

NRSC - NEUROSCIENCE

NRSC 601/BIOL 627 Principles of Neuroscience I

Credits 3. 3 Lecture Hours.

Detailed introduction to the basic fundamentals of cellular and molecular neuroscience; topics include membrane potentials, action potential generation, and the mechanisms underlying synaptic transmission, as well as their molecular basis.

Prerequisites: Graduate classification or approval of instructor.

Cross Listing: BIOL 627/NRSC 601.

NRSC 602/BIOL 628 Principles of Neuroscience II

Credits 3. 3 Lecture Hours.

Fully integrated overview of nervous system organization and systems-level neurobiology; broad topics include sensory systems and sensory systems function, motor systems and neuromuscular function, central pattern generation and locomotion, homeostatic regulation, motivation, emotions, learning and memory, and circadian rhythms.

Prerequisites: Graduate classification or approval of instructor.

Cross Listing: BIOL 628/NRSC 602.

NRSC 603/VIBS 603 Neuroanatomy

Credits 4. 2 Lecture Hours. 6 Lab Hours.

Gross, developmental and microscopic anatomy of nervous system of selected laboratory and domestic animals.

Prerequisite: Approval of instructor.

Cross Listing: VIBS 603/NRSC 603.

NRSC 604/VIBS 604 Biomedical Neuroendocrinology and Endocrine Disorders

Credits 3. 3 Lecture Hours.

Gross and functional anatomy and endocrine functions of neuroendocrine systems, hypothalamus and pituitary. Neuroendocrine control of puberty, sexual behavior, menstruation, ovulation, pregnancy, labor, lactation, testis, thyroid, growth, stress, diabetes, obesity, sleep, memory, learning and aging and their disorders. Overview biosynthesis, transport and signaling of neuropeptides, prostaglandins, peptide and steroid hormones.

Prerequisite: Approval of instructor.

Cross Listing: VIBS 604/NRSC 604.

NRSC 605/VIBS 606 Neuroanatomical Systems

Credits 3. 3 Lecture Hours.

Emphasis on major neural systems that govern identifiable physiological functions, behavior and neurodegenerative disease; whole-brain anatomy is approached from a "systems" perspective, wherein components of defined functional systems are described in terms of their location, inputs and outputs, and physiological/behavioral significance in health and disease.

Prerequisite: Approval of instructor.

Cross Listing: VIBS 606/NRSC 605.

NRSC 606/PSYC 606 Learning

Credits 3. 3 Lecture Hours.

Procedural and theoretical issues in study of basic learning mechanisms in animals and humans, including Pavlovian and instrumental conditioning. Application of this work to other domains and relevant biological mechanisms also discussed.

Prerequisite: Graduate classification or approval of instructor.

Cross Listing: PSYC 606/NRSC 606.

NRSC 609/PSYC 609 Physiological Psychology

Credits 3. 2 Lecture Hours. 3 Lab Hours.

Current research and methodological procedures on physiological bases of sensation-perception, memory and learning, arousal-sleep-attention, emotions and motivation.

Prerequisite: Graduate classification or approval of instructor.

Cross Listing: PSYC 609/NRSC 609.

NRSC 611 Molecular Biology of Differentiation and Development

Credits 3. 3 Lecture Hours.

Major paradigms of eukaryotic gene regulation in terms of the role of gene expression during ontogeny and the effect of dysfunction in these processes on the neoplastic state.

NRSC 615/PSYC 615 Perceptual Processes

Credits 3. 3 Lecture Hours.

Complex sensory and perceptual phenomena with emphasis on the relationship between perception and motivation, cognition, creativity and instinctive/ethological; learning/experiential factors in higher level perceptual processes.

Prerequisite: Graduate classification or approval of instructor.

Cross Listing: PSYC 615/NRSC 615.

NRSC 616/VIBS 616 Advanced Developmental Neurotoxicology

Credits 3. 3 Lecture Hours.

Study of mechanisms of toxicity of substances potentially devastating to the developing brain and spinal cord including lead, mercury and other heavy metals, alcohol, nicotine (smoking), pesticides, flame retardants and others.

Prerequisite: Graduate classification or approval of instructor.

Cross Listing: VIBS 616.

NRSC 621/VIBS 621 Functional Neuroanatomy

Credits 4. 4 Lecture Hours.

A comprehensive review of the neuroanatomical determinants of function; rigorous neuroanatomical foundation relevant for research investigating changes in neural pathways and/or networks involved in sensory and motor functions, learning and memory, perception, selective attention, as well as recovery of function following brain damage.

Cross Listing: VIBS 621.

NRSC 633 Neuropsychopharmacology

Credits 4. 4 Lecture Hours.

Interaction of drugs and toxins with neurotransmitter systems with primary emphasis on mechanisms involving receptor function that impacts central nervous system integration.

Prerequisite: Approval of course coordinator.

NRSC 634/BIOL 634 Comparative Neurobiology

Credits 3. 3 Lecture Hours.

Cellular, molecular and systems neurobiology, together with neuroethology. A comparative approach to subject matter is stressed. Topics such as evolution of nervous systems and their diverse structure and complex functions are dealt with.

Cross Listing: BIOL 634/NRSC 634.

NRSC 635/BIOL 601 Biological Clocks

Credits 3. 3 Lecture Hours.

Introduction to the formal properties of biological rhythms; cellular and molecular bases for rhythmicity; temporal adaptations of organisms using clocks.

Prerequisites: Graduate classification or approval of instructor.

Cross Listing: BIOL 601/NRSC 635.

NRSC 636 Signaling in Behavior and Development**Credits 3. 3 Lecture Hours.**

Will focus on signaling pathways used in multicellular animals. In each lecture, major signaling pathways used in behavior, physiology, and development will be introduced at the molecular level, and then be discussed in the context of organismal biology.

Prerequisite: Graduate classification.**NRSC 640/VIBS 640 Neurobiology****Credits 1 to 5. 1 to 5 Lecture Hours.**

Biology of the mammalian central nervous system with emphasis on cellular and molecular interactions; contemporary research topics in areas such as neuron-glia interactions, neuroimmunology, neuroendocrinology, developmental neurobiology and neurogenetics; extensive readings from primary literature.

Prerequisites: Undergraduate or graduate cell biology, genetics and biochemistry or approval of instructor.**Cross Listing:** VIBS 640/NRSC 640.**NRSC 641 Principles of Neuropsychology****Credits 3. 3 Lecture Hours.**

Review of major areas of cognitive functioning including concentration, memory, language, visuospatial/construction skills and executive functions; review of neurobehavioral syndromes including dementia, epilepsy, head injury, stroke, drug toxicity, etc.; assessment of deficits associated with disorders.

Prerequisites: PSYC 624 or PSYC 627 or equivalent as approved by instructor.**NRSC 642/PSYC 642 Neuroimaging Data Analysis****Credits 3. 3 Lecture Hours.**

Physics of magnetic resonance imaging; experimental design for fMRI; linear and nonlinear image registration; data denoising; data filtering and smoothing; volume and surface methods; General Linear Models and multivariate approaches to subject-level data; mixed effects modeling, random effects modeling, permutation methods for linear models; functional connectivity.

Prerequisite: Graduate classification or approval of instructor; coursework in regression models recommended.**Cross Listing:** PSYC 642/NRSC 642.**NRSC 644/BIOL 644 Neural Development****Credits 3. 3 Lecture Hours.**

Classical and current research literature to explore the major events in the development of a nervous system, including topics ranging from neurogenesis to synapse information.

Prerequisite: Graduate classification.**Cross Listing:** BIOL 644/NRSC 644.**NRSC 649/PSYC 649 Seminar in Behavioral Neuroscience****Credits 3. 3 Lecture Hours.**

Behavioral neuroscience; including behavioral pharmacology, neuropharmacology, methods and techniques, drug reinforcement, behavioral toxicology, pain perception and ingestive behavior. May be repeated up to three times for credit.

Prerequisite: Graduate classification or approval of instructor.**Cross Listing:** PSYC 649/NRSC 649.**NRSC 650/PSYC 650 Clinical Psychopharmacology****Credits 3. 3 Lecture Hours.**

Survey of topics in clinical psychopharmacology, including pharmacodynamics, major neurotransmitter systems, and therapeutic applications and limitations.

Prerequisite: Graduate classification or approval of instructor.**Cross Listing:** PSYC 650/NRSC 650.**NRSC 655/PSYC 655 Foundations in Cognitive Neuroscience****Credits 3. 3 Lecture Hours.**

Experimental design in cognitive neuroscience; basics of cognitive neuroscience methods; perception versus imagery; attention; motor control; short-term and long-term memory; volition and consciousness; executive function; decision making; affect and psychopathology; social cognition.

Prerequisite: Graduate classification or approval of instructor.**Cross Listing:** PSYC 655/NRSC 655.**NRSC 671/PSYC 671 Experimental Design for Behavioral Scientists****Credits 3. 2 Lecture Hours. 3 Lab Hours.**

Intensive practical study of designs of special interest to behavioral scientists; repeated measures designs.

Prerequisites: Approval of instructor.**Cross Listing:** PSYC 671/NRSC 671.**NRSC 681 Seminar****Credits 1 to 3. 1 to 3 Other Hours.**

Presentation of current research in neuroscience and related areas. May be repeated for credit.

Prerequisite: Graduate classification.**NRSC 685 Directed Studies****Credits 1 to 4. 1 to 4 Other Hours.**

Directed individual study conducted under the direction of a member of the faculty of neuroscience of selected problems in the field of neuroscience.

Prerequisites: Graduate classification and approval of Texas A&M Institute for Neuroscience Chair.**NRSC 689 Special Topics in...****Credits 1 to 4. 1 to 4 Lecture Hours.**

Selected topics in an identified area of neuroscience. May be repeated for credit.

Prerequisite: Graduate classification.**NRSC 690 Theory of Research****Credits 3. 3 Lecture Hours.**

Theory and design of research related to current biomedical problems especially those involving study of animal disease; philosophical perspectives underlying historical advances in research pertaining to the study, prevention and treatment of disease. Must be taken on a satisfactory/unsatisfactory basis.

Prerequisite: Graduate classification.**Cross Listing:** VIBS 690 and VTPP 690.**NRSC 691 Research****Credits 1 to 23. 1 to 23 Other Hours.**

Research in neuroscience conducted under the direction of a member of the faculty of neuroscience for thesis or dissertation credit.

Prerequisite: Graduate classification and approval of instructor.**NRSC 698/BIOL 698 Behavior, Genes, and Evolution****Credits 3. 3 Lecture Hours.**

Introduces an integrative approach to the study of animal behavior, complementing evolutionary and ecological perspectives with molecular and genetic approaches and methodologies.

Prerequisite: Graduate classification.**Cross Listing:** BIOL 698/NRSC 698.