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

BIOL 372 – Principles of Neurobiology II

General course syllabus as of June 2020

About the course:

Course description: BIOL 372 explores systems neurobiology – the study of how neurons work together to produce emergent properties such as sensory perception, motor function, sleep and memory. We will examine these properties and use them as a framework for understanding fundamental principles of neurobiology, including how the nervous system encodes information, transforms it between neurons, and decodes it into behaviour. Students will also develop skills in reading primary literature: five papers will be discussed that emphasize current topics in sensory and systems neurobiology and provide preparation for specialized courses and laboratory research.

Course format: Lecture
Credits: 3
Prerequisites: BIOL 200, BIOL 260, BIOL 361 or BIOL 371

Course learning objectives:

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

1. Explain basic principles of encoding information in neural activity and contrast the coding models across different sensory modalities.
2. Connect the properties of individual cells to their function in organized neural circuits and systems.
3. Discuss specific examples of neural conservation, divergence and specialization of function across species.
4. Predict the consequences of altering neural circuit motifs on information processing or behavioural output.
5. Interpret data from common experimental approaches used to study systems neurobiology.
6. Design experiments to test specific hypotheses in systems neurobiology.
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.
- 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%
Assignments	20%
Clickers and group discussion (optional)	0%
Midterm 1	20%
Midterm 2	20%
Final exam (cumulative)	30%
Total	**100%**

DETAILS ON ASSESSMENTS:

Weekly Pre-Reading and Online Quizzes:
The assigned readings and the online assignment for each week will be posted on the course website. Online assignments are multiple choice questions meant to help students to 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.

Small-group discussions:
During lectures, students will often break up into small groups to solve problems and then discuss as a class. This will provide an opportunity to apply the material covered in the readings and lectures to explore specific examples of sensory and systems neurobiology.

Assignments:
There will be 6 assignments throughout the term, and we will count your best 5 marks. The assignments will contain questions similar to those you will see on the exams.

Exams:
The midterm and final exams are mandatory closed-book exams. Midterm 1 and Midterm 2 will assess content from the first and second sections of the course, respectively. The final exam is cumulative and will assess content from the whole course.

Policy on missed final
Students must consult with their faculty's Dean's Office to determine if a deferred final can be granted.

Schedule of topics:

Week	Topic
1	Introduction to sensory systems and coding Tactile sensation 1: molecular sensors
2	Tactile sensation 2: circuits Touch specialists and pain
3	*Paper 1*: "The sensory coding of warm perception" Vision 1: the retina
4	Vision 2: central processing Equilibrium and audition 1: the inner ear
5	Audition 2: sound localization and auditory specialists *Paper 2:* "Gain control in owl audition"
6	Midterm exam #1 Chemosensation 1: peripheral olfaction and taste
7	Chemosensation 2: central olfactory processing Chemosensation 3: central taste processing
8	*Paper 3:* "Testing odor response stereotypy in the *Drosophila* mushroom body" Reflexes and central pattern generators
9	Motor systems and voluntary movement Motor planning and action selection
10	*Paper 4:* "Optical deconstruction of parkinsonian neural circuitry" Motor learning and the cerebellum
11	Midterm exam #2 Emotions, arousal, and motivated behaviour
12	Learning and memory Vocal communication
13	*Paper 5:* "Visual place learning in *Drosophila melanogaster"* The future of neuroscience
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 ae 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.