

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 June 2020

About the course:

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, and 5) Neuroendocrinology. Students will also develop skills in reading primary literature. Five papers will be assigned, discussed in class, and assessed using 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, BIOL 260

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 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
- 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	8%
Worksheets (participation only)	2%
Clickers (optional)	0%
Midterm 1	25%
Midterm 1	25%
Final exam	40%
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. These multiple choice questions are typically easier than the multiple choice questions that will appear on exams.

Clicker Questions:

During lectures, students will often break up into small groups to solve problems, then discuss as a class. These problems will provide an opportunity to apply the material covered in the readings and lectures, as well as to explore some specific examples of applied physiology. Clicker questions are optional and do not count towards the final mark.

Worksheet:

During some lectures, students will also break up into small groups to solve longer form questions. These worksheet will be marked for participation only, and they can be handed in any time before the beginning of the next lecture. This allows students who watch the asynchronous recording of the lecture to still achieve full worksheet marks.

Exams

The two midterms and the final are closed-book exams. The second midterm will assess content since the first midterm. 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
2	The neuron doctrine Neural circuits and glia
3	Membrane permeability and membrane potential Graded potential and passive membrane properties
4	Paper 1: Synaptic inhibition Voltage clamp and current
5	Action potentials Midterm 1
6	Ion channels Paper 2: Ion channels
7	Neurotransmitter release Neurotransmitters and the synaptic vesicle cycle
8	Ionotropic receptors Metabotropic receptors
9	Signal transduction Paper 3: Synaptic signaling
10	Drugs and synapses Midterm 2
11	Synaptic strength and short-term plasticity Long-term plasticity
12	Paper 4: Synaptic plasticity Neuroendocrinology
13	HPA, HPG, and HPT axes Paper 5: Neural control of fertility
Date TBA	Final exam

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 those 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 are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

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