NEUROSCIENCE (NEUR)

NEUR 238 - SPECIAL TOPICS
Short Title: SPECIAL TOPICS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Internship/Practicum, Laboratory, Lecture, Seminar, Independent Study
Credit Hours: 1-4
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Lower-Level
Description: Topics and credit hours may vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.

NEUR 306 - CONCEPTS OF LEARNING AND MEMORY
Short Title: CONCEPT LEARNING&MEMORY
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: This course is designed to introduce students to the field of learning and memory. This field has exploded in the last few years with the introduction of new techniques, new approaches, and new concepts. The course will introduce the student to classical and modern concepts of learning and memory across all levels at which learning and memory is studied, including behavioral, anatomical, cellular, molecular and genetic levels of analysis. The basic concepts of learning and memory will also be related to known diseases of learning and memory. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 506. Mutually Exclusive: Cannot register for NEUR 306 if student has credit for NEUR 506.
Course URL: www.ruf.rice.edu/~neurosci (http://www.ruf.rice.edu/~neurosci/)

NEUR 310 - INDEPENDENT RESEARCH FOR NEUROSCIENCE UNDERGRADUATES
Short Title: IND RES FOR NEUR UNDERGRADS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Research
Credit Hours: 1-4
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: Information on how to find a lab, apply to the course and what to expect can be found at www.neur310.rice.edu. This course gives credit for independent research in Rice Neuroscience faculty laboratories (or other Texas Medical Center laboratories.) Students spend at least 3 hours per week in the laboratory for each semester hour of credit. If taken for 3 or more hours, counts as one required 300+ level lab course within the neuroscience major. Can be repeated once for 3 hours or more to count towards an elective credit within the neuroscience major. Requires a proposal abstract, weekly reports, and a final project that summarizes your activities in the lab. Students wishing to perform their research in an off-campus lab must submit a completed application to the NEUR 310 instructor at least 2 weeks prior to the start of classes. Students are strongly advised to secure research advisors and register for the class well in advance of the start of classes. Repeatable for Credit. Suggested Pre-Reqs: CMOR 220 and BIOS 212; these are not required, but skills learned in these courses will help make you more valuable to labs when you apply. Instructor Permission Required. Recommended Prerequisite(s): CMOR 220 and BIOS 212 Repeatable for Credit.

NEUR 321 - ANALYSES OF NEURONAL FUNCTION
Short Title: ANALYSES OF NEURONAL FUNCTION
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: This course will cover all basic aspects of the intrinsic electrophysiological properties of neurons and of synaptic transmission. It will also introduce principles of synaptic integration and plasticity. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 521. Mutually Exclusive: Cannot register for NEUR 321 if student has credit for NEUR 521.

NEUR 322 - BRAIN CELL BIOLOGY AND DEVELOPMENT
Short Title: BRAIN CELL BIOL & DEVELOPMENT
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: Anatomy and development of the nervous system is designed to introduce the student to the basic structure and function of the nervous system, and describe its rough development. It is intended for first year students without any specific advanced knowledge of neuroscience. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 522. Mutually Exclusive: Cannot register for NEUR 322 if student has credit for NEUR 522. Repeatable for Credit.

NEUR 323 - GENETICS FOR NEUROSCIENCE
Short Title: GENETICS FOR NEUROSCIENCE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: This course integrates genetics into neuroscience and is intended to teach neuroscience students how to tackle neurobiological problems using genetic strategies and tools. In the introduction, students will be exposed to the basic concepts in genetics. Strategies using model organisms from C.elegans to mice will be covered. Finally we will discuss genetic approaches in humans. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 523. Mutually Exclusive: Cannot register for NEUR 323 if student has credit for NEUR 523.

NEUR 362 - COGNITIVE NEUROSCIENCE: EXPLORING THE LIVING BRAIN
Short Title: COGNITIVE NEUROSCIENCE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Distribution Group: Distribution Group II
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Prerequisite(s): PSYC 203
Description: Survey of theory and research on how mental processes are carried out by the human brain, with an emphasis on relating measures of brain activity to cognitive functioning, methods surveyed included electro physiological recording techniques, functional imaging techniques and methods that involve lessoning or disrupting neural activity. Cross-list: PSYC 362.

NEUR 364 - COGNITIVE NEUROSCIENCE LAB
Short Title: COGNITIVE NEUROSCIENCE LAB
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Laboratory
Credit Hour: 1
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Prerequisite(s): PSYC 362 (may be taken concurrently) or NEUR 362 (may be taken concurrently)
Description: The objective is to equip the students of PSYC/NEUR 362 the tools on how to apply cognitive neuroscience techniques to health or clinical topics and to investigate sensorimotor and cognitive measures in a human model. The prereq may be taken the same semester as this class. Instructor Permission Required. Cross-list: PSYC 364. Graduate/Undergraduate Equivalency: NEUR 564. Mutually Exclusive: Cannot register for NEUR 364 if student has credit for NEUR 564.

NEUR 376 - NEUROBIOLOGY OF DISEASE
Short Title: NEUROBIOLOGY OF DISEASE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: Covers some of the most important disorders of nervous system function. Exposes students to incidence, clinical manifestations, pathophysiology, current scientific models of causes/mechanisms of disorders of the adult brain: stroke, Parkinson's disease, Alzheimer's disease, seizure disorders, brian tumors, multiple sclerosis, amyotrophic lateral sclerosis, brain/spinal cord injury, addiction, depression, and schizophrenia. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 576. Mutually Exclusive: Cannot register for NEUR 376 if student has credit for NEUR 576.

NEUR 380 - FUNDAMENTAL NEUROSCIENCE SYSTEMS
Short Title: NEUROSYSTEMS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: This course will provide a broad overview of the brain's neural systems that subserve perception, learning, and behavior. The course will be highly integrative with thematic content including functional organization of the nervous system, neural encoding and decoding, sensory systems, motor systems, and high-level concept processing. Cross-list: PSYC 380. Recommended Prerequisite(s): PSYC 101.

NEUR 381 - PHYSIOLOGY OF VISUAL SYSTEM
Short Title: PHYSIOLOGY OF VISUAL SYSTEM
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: Course provides an advanced level and comprehensive coverage of the physiology of the retina and visual cortex. Useful for graduate students and postdocs in neuroscience, physiology, biochemistry, cell biology, and molecular genetics who are interested in visual information processing and brain function. Offered even years only. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 580. Mutually Exclusive: Cannot register for NEUR 381 if student has credit for NEUR 580.

NEUR 383 - INTRODUCTION TO NEUROENGINEERING: MEASURING AND MANIPULATING NEURAL ACTIVITY
Short Title: INTRO TO NEUROENGINEERING
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Prerequisite(s): (PHYS 101 or PHYS 111 or PHYS 125 or PHYS 141) and (PHYS 102 or PHYS 112 or PHYS 126 or PHYS 142) and (COMP 140 or CAAM 210 or CMOR 220)
Description: This course will serve as an introduction to quantitative modeling of neural activity and the methods used to stimulate and record brain activity. Cross-list: BIOE 380, ELEC 380.

NEUR 401 - UNDERGRADUATE HONORS RESEARCH
Short Title: UNDERGRADUATE HONORS RESEARCH
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Research
Credit Hours: 5
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Prerequisite(s): NEUR 310
Description: The Neuroscience Honors Research Program is a suite of courses offering our seniors and advanced juniors the opportunity to perform a two-semester, individual research project in a research laboratory in Neuroscience. Students having performed NEUR 310 research in an off-campus laboratory in the Texas Medical Center will also be eligible to apply to perform honors research in that laboratory. The Honors Research Program courses function as a set and must all be taken in the same academic year. Registration for any of the courses requires a commitment to register for all three. Requires at least 15 hours of laboratory research per week, a proposal (revised from application), monthly reports, and a formal progress report (abstract, aims, progress toward aims, discussion of results, plans for the spring semester). Prerequisites: strong performance in NEUR 310. Research professor recommendation required. Application for admission required. Instructor Permission Required. Repeatable for Credit.

NEUR 402 - UNDERGRADUATE HONORS RESEARCH
Short Title: UNDERGRADUATE HONORS RESEARCH
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Research
Credit Hours: 5
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Prerequisite(s): NEUR 310 and NEUR 401
Description: The Neuroscience Honors Research Program is a suite of courses offering our seniors and advanced juniors the opportunity to perform a two-semester, individual research project in a research laboratory in Neuroscience. Students having performed NEUR 310 research in an off-campus laboratory in the Texas Medical Center will also be eligible to apply to perform honors research in that laboratory. Registration for any of the courses requires a commitment to register for all three. Requires at least 15 hours of laboratory research per week, monthly reports, a thesis (substantial research paper) and a poster presentation at the Rice Undergraduate Research Symposium. Instructor Permission Required. Repeatable for Credit.

NEUR 411 - NEUROLINGUISTICS
Short Title: NEUROLINGUISTICS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: Study of language and the brain. Includes localization of speech, language, and memory functions, hemispheric dominance, pathologies of speech and language associated with brain damage, and hypotheses of the representation and operation of linguistic information in the cortex. Cross-list: LING 411.

NEUR 415 - THEORETICAL NEUROSCIENCE: FROM CELLS TO LEARNING SYSTEMS
Short Title: THEORETICAL NEUROSCIENCE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Prerequisite(s): (MATH 102 or MATH 106) and (MATH 211 or MATH 220 or CMOR 304)
Description: This course presents the theoretical foundations of cellular and systems neuroscience from a quantitative perspective, integrating mathematical modeling, computational tools, and data analysis. Students will develop and apply differential equations, probabilistic models, and reverse correlation techniques to analyze neural activity and synaptic interactions. The course combines traditional lectures with student-led presentations in a seminar-style format. Coursework includes problem sets, coding-based assignments, and group projects. MATLAB or Python proficiency is strongly recommended. Cross-list: CMOR 415, ELEC 488. Graduate/Undergraduate Equivalency: NEUR 615. Recommended Prerequisite(s): This course requires coding in MATLAB or Python. As such, COMP 140, CMOR 220 or some equivalent coding experience is highly recommended. Mutually Exclusive: Cannot register for NEUR 415 if student has credit for NEUR 615.

NEUR 416 - NEURAL COMPUTATION
Short Title: NEURAL COMPUTATION
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: How does the brain work? Understanding the brain requires sophisticated theories to make sense of the collective actions of billions of neurons and trillions of synapses. Word theories are not enough; we need mathematical theories. The goal of this course is to provide an introduction to the mathematical theories of learning and computation by neural systems. These theories use concepts from dynamical systems (attractors, oscillations, chaos) and concepts from statistics (information, uncertainty, inference) to relate the dynamics and functions of neural networks. We will apply these theories to sensory computation, learning and memory, and motor control. Students will learn to formalize and mathematically answer questions about neural computations, including "what does a network compute?", "how does it compute?", and "why does it compute that way?" Prerequisites: knowledge of calculus, linear algebra, and probability and statistics. Cross-list: CMOR 416, ELEC 489.

NEUR 441 - MOLECULAR MEMBRANE BIOLOGY
Short Title: MOLECULAR MEMBRANE BIOLOGY
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Course Level: Undergraduate Upper-Level
Prerequisite(s): BIOS 341
Description: Molecular mechanisms of eukaryotic cell function. Emphasis on detailed, in-depth mechanistic analysis of specific topics related to compartmentalization and membrane related events. Cross-list: BIOS 441. Mutually Exclusive: Cannot register for NEUR 441 if student has credit for BIOS 555.

NEUR 477 - SPECIAL TOPICS
Short Title: SPECIAL TOPICS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Internship/Practicum, Intensive Learning Experience, Laboratory, Lecture, Seminar, Activity Course, Independent Study, Lecture/Laboratory, Research, Studio
Credit Hours: 1-4
Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.
Course Level: Undergraduate Upper-Level
Description: Topics and credit hours may vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.

NEUR 501 - ADVANCED COGNITIVE NEUROSCIENCE: ATTENTION AND PERCEPTION
Short Title: ATTENTION AND PERCEPTION
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Overview of neuropsychological and cognitive neuroscience approaches to higher mental functions including sensation and perception, attention, motor control, and neuroplasticity. Other topics include basic neuroanatomy, experimental and clinical investigative methods, and the historical and philosophical context of contemporary neuroscience. Cross-list: PSYC 575. Mutually Exclusive: Cannot register for NEUR 501 if student has credit for NEUR 301.
Course URL: neuroscience.rice.edu (http://neuroscience.rice.edu)

NEUR 502 - ADVANCED COGNITIVE NEUROSCIENCE: HIGHER MENTAL FUNCTIONS
Short Title: HIGHER MENTAL FUNCTIONS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Overview of neuropsychological and neuroimaging approaches to higher mental functions, including language, memory, executive functions, reasoning, and numerical processing. Cross-list: PSYC 576. Mutually Exclusive: Cannot register for NEUR 502 if student has credit for NEUR 302.
Course URL: neuroscience.rice.edu (http://neuroscience.rice.edu)

NEUR 506 - CONCEPTS OF LEARNING AND MEMORY
Short Title: CONCEPT LEARNING&MEMORY
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: This course is designed to introduce graduate students to the field of learning and memory. This field has exploded in the last few years with the introduction of new techniques, new approaches, and new concepts. The course will introduce the student to classical and modern concepts of learning and memory across all levels at which learning and memory is studied, including behavioral, anatomical, cellular, molecular and genetic levels of analysis. The basic concepts of learning and memory will also be related to known diseases of learning and memory. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 306. Mutually Exclusive: Cannot register for NEUR 506 if student has credit for NEUR 306.
Course URL: www.ruf.rice.edu/~neurosci (http://www.ruf.rice.edu/~neurosci/)

NEUR 521 - ANALYSES OF NEURONAL FUNCTION
Short Title: ANALYSES OF NEURONAL FUNCTION
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: This course will cover all basic aspects of the intrinsic electrophysiological properties of neurons and of synaptic transmission. It will also introduce principles of synaptic integration and plasticity. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 321. Mutually Exclusive: Cannot register for NEUR 521 if student has credit for NEUR 321.

NEUR 522 - BRAIN CELL BIOLOGY AND DEVELOPMENT
Short Title: BRAIN CELL BIOL & DEVELOPMENT
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 1-3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Anatomy and development of the nervous system is designed to introduce the graduate student to the basic structure and function of the nervous system, and describe its rough development. It is intended for first year graduate students without any specific advanced knowledge of neuroscience. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 322. Mutually Exclusive: Cannot register for NEUR 522 if student has credit for NEUR 322.

NEUR 523 - GENETICS FOR NEUROSCIENCE
Short Title: GENETICS FOR NEUROSCIENCE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: This course integrates genetics into neuroscience and is intended to teach neuroscience students how to tackle neurobiological problems using genetic strategies and tools. In the introduction, students will be exposed to the basic concepts in genetics. Strategies using model organisms from C.elegans to mice will be covered. Finally we will discuss genetic approaches in humans. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 323. Mutually Exclusive: Cannot register for NEUR 523 if student has credit for NEUR 323.

NEUR 564 - COGNITIVE NEUROSCIENCE LAB
Short Title: COGNITIVE NEUROSCIENCE LAB
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Laboratory
Credit Hour: 1
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: The objective is to equip the students of PSYC/NEUR 362 the tools on how to apply cognitive neuroscience techniques to health or clinical topics and to investigate sensorimotor and cognitive measures in a human model. Cross-list: PSYC 564. Graduate/Undergraduate Equivalency: NEUR 364. Mutually Exclusive: Cannot register for NEUR 564 if student has credit for NEUR 364.

NEUR 576 - NEUROBIOLOGY OF DISEASE
Short Title: NEUROBIOLOGY OF DISEASE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Covers some of the most important disorders of nervous system function. Exposes students to incidence, clinical manifestations, pathophysiology, current scientific models of causes/mechanisms of disorders of the adult brain: stroke, Parkinson's disease, Alzheimer's disease, seizure disorders, brian tumors, multiple sclerosis, amyotrophic lateral sclerosis, brain/spinal cord injury, addiction, depression, and schizophrenia. Course taught at Baylor College of Medicine. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 376. Mutually Exclusive: Cannot register for NEUR 576 if student has credit for NEUR 376.

NEUR 578 - HIGHER BRAIN FUNCTION
Short Title: HIGHER BRAIN FUNCTION
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Seminar
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Aspects of systems' neuroscience related to higher brain function: (1) role of limbic system in higher brain functions, (2) role of the extended amygdala and the mesolimbic system in reward and addiction, (3) discussion of human brain processes including decision making, goal directed learning and representation of self and others. Course taught at Baylor College of Medicine. Instructor Permission Required. Mutually Exclusive: Cannot register for NEUR 578 if student has credit for NEUR 378.
Course URL: www.ruf.rice.edu/~neurosci (http://www.ruf.rice.edu/~neurosci/)

NEUR 580 - PHYSIOLOGY OF VISUAL SYSTEM
Short Title: PHYSIOLOGY OF VISUAL SYSTEM
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Course provides an advanced level and comprehensive coverage of the physiology of the retina and visual cortex. Useful for graduate students and postdocs in neuroscience, physiology, biochemistry, cell biology, and molecular genetics who are interested in visual information processing and brain function. Offered even years only. Instructor Permission Required. Graduate/Undergraduate Equivalency: NEUR 381. Mutually Exclusive: Cannot register for NEUR 580 if student has credit for NEUR 381.

NEUR 615 - THEORETICAL NEUROSCIENCE I: BIOPHYSICAL MODELING OF CELLS AND CIRCUITS
Short Title: THEORETICAL NEUROSCIENCE
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: This course presents the theoretical foundations of cellular and systems neuroscience from a quantitative perspective, integrating mathematical modeling, computational tools, and data analysis. Students will develop and apply differential equations, probabilistic models, and reverse correlation techniques to analyze neural activity and synaptic interactions. The course combines traditional lectures with student-led presentations in a seminar-style format. Coursework includes problem sets, coding-based assignments, and group projects. MATLAB or Python proficiency is strongly recommended. Cross-list: CMOR 615, ELEC 588. Graduate/Undergraduate Equivalency: NEUR 415. Mutually Exclusive: Cannot register for NEUR 615 if student has credit for NEUR 415.

NEUR 677 - SPECIAL TOPICS
Short Title: SPECIAL TOPICS
Department: Neuroscience
Grade Mode: Standard Letter
Course Type: Internship/Practicum, Laboratory, Lecture, Seminar, Independent Study
Credit Hours: 1-4
Restrictions: Enrollment is limited to Graduate or Visiting Graduate level students.
Course Level: Graduate
Description: Topics and credit hours vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.