques to teach undergraduate and graduate courses in Psychology and Neuroscience.

**NSCI 7241 College Teaching Practicum (1-4)**

College Teaching Practicum allows doctoral students in Psychology and Neuroscience to design, prepare, and team-teach a section of an undergraduate course in their areas of expertise. Students receive supervision and mentoring based on classroom observations by Dr. Dohanich and other faculty members. Each student enrolled in the course teaches approximately 25% of an undergraduate course. Final grades are based on the effectiveness of teaching as evaluated by Dr. Dohanich using the attached rubric provided the CELT Peer Observation Program. The College Teaching Pedagogy course (PSYC/NSCI 7240) is the mandatory pre-requisite course for College Teaching Practicum.

**NSCI 7260 Graduate Communications (3)**

In today's competitive science market place, effective communication can be THE deciding factor in obtaining postdoctoral fellowships, faculty positions or alternative career options, as well as in getting grants funded and manuscripts published. Deliberate practice of these skills is therefore critical for graduate level science trainees. This course will involve extensive discussion and practice of oral and written communication. By the end of the semester, students will have prepared a draft of a NIH F-31 proposal, similar to that required for qualifying exams and will receive input on the clarity, rigor, format, grammar, and writing style of this document. This course is open to Ph.D. students only, and is recommended to students in their 4th semester of graduate study.

**NSCI 7450 Genome Biology (3)**

Genome-level science is changing the pace of biomedical research and medicine. This course will examine how whole genomes, transcriptomes, and proteomes are studied, and what we are learning about the biology of multiple organisms using these novel techniques. Epigenetics, genomics, and proteomics will be covered in the context of disease and the development of novel therapeutics. NOTE: Cross-listed as CELL/NSCI 4450/ 6450/ 7450.

**NSCI 7660 Special Topics (1-3)**

**Maximum Hours:** 99

**NSCI 7940 Transfer Credit-Grad (1-3)**

Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 7980 Research In Neuroscience-PhD (1-9)**

Individual research supervised by faculty.

**Maximum Hours:** 99

**NSCI 7981 Research in Neuroscience -MA (1-9)**

Individual research supervised by faculty. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 9980 Master's Thesis Research (0-3)**

Research toward completion of a masters degree. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99

**NSCI 9990 Dissertation Research (0-3)**

Research toward completion of a doctoral degree. Course may be repeated up to unlimited credit hours.

**Maximum Hours:** 99