Course Component: Lecture

NSC 5102 Cellular and Molecular Neuroscience (3 units)
The molecular and cellular properties of neurons. Emphasis to be placed on the molecular basis of electrical activity of neurons and chemical synaptic transmission.

Course Component: Lecture

NSC 5104 Systems Neuroscience (3 units)
Structure and function of representative components of the nervous system to be presented in an integrated and comprehensive manner, emphasizing a reductionist approach to the study of neural networks and their behavioural output.

Course Component: Lecture

NSC 5106 Molecular Psychiatry (3 units)
Study of genetic and neurochemical bases of mental illnesses using transgenic and gene knockout mouse models, animal behavioural paradigms, in vivo imaging. Gene therapy approaches in psychiatry; influence of environmental stressors.

Course Component: Lecture

NSC 6101 Consciousness: An Interdisciplinary Perspective from Neuroscience, Philosophy and Psychology (3 units)
This interdisciplinary course addresses two fundamental questions in the study of the mind: 1) what is consciousness? 2) Can we explain the emergence and operation of this central feature of human life by analyzing the brain?

Course Component: Lecture

NSC 6300 Seminars
Course Component: Lecture

NSC 7100 Neurotransmission and Neuromodulation (3 units)
Molecular and cell biology of neurotransmission including the identity, actions and mechanisms of neurotransmitters and neuromodulators. Use of computer simulations to explore the complex interactions between synaptic input and the electrical architecture of neurons.

Course Component: Seminar
Permission of the Department is required.

NSC 8104 Computational Neuroscience (3 units)
Basic concepts of sensory-motor processing from the cellular level of excitable membranes and synaptic signalling mechanisms to the emergent properties of complex neural networks.

Course Component: Lecture

NSC 8105 Molecular Biology of the Neuron (3 units)
Emphasis on how signal transduction regulates neuronal function. Topics to include the role of the cytoskeleton in neuronal function, membrane sorting in exocytosis and endocytic pathways, metabotropic and ionotropic receptor signaling, signaling by the GTP-binding proteins, plasma membrane and vesicular transporters, role of protein-protein interactions in the regulation of neuronal signaling, and genomic and proteomic approaches to study neuronal signaling.

Course Component: Lecture

NSC 8106 Mechanisms of Neurological Disease (3 units)
Current knowledge of select neuropathologies with emphasis on the underlying genetics and biochemistry of these conditions. Examination of some fundamental cellular processes important for understanding neurological diseases.

Course Component: Lecture

NSC 8107 NEURAL CONTROL OF METABOLISM (3 units)
Examination of how the brain controls metabolism and how metabolic disorders affect brain function. Topics include the brain's control of food intake, glucose homeostasis and energy expenditure. Examination of the effects of mental states on metabolic homeostasis, the relationship between neurogenesis and metabolism, neurovascular coupling in brain metabolism, and genetic risk in metabolic syndromes.

Course Component: Lecture

Prerequisite: NSC 5102 or NSC 5104

NSC 8340 Neuromuscular Function and Dysfunction (3 units)
Topics to be covered include factors controlling muscle- and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron-muscle interactions, the role of the cytoskeleton in the organization of postsynaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease.

Course Component: Lecture
Prerequisite: CMM 5340 or equivalent.

NSC 9998 Examen de synthèse (doctorat) / Comprehensive Examination (Ph.D.)
Volet / Course Component: Recherche / Research

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