

BIOL 404 (10441) – Sensory Biology

Fall 2022 (Sept – Dec 2022)

TWF 11:30 to 12:20

Cornett Building B143

Delivery Mode: face-to-face

Please check Brightspace for any changes on the location for lecture (e.g., online)

Instructor: Dr. Erin Star

estar@uvic.ca

Office Hours: Wednesdays 12:30 to 1:30 (starting Sept 14, 2022) or by appointment

Office: Cunningham 019 or by Zoom

Course Description

Explores the neural mechanisms underlying sensory systems: sensory receptor coding logic; signal transduction; neuronal circuitry; comparative analysis of model organisms. Related clinical disorders and therapeutic strategies are also discussed. A large emphasis is placed on the primary literature highlighting major advances in the field, aimed at building skills for designing experiments to test specific hypotheses.

[2022 UVic Calendar \(Fall\)](#)

Prerequisites:

- Complete one of:
 - [BIOL365](#) - Animal Physiology (1.5)
 - [BIOL367](#) - Neurobiology: Molecules to Behaviour (1.5)
 - [BIOL409A](#) - Neurobiology: Molecules to Behaviour (1.5)

This course provides an overview of animal sensory systems with emphasis placed on understanding the cellular and molecular mechanisms that underlie signal detection and transduction. As a significant component of this course is to gain an understanding of the major discoveries in sensory biology (and the scientific process of those discoveries) through the examination of primary literature, an understanding of basic principles in molecular and cellular biology is required. A major goal of this course is to support the development of skills relating to

- (i) evaluation of primary literature
- (ii) development of hypotheses based on pre-existing facts
- (iii) designing of experiments to test hypotheses

For each topic covered, approximately 2/3 of the time will be spent in a lecture-style format to introduce the topic and 1/3 of the time will be a detailed discussion

of a single article related to the topic. The article or “discussion paper” will demonstrate a discovery in the field and/or an interesting experimental technique. Each figure within the paper will be examined and we will discuss the conclusions of the paper, overall significance, and possible future experiments. *Students are expected to come to class having read the paper and be ready to contribute to discussion.*

Reading Material

There is no assigned text for this course. Reading material will be drawn from primary literature, review articles and other sources and links will be posted on Brightspace. Learning outcomes are presented at the start of each lecture. Students will benefit from having access to recent Neuroscience and Cellular/Molecular Biology textbooks.

Recommended Textbooks:

Principles of Neural Science

Eric Kandel et al.

Molecular Biology of the Cell

Bruce Alberts et al.

Evaluation

Final exam (comprehensive)

Exam1 - Oct 4, 2022 (covering material from Sept 7 to Sept 28)

Exam2 - Nov 2, 2022 (covering material from Oct 5 to Oct 26)

Participation*

Option	A	B	C
Final Exam	45%	60%	60%
Exam1	20%	5%	20%
Exam2	20%	20%	5%
Participation*	15%	15%	15%

The option (A, B or C) that gives a student the highest **final** grade in the course will be selected for each student without a request being made to the instructor.

*Participation grade is determined by the completion of discussion paper assignments (12%) and participation in small group in-class “brainstorming” sessions related to the discussion paper (3%). To receive full participation marks 8/10 of the assignments/brainstorming sessions need to be completed. See below for additional information.

Discussion Paper Participation (15%)

Assignments - Each assignment will consist of three questions directly related to

the discussion paper. The questions are designed to encourage you to read and think about the discussion paper in advance of the class. The questions will be graded out of three. The assignments are to be submitted on Brightspace prior to the **start** of class (11:30am). Assignments not received by 11:30am on the day of the discussion paper lecture will be given a grade of zero. Assignment questions will be posted on Brightspace one week in advance of due date.

Brainstorming questions - On “Discussion Paper” days there will be a 10min brainstorming session where students will be divided into groups and presented with two questions for discussion. The first question will be a general question related to the topic of the paper and will be addressed by all groups. The group will have five minutes to produce a written response that will be handed to the instructor. The second question will be specific to a figure or issue within the discussion paper and will be unique for each group. Again, the group has five minutes to discuss the problem and submit a written response to the instructor. At relevant times during the discussion, one person from the group will be called upon to present the response. The names of all students in the group should be on the submitted response. *It is your responsibility to ensure that your name is on the submitted response.* Dr. Star will arrange the composition of groups.

Exams (85%)

The exams will test the understanding of ideas, concepts, mechanisms, and pathways underlying sensory biology. Emphasis will be placed on the ability to apply ideas and concepts within an experimental context (e.g., can the student develop a hypothesis and design experiments to test their hypothesis). Questions will be taken from both the lectures and discussion papers. The exams will be mostly short answer questions with some matching, M/C and labeling of diagrams. **Writing the final exam and one of the two midterm exams is a course requirement.** Exams will cover anything presented in the lectures.

Medical documentation for short-term absences is not required for this term (Fall 2021 approved by Senate). Attendance is important. Students who can not attend due to illness are asked to notify their instructor immediately. If illness, accident, or family affliction causes a student to miss the final exam or to fail to complete any assignment/exam by the end of the term, students are required to submit a request for academic concession ([regulations](#) and [guidelines](#)).

Students are required to abide by all academic regulations as set out in the University calendar, including standards of academic integrity. Violations of academic integrity (e.g., cheating and plagiarism) are considered serious and may result in significant penalties.

Grading

It is the policy of the Department of Biology that no supplemental exams or

assignments will be offered. Please see link for information regarding [academic accommodations](#).

Students are responsible for confirming their status in the course and must not assume they will be automatically dropped from the course if they do not attend.

Last day for withdrawing from first-term courses without penalty of failure
Oct 31, 2022, <https://www.uvic.ca/calendar/dates/>

Students who have completed the following elements will be considered to have completed the course:

- final exam
- midterm 1 OR midterm 2

Failure to complete one or more of these elements will result in a grade of “N” regardless of the cumulative percentage on other elements of the course. N is a failing grade and factors into GPA as a value of 0.

All course content and materials are made available by instructors for educational purposes and for the exclusive use of students registered in their class. The material is protected under copyright law, even if not marked with a ©. Any further use or distribution of materials to others requires the written permission of the instructor, except under fair dealing or another exception in the Copyright Act. Violations may result in disciplinary action under the [Resolution of Non-Academic Misconduct Allegations policy \(AC1300\)](#).

All lecture notes and course materials that I make available, and all exams and quizzes are my intellectual property. They are made available to students for instructional purposes only. Please do not distribute lecture notes or any exams or quizzes from the course without my permission. To do so, through note-sharing sites or other means, violates the Policy on Academic Integrity.

Please be aware that sessions in this course may be recorded to allow students who are not able to attend to watch later. The recording will be posted in Brightspace. Students who have privacy concerns can contact me and will have the option to limit their personal information shared in the recording. If you have other questions or concerns regarding class recording and privacy, please contact privacyinfo@uvic.ca

A note to remind you to take care of yourself. Diminished mental health can interfere with optimal academic performance. Do your best to engage in self-care and maintain a healthy lifestyle this semester. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. The source of symptoms might be related to your course work; if so, please speak with me. However, problems with other parts of your life can also contribute to decreased academic performance. [The UVic Student Wellness Centre](#) provides cost-free and confidential mental health

services to help you manage personal challenges that impact your emotional or academic well-being.

The University of Victoria is committed to promoting critical academic discourse while providing a respectful and supportive learning environment. All members of the university community have the right to this experience and the responsibility to help create such an environment. The University will not tolerate racism, sexualized violence, or any form of discrimination, bullying or harassment. Please be advised that, by logging into UVic's learning systems or interacting with online resources, and course-related communication platforms, you are engaging in a university activity. All interactions within this environment are subject to the university expectations and policies. Any concerns about student conduct may be reviewed and responded to in accordance with the appropriate university policy. To report concerns about online student conduct: onlineconduct@uvic.ca

Please see the Student Code of Conduct:
[tri-fac-student-code-of-conduct.pdf \(uvic.ca\)](#)

We acknowledge and respect the lək'wəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

Biol404 - Sensory Biology Fall 2022*

Tuesday	Wednesday	Friday
	Sept 7 - Introduction and Overview	Sept 9 - Review of techniques and development of sensory systems
Sept 13 - Vision I	Sept 14 - Vision II	Sept 16 - Discussion paper #1
Sept 20 - Vision III	Sept 21 – Circadian Rhythm	Sept 23 - Discussion paper #2
Sept 27 - Magnetoreception	Sept 28 – Olfaction I	Sept 30 – National Day for Truth and Reconciliation
Oct 4 - Exam #1	Oct 5 - Olfaction II	Oct 7 – Discussion paper #3
Oct 11 – Olfaction III	Oct 12 - Olfaction IV - Pheromones	Oct 14 - Discussion paper #4
Oct 18 - Taste I	Oct 19 - Taste II	Oct 21 - Discussion paper #5
Oct 25 - Taste III	Oct 26 - Discussion paper #6	Oct 28 - Mechanosensation I <i>Last day to withdraw (Oct 31)</i>
Nov 1 - Mechanosensation II	Nov 2 - Exam #2	Nov 4 - Discussion paper #7
Nov 8 - Auditory System I	Nov 9 - Reading Break	Nov 11 – Reading Break
Nov 15 – Auditory System II	Nov 16 – Auditory System III	Nov 18 - Discussion paper #8
Nov 22 - Nociception	Nov 23 – Discussion paper #9	Nov 25 – Sensory Processing
Nov 29 - Stem Cells: Applications for Sensory Systems	Nov 30 - Discussion paper #10	Dec 2 – Review

Monday, Dec 5 (Friday course schedule) – last day of classes
 National Day of Remembrance and Action on Violence Against Women
 Classes and exams cancelled from 11:30am to 12:30pm

***course schedule is subject to change - changes will be announced in class and posted on Brightspace**