Neuroscience (NEUR)

Neuroscience (NEUR) Courses

NEUR 1202 [0.5 credit]
Neuroscience of Mental Health and Psychiatric Disease
Clinical symptoms of psychiatric disease, including biological, developmental, experiential and environmental factors that contribute to disease. Topics may include depressive disorders, schizophrenia, autism, ADHD, anorexia, narcolepsy, substance abuse, and personality disorders.
Precludes additional credit for NEUR 1201 (no longer offered).
Lecture three hours a week.

NEUR 1203 [0.5 credit]
Neuroscience of Mental Health and Neurological Disease
Clinical symptoms of neurological disease, including biological, developmental, experiential and environmental factors that contribute to disease. Topics may include stroke, multiple sclerosis, migraine, seizure disorder, Parkinson's disease, ALS, chronic pain, Alzheimer's disease and concussion.
Lectures three hours a week.

NEUR 2001 [0.5 credit]
Introduction to Research Methods in Neuroscience
A general introduction to research methodologies employed within neuroscience. Topics covered include research designs and techniques, basic descriptive statistics, and how to interpret and report research findings.
Precludes additional credit for PSYC 2000 and PSYC 2001.
Prerequisite(s): second-year standing.
Lecture three hours a week, online labs/tutorials.

NEUR 2002 [0.5 credit]
Introduction to Statistics in Neuroscience
A general introduction to statistical techniques employed within contemporary neuroscience. Topics covered include basic data analysis using descriptive and inferential statistics (t-tests, ANOVA, correlation, chi-square).
Precludes additional credit for ENST 2006, GEOG 2006, PSYC 2002.
Prerequisite(s): PSYC 2001 or NEUR 2001.
Lectures three hours a week, online labs/tutorials.

NEUR 2003 [0.5 credit]
Introduction to Techniques in Neuroscience
Introduction to common techniques used in neuroscience research. Brain imaging, animal behaviour, electrophysiology, immunohistochemistry and microscopy, genomics, transgenics, cell culture, and DSM-IV-based clinical assessment.
Prerequisite(s): one of PSYC 1001, NEUR 1201, NEUR 1202 or NEUR 1203.
Lectures three hours a week.

NEUR 2004 [0.5 credit]
Fundamentals of Scientific Writing in Neuroscience
Introduction to various forms of scientific writing appropriate to neuroscience, with a focus in fundamental skills in scientific writing.
Prerequisite(s): second-year standing in a Neuroscience program and one of NEUR 1201, NEUR 1202 or NEUR 1203.
Lectures and workshops three hours a week.

NEUR 2201 [0.5 credit]
Cellular and Molecular Neuroscience
Core principles in cellular and molecular neuroscience, including signal transmission along and between neurons, ion channels and transporters, intracellular signaling pathways, synaptic plasticity and neuroendocrine systems.
Precludes additional credit for PSYC 3200 (no longer offered) and NEUR 3200 (no longer offered).
Prerequisite(s): one of NEUR 1201, NEUR 1202, NEUR 1203, or both BIOL 1103 and BIOL 1104.
Lectures three hours a week, online labs.

NEUR 2202 [0.5 credit]
Neurodevelopment and Plasticity
Core principles in nervous system development, developmental plasticity, and neuroanatomy. Topics include early brain development, neurogenesis and apoptosis, neuronal migration and axon growth, synaptogenesis and synaptic pruning, and plasticity within the developing brain.
Precludes additional credit for PSYC 3200 and NEUR 3200.
Prerequisite(s): one of NEUR 1201, NEUR 1202, NEUR 1203, or both BIOL 1103 and BIOL 1104.
Lectures three hours a week, online labs.

NEUR 2801 [0.5 credit]
Neuroscience and Creativity
Abnormal brain function associated with mental illness or substance abuse has been commonly depicted in or been the inspiration for important cultural works including movies, music, paintings and literature. The neurobiological basis of creativity in individuals with and without mental illness.
Prerequisite(s): one of PSYC 1001, NEUR 1201, NEUR 1202 or NEUR 1203.
Lectures and seminars three hours a week.

NEUR 3001 [0.5 credit]
Data Analysis in Neuroscience I
Introducing software for analyzing neuroscience data. Drawing graphs, correlations, regression, with a focus on the appropriate use of statistical methods and interpretation of results.
Prerequisite(s): PSYC 2001 and PSYC 2002, or NEUR 2001 and NEUR 2002.
Lectures three hours a week, online labs/workshops.

NEUR 3002 [0.5 credit]
Data Analysis in Neuroscience II
Use of software for analyzing neuroscience data. Various forms of ANOVA, and an introduction to nonparametric statistical tests; the appropriate use of statistical methods and interpretation of results.
Prerequisite(s): NEUR 3001.
Lectures three hours a week, online labs/workshops.

NEUR 3203 [0.5 credit]
Field Course in Animal Behaviour
Offered in the Department of Biology as BIOL 3605. Only those modules dealing with animal behaviour topics may be offered for Neuroscience credit.
Also listed as BIOL 3605.
Precludes additional credit for PSYC 3203.
Prerequisite(s): permission of the department.

NEUR 3204 [0.5 credit]
Neuropharmacology
Introduction to synaptic mechanisms and the arrangements of the transmitter-specific brain systems, followed by a discussion of neuro-pharmacological bases of normal and abnormal behaviour and of the behavioural effects of various classes of psychoactive drugs such as stimulants, tranquilizers, opiates.
Precludes additional credit for PSYC 3204 (no longer offered).
Prerequisite(s): NEUR 2200 or NEUR 2201.
Lectures and seminars three hours a week.

NEUR 3206 [0.5 credit]
Sensory and Motor Neuroscience
Topics include sensory systems such as vision, somatosensation and audition, plus various motor system components including lower and upper motor neurons, basal ganglia, cerebellum and the visceral motor system.
Precludes additional credit for PSYC 3200 (no longer offered), NEUR 3200 (no longer offered), PSYC 3202 (no longer offered) and NEUR 3202 (no longer offered).
Prerequisite(s): NEUR 1201 or both NEUR 1202 and NEUR 1203, and either NEUR 2200 or both NEUR 2201 and NEUR 2202.
Lectures three hours a week, laboratory three hours a week.

NEUR 3207 [0.5 credit]
Integrative Neuroscience
Neural systems underlying complex behaviours including emotion, motivation, and sleep, and the role of association cortices in brain function.
Precludes additional credit for NEUR 3200 (no longer offered) and PSYC 3200 (no longer offered).
Prerequisite(s): NEUR 1201 or both NEUR 1202 and NEUR 1203, and either NEUR 2200 or both NEUR 2201 and NEUR 2202.
Lectures three hours a week, laboratory three hours a week.

NEUR 3301 [0.5 credit]
Genetics of Mental Health
Most common mental health diseases have a genetic component. By focusing on specific diseases, this course will discuss how disease susceptibility genes are identified, and describe the genetic, genomic and epigenetic mechanisms through which DNA alterations can predispose to disease.
Prerequisite(s): BIOL 2104 or BIOL 2107, and NEUR 2200 or NEUR 2201.
Lectures three hours a week.

NEUR 3303 [0.5 credit]
The Neuroscience of Consciousness
Consciousness remains one of the least understood aspects of the nervous system. This course explores neural mechanisms underlying consciousness, changes in consciousness associated with sleep, coma, vegetative states, drugs, and other stimuli, and considers the evolutionary basis of consciousness, and its relationship with awareness.
Prerequisite(s): NEUR 2200 or NEUR 2202.
Lectures three hours a week.

NEUR 3304 [0.5 credit]
Hormones and Behaviour
The effects of hormones throughout life at all levels of the nervous system. The role of hormones in mediating behaviours that are both basic (feeding, reproduction and social interactions) and complex (motivation, emotion, learning and memory).
Prerequisite(s): NEUR 2200 or both NEUR 2201 and NEUR 2202.
Lectures three hours a week.

NEUR 3401 [0.5 credit]
Environmental Toxins and Mental Health
Exposure to environmental toxins from the air, water or food can interfere with neuronal function, alter neurodevelopment, and damage the brain. This course will explore associations between toxins and diseases such as Parkinson's disease, multiple sclerosis and depression, focusing on mechanisms underlying development of pathology.
Prerequisite(s): NEUR 2200 or both NEUR 2201 and NEUR 2202.
Lectures three hours a week.

NEUR 3402 [0.5 credit]
Impact of Lifestyle and Social Interactions on Mental Health
Healthy lifestyle choices and positive social interactions can reduce the incidence of pathological conditions such as depression, obesity, cardiovascular disease and impaired immunity. This course focuses on psychosocial and neurobiological mechanisms that underlie the relationship between lifestyle, social interactions and health.
Prerequisite(s): NEUR 2200 and both NEUR 2201 and NEUR 2202.
Lectures three hours a week.

NEUR 3403 [0.5 credit]
Stress and Mental Health
Stressful events can have profound repercussions on physical and psychological well-being. This course examines the psychosocial and biological processes by which stressors predispose to both physical (immune-related disorders, diabetes, heart disease) and psychological (acute stress disorder, posttraumatic stress disorder, depression, anxiety) pathologies.
Prerequisite(s): NEUR 2200 or both NEUR 2201 and NEUR 2202.
Lectures three hours a week.

NEUR 3501 [0.5 credit]
Neurodegeneration and Aging
Neurodegeneration is particularly acute in the aging population, and is characteristic of diseases such as Alzheimer's, Parkinson's, multiple sclerosis and Huntington's disease. This course will explore mechanisms underlying neurodegeneration, plus recent advances aimed at the restoration of nervous tissue, potentially curing these pathologies.
Prerequisite(s): NEUR 2200 or both NEUR 2201 and NEUR 2202.
Lectures three hours a week.

NEUR 3502 [0.5 credit]
Neurodevelopmental Determinants of Mental Health
Development of the human brain, the generation and differentiation of the various cell types, and the formation of the vast network of neural connections. How neurodevelopmental dysregulation can result in pathologies including dyslexia, ADHD, schizophrenia and autism.
Prerequisite(s): NEUR 2200, or both NEUR 2201 and NEUR 2202.
Lectures three hours a week.

NEUR 3999 [0.0 credit]
Co-operative Work Term

NEUR 4001 [0.5 credit]
Special Topics in Neuroscience
Each section of NEUR 4001 deals with a different topic. Topics change yearly. Students may register in more than one section of NEUR 4001 but can register in each section only once.
Prerequisite(s): NEUR 3200, or NEUR 3204 and NEUR 3206 and NEUR 3207, or permission of the Department.
Lectures three hours a week.

NEUR 4200 [0.5 credit]
Seminar on Current Advances in Neuroscience
Headline research in neuroscience. Topics may include technical and conceptual advances, ethical issues, medical improvement, and social impacts of neuroscience research.
Precludes additional credit for PSYC 4200 (no longer offered).
Prerequisite(s): fourth year standing and one of NEUR 3200, NEUR 3206 or NEUR 3207.
Seminar three hours a week.

NEUR 4202 [0.5 credit]
Seminar on Current Research in Neuroscience and Psychiatric Disease
Recent research in clinical neuroscience including biological, developmental, experiential and environmental factors that contribute to disease. Topics may include depressive disorders, schizophrenia, autism, ADHD, anorexia, narcolepsy, substance abuse, and personality disorders.
Prerequisite(s): fourth year standing or one of NEUR 3200, NEUR 3206 or NEUR 3207.
Seminar three hours a week.

NEUR 4203 [0.5 credit]
Seminar on Current Research in Neuroscience and Clinical Neurology
Recent research in neurological disease, including biological, developmental, experiential and environmental factors that contribute to disease. Topics may include stroke, multiple sclerosis, migraine, seizure disorder, Parkinson's disease, ALS, chronic pain, Alzheimer's disease and concussion.
Prerequisite(s): fourth year standing and one of NEUR 3200, NEUR 3206 or NEUR 3207.
Seminars three hours a week.

NEUR 4301 [0.5 credit]
Neurobiology of Energy Homeostasis
Focus on neuroanatomical and molecular mechanisms underlying how mammals adapt to changes and challenges in the environment. Topics include regulation of feeding, energy expenditure, water balance, and temperature regulation.
Prerequisite(s): NEUR 3304.
Lectures three hours a week.

NEUR 4302 [0.5 credit]
Sex and the Brain
Neurobiological processes behind reproductive behaviours in various animal species including humans. Evaluation of data concerning neurobiological differences between sexes, biological determinants of sexual orientation, and relating to neurobiology of sex disorders.
Precludes additional credit for NEUR 3302 (no longer offered).
Prerequisite(s): NEUR 3304.
Lectures three hours a week

NEUR 4303 [0.5 credit]
Indigenous Health & Mental Health
The physical and mental health issues of Indigenous people in the context of the cultural, environmental, developmental and biological factors that contribute to comorbid conditions and greater risk and resilience.
Prerequisite(s): 3rd year standing or above.
Lectures three hours a week.

NEUR 4305 [0.5 credit]
Immune-Brain Interactions
Communication between the brain and the immune system; messengers mediating the interaction. How disturbances of immune-brain signaling can lead to disease (multiple sclerosis, Parkinson's) and to changes in mood and cognition.
Precludes additional credit for NEUR 3305 (no longer offered).
Prerequisite(s): NEUR 3200 or NEUR 3207.
Lectures three hours a week.

NEUR 4306 [0.5 credit]
The Neural Basis of Addiction
How substance and behavioural addictions impact neural function to ultimately lead to the neuropathology of addiction in vulnerable populations. Contemporary neurobiological theories of addiction will also be addressed.
Precludes additional credit for NEUR 3306.
Prerequisite(s): NEUR 3204.
Lecture three hours a week.

NEUR 4600 [0.5 credit]
Advanced Lab in Neuroanatomy
Advanced experiential learning in neuroanatomy, histology and microscopy.
Prerequisite(s): NEUR 3200 or both NEUR 3206 and NEUR 3207, fourth-year standing in a Neuroscience program, a minimum Major CGPA of 9.0 and permission of the Department.

NEUR 4801 [0.5 credit]
Neuroethics
Ethical issues of key importance to current neurobiological research. Topics may include the use of animals in research, stem cell research, genetic diagnosis and gene therapy, neuroimaging, and the effect on identity and autonomy of manipulations such as psychopharmaceuticals and psychosurgery.
Prerequisite(s): NEUR 3200 or both NEUR 3206 and NEUR 3207.
Lectures and seminars three hours a week.

NEUR 4900 [0.5 credit]
Independent Study
A reading or research course for selected students who wish to investigate a particular topic of interest. Normally students may not offer more than one credit of independent study in their total program.
Prerequisite(s): third- or fourth- year standing and permission of the Department.

NEUR 4905 [1.0 credit]
Honours Workshop
The course will focus on active learning in areas that include written and oral communication, evaluation and interpretation of results, statistics and data management, emphasizing transferable skills that will be most appropriate for non-research career paths.
Precludes additional credit for NEUR 4907 and NEUR 4908.
Prerequisite(s): fourth-year standing in an Honours Neuroscience program and permission of the Department.
Lectures and seminars three hours a week, and colloquia three hours a week.

NEUR 4907 [1.0 credit]
Honours Essay and Research Proposal
An independent essay based critical review and research proposal on a topic in neuroscience, using library resources, under the direct supervision of a Faculty advisor. Evaluation is based on a written report.
Precludes additional credit for NEUR 4905 and NEUR 4908.
Prerequisite(s): NEUR 3200, or both NEUR 3206 and NEUR 3207, and fourth-year standing in an Honours Neuroscience program, a minimum Major CGPA of 9.0 and permission of the Department.
Seminar three hours a week and colloquia three hours a week.

NEUR 4908 [1.0 credit]
Honours Research Thesis
An independent research project undertaken under the direct supervision of a faculty advisor typically from the Department of Neuroscience. Evaluation is based on a written report and poster.
Precludes additional credit for NEUR 4905 and NEUR 4907.
Prerequisite(s): NEUR 3200, or both NEUR 3206 and NEUR 3207, and fourth-year standing in an Honours Neuroscience program, a minimum CGPA of 9.0 and permission of the Department.
Colloquia three hours a week.

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current session and to determine the term of offering, consult the class schedule at central.carleton.ca