THE UNIVERSITY OF BRITISH COLUMBIA

Biology UBC
Vancouver, BC, CANADA

UBC's Point Grey Campus is located on the unceded, traditional and ancestral territory of the xʷməθkʷəy̓əm (Musqueam).

This syllabus is a general representation of the course as previously offered and is subject to change.

BIOL 371 – Principles of Neurobiology 1

General Course Syllabus
(as of May 2025 for Term 2 BIOL371 course, subject to changes depending on the instructor)

Course description: The nervous system includes the brain and its pathways of connectivity with every organ in the body. As the control center of the animal body, it is fundamental to all aspects of physiology. BIOL 371 is focused on the organization of the nervous system and how neurons and glial cells communicate. To accomplish these two objectives, the course will be organized into five sections consisting of 1) Nervous system structure, 2) Nervous system physiology, 3) Synapses, 4) Synaptic plasticity. Students will also develop skills in reading primary literature. Four papers will be assigned, discussed in class, and assessed using either worksheets or clickers. This approach will facilitate the ability to learn the most current topics in neurobiology as students transition to more specialized courses and laboratory research positions.

Course format: Lecture
Credits: 3
Prerequisites: BIOL 200, AND one of BIOL 260, NSCI 200, PSYC 270, PSYC 271, PSYC 304, CAPS 301.

Course learning objectives:
By the end of the course, students will be able to:

1. Determine the functional properties of a neuron based on its anatomy, connections to brain areas, and synaptic properties.
2. Predict changes in neuron membrane potential in response to currents, protein functions, ion gradients, and experimental manipulations.
3. Explain how neural signals are initiated, regulated, and terminated at the synapse.
4. Distinguish common signal transduction pathways in the nervous system.
5. Explain how neurons are potentiated or depressed at the molecular and cellular levels.
6. Interpret data from common experimental approaches used to study nervous system function.
7. Read and critically analyze scientific articles in the field.

Textbook and additional resources:

The following resources are required:

- Textbook: Neuroscience (6th or 7th Edition). Editors: Dale Purves, George J. Augustine, David Fitzpatrick, William C. Hall, Anthony-Samuel LaMantia, Richard D. Mooney, Michael L. Platt, and Leonard E. White.
- iClicker Cloud
- Calculator
- Access to the course website on Canvas (canvas.ubc.ca)

Grading Scheme:

Note: the grading scheme may vary by term and instructor. Below are sample grading breakdowns over the 2020/21 Winter Session (2020W):

Assessment	Weight
Pre-reading quizzes	10%
Worksheets	12%
Midterm	30%
Final exam	48%
Total	100%

DETAILS ON ASSESSMENTS:

Weekly Pre-Reading and Online Homework:

The assigned readings and the online assignment for each week will be posted on the course website. Online assignments are multiple choice questions and are meant to help students to either prepare for the coming lecture and paper discussions, or to review the material.

Worksheet:

Four papers are assigned and discussed through-out the term. Students will form self-assigned groups to work on the worksheet questions. Each paper will be discussed in class and the worksheets will be submitted by each group 5 days after the class discussion.

Exams

The midterm and the final are closed-book exams. The final exam is cumulative and will assess content from the whole of the course.

Policy on missed final

Students must visit their faculty's Dean's Office to determine if a deferred final can be granted. Students who miss a midterm and do not participate in the course may not be allowed to write a deferred final.

Schedule of topics:

Week	Topic
1	Nervous system structure and function; Neurons and glia
2	Neural circuits Membrane permeability and equilibrium potentials
3	Passive membrane properties, Paper 1: Circuits
4	Voltage clamp Action potentials
5	Action potentials continued Patch clamp and ion channels
7	Voltage-gated ion channels Paper 2: Ion channels
8	Midterm break
9	Midterm Exam Synaptic transmission
10	Synaptic vesicle cycle Neurotransmitters and Ionotropic receptors
11	Neurotransmitters and Metabotropic receptors Modulation of synapses
11	Paper 3: Metabotropic receptors/autoreceptors Short-term synaptic plasticity,
12	Sensitization and Habituation Long term potentiation – Induction
13	Long term potentiation - maintenance Paper 4: Long-term synaptic changes

University Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including thos e for survivors of sexual violence.

UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom.

UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances.

UBC values academic honesty and students ae expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of how to access support are available on the UBC Senate website.