

# NEUROSCIENCE (NSCI)

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## **NSCI 323 Cellular Neuroscience Units: 3.00**

Fundamental properties of the nervous system. Emphasis placed on the properties of neurons that are fundamental to neuron-to-neuron communication, the formation of neural circuits, and the repair of the nervous system following injury. Tutorials introduce techniques and neurological problems that illustrate principles of neural function.

**Requirements:** Prerequisite BIOL 339 or KNPE 125 or KNPE 225 or (PHGY 215 and PHGY 216) or PSYC 271 or PHGY 210 or PHGY 212 or PHGY 214

**Offering Faculty:** Faculty of Health Sciences

## **NSCI 324 Systems Neuroscience Units: 3.00**

Fundamental properties of the nervous system. Emphasis placed on the properties of neurons and neural circuits that underlie behaviour and cognitive functions within selected neural systems, such as sensory, motor, reward, and autonomic systems. Tutorials introduce techniques and neurological problems that illustrate principles of neural function.

**Requirements:** Prerequisite (PHGY 215/3.0 and PHGY 216/3.0) or PSYC 271/3.0 or NSCI 323/3.0 or PHGY 210/6.0 or PHGY 212/6.0 or PHGY 214/6.0.

**Offering Faculty:** Faculty of Health Sciences

## **NSCI 401 Introduction to Theoretical Neuroscience Units: 3.00**

This course will provide an introduction to the main modelling approaches and theoretical concepts in Neuroscience. The computational anatomy of the brain and how it implements perception, learning, memory, decision making and motor control, among other topics, will be discussed.

RECOMMENDATION NSCI 323/3.0, NSCI 324/3.0, ANAT 312/3.0, PSYC 271/3.0.

**Requirements:** Prerequisite STAT263; STAT 267; STAT 367; COMM 162; ECON 250; PSYC 202; SOCY 211; BIOL 243; CHEE 209; GPHY 247; KNPE 251; POLS 385; NURS 323 and Level 4 in a LISC Maj or Spec Plan and a GPA of 2.5

**Offering Faculty:** Faculty of Health Sciences

## **NSCI 403 Introduction to Neuroimaging Units: 3.00**

This course covers the theory and practice of modern neuroimaging methods. Topics include data acquisition, research study design, and analysis methods. Functional MRI is presented in the most depth, but computed tomography (CT), positron emission tomography (PET), and single photon emission computed tomography (SPECT), are also covered. LEARNING HOURS 120 (36L;84P)

**Requirements:** Prerequisite Level 4 and (registration in a LISC Major or Specialization Plan) and (a GPA of 2.5) and one of (NSCI323 or NSCI324 or ANAT312 or PSYC271 or PSYC 370).

**Offering Faculty:** Faculty of Health Sciences

## **NSCI 414 Progress in Neuroanatomy and Neuropharmacology Units: 3.00**

A contemporary and comprehensive assessment of the neurochemical anatomy and neuropharmacology of the mammalian and human nervous systems as they relate to development, function and disease. Topics will include dynamics of neurotransmitter interactions, neuronal drug receptor interactions and second messengers, neurotoxicity associated transmitters and neural growth factors. NOTE BMCO students should contact the Department regarding prerequisites.

**Requirements:** Prerequisites A grade of B- in (ANAT312 or NSCI 323 or PHAR 340) and (a GPA of 2.5). Corequisite NSCI 324.

**Offering Faculty:** Faculty of Health Sciences

## **NSCI 422 Cellular and Molecular Neuroscience Units: 3.00**

A course providing 1) the essentials in cellular and molecular neuroscience to pursue a graduate program and/or a career in neuroscience or related field, and 2) independent learning and communication skills applicable broadly. The course is divided into three segments: 1) neuronal integration, 2) synaptic plasticity, and 3) neuromodulation.

NOTE BMCO students should contact the Department regarding prerequisites.

LEARNING HOURS 119 (12L;24S;8G;6I;69P)

**Requirements:** Prerequisite A grade of B in NSCI 323 and (Level 4 and registration in the LISC Major or Specialization Plan) and (a GPA of 2.5)

**Offering Faculty:** Faculty of Health Sciences

**NSCI 429 Disorders of the Nervous System Units: 3.00**

A multi-disciplinary course exploring advanced concepts of clinical neuroscience. Topics include stroke, traumatic brain and cord injuries, neurodegenerative disorders, epilepsy, schizophrenia, depression, deep brain stimulation, pain and placebo effects, normal and abnormal aging, stem cells. Students will learn to critically evaluate scientific literature and present these concepts to classmates during student-led seminars. Restricted to fourth-year students. Enrollment is limited.

**Requirements:** PREREQUISITE NSCI 322/3.0 or NSCI 323/3.0 or NSCI 324/3.0 or ANAT 312/3.0 and Level 4 and (registration in a LISC Major or Specialization Plan) and (a GPA of 2.5)

**Offering Faculty:** Faculty of Health Sciences

**NSCI 433 Cellular Elements of the Nervous System: Responses to Injury and Disease Units: 3.00**

Cellular dysfunction is a critical feature of neural injury and disease among humans. This course will examine the cellular elements of the mammalian central and peripheral nervous system, with an emphasis placed on understanding normal and abnormal cellular function in both humans and animal models.

NOTE Restricted to students registered in the 4th year.  
LEARNING HOURS 114 (36L;36Lb;42P)

**Requirements:** Prerequisite (NSCI323 or NSCI324) and (ANAT309 or ANAT312) and (a GPA of 2.5) and registration in a LISC Major or Specialization Plan.

**Offering Faculty:** Faculty of Health Sciences

**NSCI 444 Controversies in Neuroscience Units: 3.00**

As insight regarding the human brain expands, so do related issues such as what constitutes personhood, what drives the criminal mind, intelligence-enhancing drugs and end-of-life issues. Led by experts who deal daily with such concerns, we will focus weekly on a particular topic in neuroscience which impacts on society.

LEARNING HOURS 108 (12L;24S;72P)

**Requirements:** PREREQUISITE NSCI 322/3.0 or NSCI 323/3.0 or NSCI 324/3.0 or ANAT 312/3.0 and Level 4 and (registration in a LISC Major or Specialization Plan) and (a GPA of 2.5)

**Offering Faculty:** Faculty of Health Sciences

**NSCI 483 Neurobiology of Learning and Memory Units: 3.00**

An exploration of brain systems underlying how we learn and remember, and how they become disordered. Online multimedia modules and study of cutting edge research articles reveal how modern techniques and ideas are driving neuroscience forward. Requires interviewing a person with a disorder in order to learn to advocate for them in society.

**Requirements:** Minimum 4th year (Level 4) standing and one of [(PHGY 215/3.0 and PHGY 216/3.0); PSYC 271/3.0; PHGY 214/6.0; PHGY 210/6.0]. For LISC and BCHM Honours students Level 4 and registration in a LISC or BCHM Major or Specialization Plan and a GPA of 2.5

**Offering Faculty:** Faculty of Health Sciences

**NSCI 491 Directed Special Laboratory Units: 3.00**

Laboratory course in a selected area of Neuroscience to be arranged in consultation with individual members of the Centre for Neuroscience Studies. Course involves experimental design, data collection and analysis (approximately 6 hours of laboratory work per week required) as well as a brief communication of the laboratory work. NOTE Students are limited to one NSCI 491/3.0 research project in Year 4.

NOTE Students whose research project requires the care and/or handling of animals must also complete the Introductory Animal Care Course and if required the appropriate Animal Use workshops through the Office of the University Veterinarian.

**Requirements:** BSCH SSP LISC NSCI

**Offering Faculty:** Faculty of Health Sciences

**NSCI 499 Research Project in Neuroscience Units: 12.00**

An investigation into a selected area of neuroscience. The research project involves experimental design, data collection, and analysis, written report and oral presentation. Students will be required to attend seminars and tutorials on topics related to research. Limited enrolment.

NOTE Acceptance by a supervisor required prior to registration.

NOTE Students whose research requires the care and/or handling of animals must also complete the Introductory Animal Care Course and if required the appropriate Animal Use workshops through the Office of the University Veterinarian.

LEARNING HOURS 480 (288Lb;24G;24I;144P).

**Requirements:** Prerequisite Level 4 and registration in a LISC Specialization and a cumulative GPA of 2.50 or higher. Exclusion ANAT 499; CANC 499; EPID 499; LISC 499; MICR 455; MICR 499; PATH 499; PHAR 499; PHGY 499; REPD 499.

**Offering Faculty:** Faculty of Health Sciences