**NEUROSCIENCE (NRSC)**

**Courses**

**NRSC 2100 (4) Introduction to Neuroscience**
Provides an introduction to fundamental concepts in neuroscience. The goal of this first course is to provide a strong foundation in neurobiology-cell biology, physiology of the neuronal membrane, interneuronal communication, neurotransmission, gross anatomy, and how the brain develops. Students will also learn principles of sensory systems functions. Recitation will reinforce lecture concepts through discussion of current research.

**Requisites:** Requires prerequisite courses of MCDB 1111 or MCDB 1150 or EBIO 1210 (minimum grade C-).

**NRSC 2101 (1-4) Topics in Neuroscience**
Provides students with the opportunity to focus on a specific area of Neuroscience in depth. Instructor consent required.

**Repeatable:** Repeatable for up to 6.00 total credit hours.

**NRSC 2200 (2) Laboratory Techniques in Neuroscience**
Introduces students to many basic and essential laboratory skills in neuroscience research. Students will learn experimental methods and perform experiments depicting principles in neurophysiology, neuroanatomy, neurochemistry, and the fundamentals of neuroimaging techniques.

**Requisites:** Requires a prerequisite course of NRSC 2100 (minimum grade C-). Restricted to Neuroscience (NRSC) majors only.

**Grading Basis:** Letter Grade

**NRSC 4011 (1-3) Senior Thesis**
Critically reviews topics in neuroscience research, scholarly analysis of a major neuroscience issue, and/or empirical research project. See the neuroscience director for further information.

**NRSC 4015 (3) Affective Neuroscience**
Experiencing and learning from affect—emotional value—is a fundamental part of the human experience. When people start thinking of brains as computers, research on emotion fell by the wayside. Recently however, this has changed, and there is an explosion of work on the brain mechanisms of affective value. Covers recent advances in understanding the emotional brain.

**Equivalent - Duplicate Degree Credit Not Granted:** NRSC 5015

**Requisites:** Requires a prerequisite course of PSYC 2012 or NRSC 2100 (minimum grade C-). Restricted to students with 57-180 credits (Juniors or Seniors).

**NRSC 4021 (3) Neurobehavior**
Provides a comprehensive treatment of how the brain acquires, stores, and retrieves memories. To do this we will consider (a) the methods used to address these issues, (b) what we know about how brain systems are organized to support memories of different types, and (c) the synaptic mechanisms that are involved.

**Equivalent - Duplicate Degree Credit Not Granted:** NRSC 5032

**Requisites:** Requires a prerequisite course of PSYC 2012 or PSYC 4052 or NRSC 2100 or NRSC 4052 (minimum grade C-). Restricted to students with 57-180 credits (Juniors or Seniors).

**Additional Information:** Departmental Category: Biological

**NRSC 4052 (4) Behavioral Neuroscience**
This advanced course the anatomy and physiology of the central nervous system in detail, and applies that understanding to the visual, auditory, and sensorimotor systems, demonstrating how the anatomy and physiology of the nervous system can be used to explain behavior. The laboratory uses live animals and computer simulations.

**Equivalent - Duplicate Degree Credit Not Granted:** NRSC 5052 and PSYC 4052 and PSYC 5052

**Requisites:** Requires a prerequisite course of PSYC 2012 or NRSC 2100 and one of the following sequences: EBIO 1210 and EBIO 1220 or CHEM 1113 and CHEM 1133 or PHYS 1010 and 1020 or PHYS 2010 and PHYS 2020 (all minimum grade C-).

**Additional Information:** Departmental Category: Biological

**NRSC 4062 (3) The Neurobiology of Stress**
Provides an introduction to the concept of stress and the physiological systems involved. Factors modulating stress vulnerability versus resilience, and stress interactions with other systems with health relevance will be explored. Emphasis will be placed on current research on brain mechanisms. Formerly PSYC 4062.

**Requisites:** Requires prerequisite course of PSYC 2012 or NRSC 2100 (minimum grade C-). Restricted to students with 57-180 credits (Junior or Senior).

**Recommended:** Prerequisite a strong foundation and interest in biological psychology, neuroscience, and physiology.

**Additional Information:** Departmental Category: Biological

**NRSC 4072 (3) Clinical Neuroscience: A Clinical and Pathological Perspective**
Provides a review of the anatomy and physiology of the nervous system and then explores how alterations in these systems can result in neurologic or psychiatric disorders. Emphasizes pathological neuroanatomy, neurophysiology and neuropharmacology, which is essential for understanding problems related to health and disease.

**Equivalent - Duplicate Degree Credit Not Granted:** NRSC 5072

**Requisites:** Requires a prerequisite course of PSYC 2012 or PSYC 4052 or NRSC 2100 or NRSC 4052 and one of the following sequences of courses: EBIO 1210 and 1220 or MCDB 1150 and 2150 or MCDB 1150 and EBIO 1220 or EBIO 1210 and MCDB 2150 (all minimum grade C-).

**Additional Information:** Departmental Category: Biological

**NRSC 4082 (3) Neural Circuits of Learning and Decision Making**
Provides an in-depth survey of the neural mechanisms of learning, motivated behavior and decision making. Analysis will focus on the interaction of neural circuits underlying these processes with particular attention to the cellular, molecular and information-processing aspects of identified pathways and considered into the context learning-based and neuroeconomic models of choice.

**Equivalent - Duplicate Degree Credit Not Granted:** NRSC 5082

**Requisites:** Requires prerequisite course of NRSC 2100 or NRSC 4052 (minimum grade C-).

**Grading Basis:** Letter Grade

**NRSC 4092 (3) Behavioral Neuroendocrinology**
Provides an introduction to neuroendocrinology with a focus on the interaction between hormones and brain function.

**Equivalent - Duplicate Degree Credit Not Granted:** NRSC 5092

**Requisites:** Requires a prerequisite course of NRSC 2100 (minimum grade C-). Restricted to students with 57-180 credits (Junior or Senior) Psychology (PSYC) or Neuroscience (NRSC) majors only.

**Additional Information:** Departmental Category: Biological
NRSC 4132 (3) Neuropharmacology
Study of drug action within the central nervous system. This course is designed to provide a fundamental understanding of the neurobiological and neurochemical mechanisms of drug action. Topics covered include the following: 1) principles of pharmacology; 2) brain neurotransmitter systems; 3) biochemical basis of psychiatric disorders and their pharmacological treatment.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 5132
Requisites: Requires a prerequisite course of NRSC 2100 (minimum grade C-).
Additional Information: Departmental Category: Biological

NRSC 4155 (4) Cognitive Neuroscience/Neuropsychology
Introduction to cognitive neuroscience and neuropsychology. Provides a survey of the neuropsychological underpinnings for a wide range of cognitive functions: vision, object recognition, attention, language, memory and executive function. One lab per week.
Equivalent - Duplicate Degree Credit Not Granted: PSYC 4155
Requisites: Requires a prerequisite course of PSYC 2012 or NRSC 2100 and one of the following: PSYC 2111 or MATH 2510 or IPHY 2800 or EBIIO 1010 or BCOR 1020 or ECON 3818 (all minimum grade C-).

NRSC 4542 (3) The Neurobiology of Mental Illness
Provides in depth study of what is known concerning the neurobiology of mental illnesses, with a focus on depression and anxiety. Consideration will be given to both animal models and human work, with neurochemical, circuitry level, and neuroinflammatory processes to be highlighted. There will be discussion of the intricacies of determining the effectiveness of pharmacological treatments, and what the implications of such treatments might be.
Requisites: Requires prerequisite courses of PSYC 2012 or NRSC 2100 and one of the following: PSYC 2111 or MATH 2510 or IPHY 2800 or EBIIO 1010 or BCOR 1020 or ECON 3818 (all minimum grade C-).
Additional Information: Departmental Category: Biological

NRSC 4545 (3) Neurobiology of Addiction
Covers an intensive survey and synthesis of recent findings contributing to our understanding of the neurobiological basis of addiction. Analysis of both drug and behavioral addictions will be made at the molecular, cellular and neurocircuity levels and synthesized into models utilizing common themes between various addictions and contributing pathologies.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 5545
Requisites: Requires prerequisite courses of NRSC 4132 (minimum grade C-).

NRSC 4561 (2-3) Special Topics in Neuroscience
Presents and analyzes special interest topics from the broad and interdisciplinary field of neuroscience. The instructor determines the content of a particular section. Repeatable for up to 6.00 total credit hours.
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Requires prerequisite course of NRSC 2100 (minimum grade C-). Restricted to Neuroscience (NRSC) majors only.
Grading Basis: Letter Grade

NRSC 4841 (1-3) Independent Study in Neuroscience
Pass/Fail only.
Repeatable: Repeatable for up to 8.00 total credit hours.
Requisites: Restricted to students with 57-180 credits (Junior or Senior) Neuroscience (NRSC) majors only.
Grading Basis: Pass/Fail

NRSC 4911 (3) Teaching of Neuroscience
Offers a rich experience for students to develop and organize curriculum to complement the Neuroscience core courses. Offers a valuable teaching experience utilizing computational modeling to simulate experimental results. Any Neuroscience curriculum course, such as Intro to Neuroscience I or II, Neuropharmacology, Neurobiology of Learning and Memory or Behavioral Neuroscience may be appropriate with instructor consent.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 5911

NRSC 5015 (3) Affective Neuroscience
Experiencing and learning from affect–emotional value–is a fundamental part of the human experience. When people started thinking of brains as computers, research on emotion fell by the wayside. Recently however, this has changed, and there is an explosion of work on the brain mechanisms of affective value. Covers recent advances in understanding the emotional brain.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4015
Requisites: Restricted to graduate students only.

NRSC 5032 (3) Neurobiology of Learning and Memory
Provides a comprehensive treatment of how the brain acquires, stores, and retrieves memories. To do this we will consider (a) the methods used to address these issues, (b) what we know about how brain systems are organized to support memories of different types, and (c) the synaptic mechanisms that are involved.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4032
Requisites: Restricted to graduate students only.
Additional Information: Departmental Category: Biological

NRSC 5052 (4) Behavioral Neuroscience
This advanced course the anatomy and physiology of the central nervous system in detail, and applies that understanding to the visual, auditory, and sensorimotor systems, demonstrating how the anatomy and physiology of the nervous system can be used to explain behavior. The laboratory uses live animals and computer simulations.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4052 and PSYC 4052 and PSYC 5052
Requisites: Restricted to graduate students only.
Additional Information: Departmental Category: Biological

NRSC 5072 (3) Clinical Neuroscience: A Clinical and Pathological Perspective
Provides a review of the anatomy and physiology of the nervous system and then explores how alterations in these systems can result in neurologic or psychiatric disorders. Emphasizes pathological neuroanatomy, neurophysiology and neuropharmacology, which is essential for understanding problems related to health and disease.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4072
Requisites: Restricted to graduate students only.
Additional Information: Departmental Category: Biological

NRSC 5082 (3) Neural Circuits of Learning and Decision Making
Provides an in-depth survey of the neural mechanisms of learning, motivated behavior and decision making. Analysis will focus on the interaction of neural circuits underlying these processes with particular attention to the cellular, molecular and information-processing aspects of identified pathways and considered into the context learning-based and neuroeconomic models of choice.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4082
Requisites: Restricted to graduate students only.
Grading Basis: Letter Grade
NRSC 5092 (4) Behavioral Neuroendocrinology
Provides an introduction to neuroendocrinology with a focus on the interaction between hormones and brain function. In addition to attending and meeting all the requirements for the lecture portion of the course, graduate students meet for an additional hour each week to discuss in depth behavioral neuroendocrinology relevant research articles.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4092
Requisites: Restricted to graduate students only.
Additional Information: Departmental Category: Biological

NRSC 5100 (2-5) Introduction to Neuroscience I
Provides an intensive introduction to the principles of neuroscience, initially covering the detailed neuroanatomy of human forebrain, hindbrain, and spinal cord. This is followed by neurophysiology with a concentration on the electrophysiology of neural systems. The basics of neuroanatomy and neurophysiology with a concentration on the electrophysiology are then applied to an examination of the structure and function of visual, auditory, and sensorimotor systems in animal and man.
Repeatable: Repeatable for up to 5.00 total credit hours.
Requisites: Restricted to graduate students only.
Recommended: Requisite, restricted to Interdepartmental Neuroscience Program or instructor consent required.

NRSC 5110 (3) Introduction to Neuroscience II
Provides an intensive interdisciplinary introduction to the principles of neuroscience. It is a sequel to NRSC 5100. Provides a detailed overview of neurochemistry, neurodevelopment, neuromotor control, neurogenetics, and cognitive neuroscience. Open to undergraduates with instructor permission.
Requisites: Requires a prerequisite course of NRSC 5100 or NRSC 4052 or PSYC 4052 (minimum grade C-).

NRSC 5132 (3) Neuropharmacology
Study of drug action within the central nervous system. This course is designed to provide a fundamental understanding of the neurobiological and neurochemical mechanisms of drug action. Topics covered include the following: 1) principles of pharmacology; 2) brain neurotransmitter systems; 3) biochemical basis of psychiatric disorders and their pharmacological treatment.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4132
Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.
Requisites: Restricted to graduate students only.
Additional Information: Departmental Category: Biological

NRSC 5262 (3) Mammalian Neuroanatomy
Provides a detailed overview of peripheral and central nervous system connectional neuroanatomy targeted at delineating functional sensory, motor and motivational systems and the control of behavior and cognition. Emphasizes histological, anatomical and functional techniques employed in investigations of the nervous system. Formerly PSYC 5262.
Requisites: Requires a prerequisite course of NRSC 2100 or NRSC 5100 or NRSC 4052 or PSYC 4052 (minimum grade C-).
Additional Information: Departmental Category: Biological

NRSC 5545 (3) Neurobiology of Addiction
Covers an intensive survey and synthesis of recent findings contributing to our understanding of the neurobiological basis of addiction. Analysis of both drug and behavioral addictions will be made at the molecular, cellular and neurocircuitry levels and synthesized into models utilizing common themes between various addictions and contributing pathologies.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4545
Requisites: Restricted to graduate students only.

NRSC 5911 (3) Teaching of Neuroscience
Offers a rich experience for students to develop and organize curriculum to complement the Neuroscience core courses. Offers a valuable teaching experience utilizing computational modeling to simulate experimental results. Any Neuroscience curriculum course, such as Intro to Neuroscience I or II, Neuropharmacology, Neurobiology of Learning and Memory or Behavioral Neuroscience may be appropriate with instructor consent.
Equivalent - Duplicate Degree Credit Not Granted: NRSC 4911
Requisites: Restricted to graduate students only.

NRSC 6100 (2) Advances in Neuroscience Seminar
Designed for beginning graduate students interested in neuroscience. Students read, discuss, and evaluate the primary literature on a number of current topics in neuroscience as well as attend the seminar program in neuroscience.
Repeatable: Repeatable for up to 8.00 total credit hours.
Requisites: Restricted to graduate students only.

NRSC 6602 (1) Behavioral Neuroscience Professional Skills Development
Enrolled graduate students in the behavioral neuroscience program will be asked to prepare, present and receive feedback on scientific presentations of their own research or from review of a current research project.
Repeatable: Repeatable for up to 14.00 total credit hours.
Grading Basis: Letter Grade

NRSC 7102 (2-3) Topics in Neuroscience
Advanced seminar dealing with different specialized topics in neuroscience.
Repeatable: Repeatable for up to 9.00 total credit hours.
Requisites: Requires a prerequisite course of NRSC 5110 (minimum grade D-).

NRSC 7112 (3) Special Topics in Neuroscience I
Advanced seminar dealing with several different specialized topics in Neuroscience.
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
Requisites: Requires a prerequisite course of NRSC 5110 (minimum grade D-).

NRSC 7122 (3) Special Topics in Neuroscience II
Advanced seminar dealing with several different specialized topics in Neuroscience.
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
Requisites: Requires a prerequisite course of NRSC 5110 (minimum grade D-).
NRSC 7132 (3) Special Topics in Neuroscience III
Advanced seminar dealing with several different specialized topics in Neuroscience.
**Repeatability:** Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
**Requisites:** Requires a prerequisite course of NRSC 5110 (minimum grade D-).

NRSC 7142 (3) Special Topics in Neuroscience IV
Advanced seminar dealing with several different specialized topics in Neuroscience.
**Repeatability:** Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
**Requisites:** Requires a prerequisite course of NRSC 5110 (minimum grade D-).

NRSC 7152 (3) Special Topics in Neuroscience V
Advanced seminar dealing with several different specialized topics in Neuroscience.
**Repeatability:** Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
**Requisites:** Requires a prerequisite course of NRSC 5110 (minimum grade D-).