

## PSL Courses: 2021-22

### PSL190H1S – Biomedical Research at the Cutting Edge

Explore the thought processes, logic, motivation, techniques, analysis and impact of recent high-profile publications to gain insight into the enterprise of science. Outstanding scientists present recent high-impact papers, and students will examine the research in depth, focusing on the underlying questions, experimental approach, results and significance.

### PSL201Y1Y - Basic Human Physiology

A survey course intended for students who are not proceeding further in Physiology. Recommended preparation: 100-level course in BIO or equivalent. Exclusion: Any 300-level PSL courses taken previously or concurrently.

### PSL280H1F - Introduction to Physiologic Adaptations of Marine Mammals

Systems approach to physiology of marine mammals in their aquatic environment. Highlights unique features of cardio-vascular, respiratory, renal, urinary, and reproductive systems. Introduces relevant physiology, and makes comparisons to human condition and disease. Prerequisites: (BIO120H1, BIO130H1), CHM136H1/CHM138H1

### PSL300H1F – Human Physiology I

Principles of neurophysiology, endocrinology and reproductive physiology for students enrolled in Life Science programs. Recommended Preparation: BIO130H1, CHM136H1/CHM138H/ CHM151Y, and 1 FCE from MAT135H1, MAT136H1, MAT137Y1, MAT157Y1, PHY131H1, PHY132H1, PHY151H1, PHY152H1. Exclusion: PSL201Y1, PSL302Y1

### PSL301H1S – Human Physiology II

Principles of respiratory, cardiovascular, gastrointestinal, and renal physiology for students enrolled in Life Science programs. Recommended Preparation & Exclusion: same as PSL300H1F

### PSL304H1F - Topics in Cellular, Molecular and Organismic Physiology I

Control systems, feedback, networks, and both neonatal and adult cardiovascular and respiratory control are the topics examined in detail using homeostasis as a unifying theme. Tutorials involve computer simulations, case studies and/or experimental design. This course is designed for students in the Physiology Specialist and Biological Physics Specialist Programs, although permission is granted to students in other programs upon approval by the Department.

Prerequisites: BCH210H1, PSL300H1, PSL301H1, MAT100-series. Recommended Preparation: PSL372H1

### PSL305H1S - Topics in Cellular, Molecular and Organismic Physiology II

Molecular, cellular and organismic physiology of the central nervous system, gut, pancreas and glucose-sensing tissues; CNS diseases, obesity and diabetes are used as model systems. Tutorials involve computer simulations. This course is designed for students in the Physiology Specialist and Biological Physics Specialist Programs, although permission is granted to students in other programs upon approval by the Department. Prerequisites & Recommended Preparation: same as PSL304H1

### PSL310H1 – Clinical Reasoning

Improved clinical reasoning will reduce the current likelihood that most people will suffer at least one medical diagnostic error, errors that contribute to ~10% of patient deaths. Learn to apply strategies of critical thinking and principles of physiology to solve clinical cases. Shadow a healthcare professional.

Prerequisites: BCH210H1, BIO230H1, PSL300H1, PSL372H1. Co-requisites: PSL301H1. Exclusion: HMB322H1

### PSL350H1S - Mammalian Molecular Biology

Extend molecular biology concepts to current scientific literature in mammalian physiology. Apply these principles to disease and complex behaviours. Discuss bioethical issues raised by these techniques and their application. Benefit from three weeks in small group seminars lead by research professors focusing on current advances in mammalian molecular biology.

Prerequisites: BCH210H1; BIO230H1/BIO255H1; PSL300H1. Co-requisites: PSL301H1.

Exclusion: BCH311H1/BIO349H1/CSB349H1/MGY311Y1

### PSL372H1F – Mammalian Physiology Laboratory

A laboratory course covering selected topics in physiology.

Prerequisites: BIO230H1/(BIO240H1, BIO241H1)/BIO255H1, BCH210H1/BCH242Y1, MAT100-series/PHY100-series; PSL300H1, PSL301H1. Co-requisite: BCH370H1 (recommended). Exclusion: CSB348H1

### PSL374H1S - Advanced Physiology Laboratory

A problem-based laboratory course focused on the integration and control of organ systems to understand body functions.

Enrolment in this course is restricted to students in the Physiology Specialist and Major Programs although permission is granted to students in other programs upon approval by the Department.

Prerequisites: BIO230H1/(BIO240H1, BIO241H1)/BIO255H1, PSL300H1, PSL301H1, PSL372H1. Exclusion: CSB348H1

**PSL378H1F - Field Physiology: Marine Mammal Autopsy**

An opportunity to go outside of the traditional university classroom and actively participate in a marine mammal autopsy. Learn the diversity and adaptive nature of marine mammalian physiology/anatomy as it compares to human. The course is two weeks (in May), one week of hands-on tissue dissection, and one week of group discussions of the findings and draft report preparation.

Prerequisites: BIO270H1, BIO271H1/PSL201Y1/PSL280H1/ PSL300H1, PSL301H1 or permission of instructor.

**PSL379H0F - Comparative Marine Mammal in the Field**

Hands-on monitoring of physiological measures with live dolphins, manatee and sea lions; field observations and applied learning to a physiology project. Two-weeks at the end of April early May: 1st week at marine research center in Mexico, 2nd week of wrap-up discussion and integration of data at U of T.

Prerequisites: PSL280H1/PSL201Y1/ PSL300H1/ PSL301H1/BIO220H1/BIO230H1/ BIO270H1/BIO271H1/CSB343H/PSY362H or permission of instructor.

**PSL404H1F - Regenerative Medicine**

Regenerative medicine promises to restore body function that has been lost due to disease, damage or age. Students will explore selected molecular, stem cell and tissue engineering developments to better understand how the body normally functions and how cells, tissues, and organs can be repaired or replaced.

Prerequisite: PSL300H1, PSL301H1.

Recommended Preparation: PSL350H1/BCH311H1/CSB349H1

**PSL420H1F - Reproduction: Development and Function**

This course provides an in-depth review of the development and function of the male and female reproductive systems. Topics include sex determination and differentiation, steroidogenesis, gametogenesis, hormonal control of the reproductive axis, the female ovulatory cycle, fertilization and implantation, infertility and assisted reproduction approaches.

Prerequisites: PSL300H1, PSL301H

**PSL421H1S – Pregnancy and Birth: From Implantation to Newborn Life**

General overview of the integrated physiological events associated with fetal development, pregnancy and birth. The approach emphasizes physiological processes using insights gained from studies of humans, animals, cells and genes. Where appropriate the clinical consequences of aberrant development are reviewed.

Prerequisites: PSL300H1, PSL301H1. Recommended Preparation: PSL420H1

**PSL424H1S – Cellular & Molecular Basis of Endocrine Disorders**

Explore how researchers uncover the molecular and cellular basis of endocrine disorders. Learn about experimental design, state-of-the-art research tools, and data interpretation. Topics include disorders in: hormone regulation, secretion and action; circadian rhythms; and sexual development and reproduction. Each week students engage in active learning sessions related to research seminars delivered by faculty.

Prerequisites: PSL300H, PSL301H, PSL350H/BCH311H/CSB349H/ MGY311Y

**PSL425H1F - Integrative Metabolism & its Endocrine Regulation**

This course integrates the newest findings and experimental approaches from cellular and molecular biology into metabolic function at the tissue, organ and whole body level.

Prerequisite: BCH210H1, PSL300H1, PSL301H1.

Recommended Preparation: PSL305H1/PSL303Y1

**PSL432H1S - Theoretical Physiology**

Theoretical treatment of neurophysiology. Mathematical modeling and analysis of neurophysiological systems.

Prerequisites: MAT235Y/MAT237H1; APM346H1/MAT244H1

Recommended Preparation: PHY200-series; PSL201Y1/ PSL300H1/(BIO270H1, BIO271H1)

**PSL440Y1Y - Neuroscience I: Systems and Behaviour**

Introduction to systems neuroscience. A review of basic neuroanatomy and physiology followed by in-depth study of selected sensory and motor systems, with an emphasis on clinical applications in the second term. Students with an elementary neuroscience background progress to reading neuroscience literature on their own.

Prerequisites: PSL300H1/PSY290H1/CSB332H1 or equivalent

**PSL445H1F - Neuroscience: Cellular and Molecular**

Overview of the fundamentals of cellular and molecular aspects of brain function. Course material is updated yearly to reflect the rapid evolution of ideas in Neuroscience.

Prerequisites: PSL300H1, PSL301H1, CSB332H1/CJH332H or permission of instructor.

**PSL446H1S – Neural Disorders**

Explore topics in neurological disorders and treatments to reinforce and expand your knowledge of cellular and molecular neurophysiology. Course material is updated yearly to reflect the rapid evolution of ideas in this area.

Prerequisites & Exclusion: same as PSL445H1F

**PSL450H1F - Mechanisms of Neural and Endocrinal Secretion**

Exocytosis and other aspects of secretion mainly in neurons and neuroendocrine cells, but also in pancreatic cells. Topics include synapse anatomy and physiology, synaptic plasma membrane and vesicle proteins, membrane fusion, genetic tools, endocrine secretion, plasticity in neurotransmitter release, diseases arising from secretion defects.

Prerequisites: BCH210H1, PSL300H1/(BIO240H1, BIO241H1), PSL350H1/BCH311H1/CSB349H1/MGY311Y1

**PSL452H1F - Membrane Physiology**

Biophysics and molecular biology of ion channels. Topics include equivalent circuits for cells, molecular structure of voltage-gated channels, distribution of channels, relationship between single-channel and whole-cell recording, and regulation of channel function by voltage, phosphorylation, G-proteins and metabolites. Prerequisites: PSL300H1, PSL301H1

**PSL462H1S - Molecular Aspects of Cardiovascular Function**

Heart anatomy and development, ion channels and contractile proteins involved in cardiac and smooth muscle contraction are studied. Emphasis is on regulation of electrical and contractile function of kinases, metabolism, volume and ions.

Prerequisites: PSL300H1, PSL301H1

**PSL470H1S – Cardiovascular Physiology**

Development of the cardiovascular system from conception to adulthood with particular emphasis on maturational changes, age-related differences and developmental problems from cellular/molecular to whole organ/system. Prerequisites: PSL300H1, PSL301H1

**PSL472H1S - Sleep Physiology and Chronobiology**

This course covers the physiology underlying sleep and circadian rhythms, and their impact on important physiological processes and health. The integrative nature of the basic physiological processes is emphasized via discussions and clinical presentations. Overall, the aim is to present the full spectrum of integrative physiology from molecules and cells to understanding the sick patient.

Prerequisites: PSL300H1, PSL301H1

**PSL480H1F - Diving Physiology of Marine Mammals**

This course compares and contrasts the physiological and anatomical adaptations exhibited by the different species of marine mammals in relationship to humans, with respect to diving.

Prerequisites: (BIO270H1, BIO271H1)/PSL201Y1/PSL300H1, PSL301H1; PSL280H1

**PSL498Y1Y/PSL499H1F/S - Project in Physiology**

Laboratory research project with reading assignments leading to a final report. By special arrangement with a Physiology staff member after admission to course. PSL498Y1/PSL499H1 is recommended for students applying to the Physiology graduate program. Enrolment in this course is restricted to students in the Physiology Specialist and Major Programs, although permission is granted to students in other programs upon approval by the Department.

Prerequisites: (PSL304H1, PSL305H1), PSL372H1, PSL374H1, permission of Department

**Research Opportunity Programs: PSL299Y and PSL399Y**

Credit courses for supervised participation in faculty research project. Details at <https://www.artsci.utoronto.ca/current/academics/research-opportunities>

**Enrolment Controls**

**P** - Priority: Some students are given priority access until a specific date.

**E** - Enrol at Department: Students must contact the sponsoring Department to enrol.

**AE** - Department Approval Required: Students must request enrolment on ACORN and await Departmental review of their request.

**PE** - Priority, then Enrol at Department: Some students are given priority access until a specific date, after which time another group of students is also able to enrol by contacting the sponsoring Department.

**R1**- Restricted: Course/section is restricted at all times for specific students.