Department of Biology Course Outline

SC/BIOL 3380 3.0 Sensory Systems
Winter, 2021
(version: Jan 21, 2021)

Course Description

This course explores sensory systems in humans, animals and machines, and how they control action, behavior and physiological state. Adopting a comparative approach, we focus on highly specialized sensory systems and unusual, often surprising solutions to sensory challenges.

Three lecture hours. One term. 3.0 credits.

Prerequisites (strictly enforced)

BIOL 3060 4.0 or PSYC 2220 3.0

Course Instructor(s) and Contact Information

Course Director:

Dr. Niko Troje

troje@yorku.ca

Department of Biology
Life Sciences Building,
Office: 429 B

Office Hours: By appointment

If you contact me by email. please include “BIOL3380” in the subject line, and your full name and student number in the text of your email.

Schedule

Lectures: Tuesdays and Thursdays from 5:30pm – 7:00pm

Classes are applied synchronously, and attendance is required.

Evaluation

Grading:	Midterm exam	25%
	Final exam	35%
	Participation breakout sessions incl. completion of worksheets and peer-grading other students	40+%
	Bonus marks for your peer-grading performance (at instructor's discretion, up to max. 10%)	

Important Dates

Reading Week: February 13-19, 2021

Midterm test: February 25, 2021

NOTE: For additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at https://registrar.yorku.ca/enrol/dates/fw20

Resources

eClass	https://eclass.yorku.ca
	I will use it as a repository for slides and lecture recordings. We will also use it to run the midterm and final exam.
Zoom	Please make sure you have a York Zoom account, as Passport York authentication will be required to enter live Zoom sessions. Please go to https://yorku.zoom.us/ to set up your YorkU Zoom account.
	Once setup, log in via SSO.
Reading 1 (recommended)	Martin Stevens: Sensory Ecology, Behaviour, & Evolution. Oxford University Press, 2013
	180 day access to online version costs $32, Hardcopy more expensive.
	https://www.vitalsource.com/en-ca/products/sensory-ecology-behaviour-and-evolution-martin-stevens-v9780191651472
Reading 2 (recommended)	Kenneth Catania: Great Adaptations Princeton University Press, 2020
	eBook for $38. Hardcopy is about the same.
	https://www.vitalsource.com/en-ca/products/great-adaptations-kenneth-catania-v9780691209555
Kritik.io	Kritik is a peer-grading platform that distributes fair and accurate assessments by harnessing collective intelligence to simplify workflows and reduce turnaround time on feedback.
	Subscription is required and costs $15 for the term. Please watch your email for an invitation to order your subscription.

Learning Outcomes

Upon successful completion of this course, students should be able to:

- Describe the function of the specialized sensory mechanisms (such as visual acuity, eye movements and stereopsis) in humans and how they are used to control action, behavior and physiological state.
- Describe alternative solutions to similar problems in a variety of animals.
- List evolutionary and physical constraints that lead to these solutions.
- Evaluate technical solutions to sensory problems in robotics and automation.
- Explain how sensory processes are integrated into control structures to result in functional systems.
- Analyze published literature, including experimental data, about specialized sensory systems.
- Extract and communicate key concepts from original, empirical literature both orally and in writing.
- Defend scientific theories related to specialized sensory mechanism with logical reasoning.
- Compare theoretical terms and concepts related to specialized sensory mechanism to the reality of empirical science.

Course Content

1. Introduction
2. Light and eyes
3. Colour and wavelength
4. Depth perception
5. Bayesian inference
6. Loudness and timbre
7. Sound localization
8. Active sensing
9. Touch and haptics
10. Unusual and unfamiliar senses
11. What is real?
12. Communication

Depending on how the course proceeds, the last few topics may change.

Copyright Protection of Course Material

Course Policies

Missed Breakout Exercises, Mid-term Exam, or Final Exam:

Missed breakout exercises and offline assignments

We will conduct small exercises every class. Generally, they are combined with short group discussions with one or more other students in a Zoom breakout room during class time. If you miss a breakout session you get zero marks for it. Breakout exercise cannot be re-opened after they close. Also, since activity deadlines cannot be extended, I already built extra time into the activity deadlines.

Don't worry too much if you miss a session here and there. The breakout exercises contribute 40% to the final mark. However, over all exercises, you can collect even more marks (up to 50). The 20% of the activities where you received the lowest marks (or 0 marks) will not be counted towards the final mark.

Missed midterm

Any student who is absent from the mid-term without a valid reason will receive a grade of zero for this exam. If you do have a valid reason that you communicate in writing to the Course Director, the percentage of the midterm will be added to the final exam.

Students who feel that there are extenuating circumstances that may interfere with their ability to successfully complete the course requirements are encouraged to discuss the matter with the Course Director as soon as possible.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods should consult with the Office for Persons with Disabilities (OPD) and ensure that requests for appropriate accommodations are arranged with the Course Director early in the term.

Missed final exam

If you miss the final examination please complete and submit a Deferred Standing Agreement (DSA) form available from the Registrar's website to troje@yorku.ca (subject: BIOL3380) together with a letter outlining the reason for missing the exam, within one week of the missed exam.

See "Deferred Standing Guidelines" on the course eClass site for further details: https://myacademicrecord.students.yorku.ca/deferred-standing

If you are approved to write a deferred exam, an in-person final exam will be arranged on campus whenever approval to do so is granted. The format of the deferred final exam may be different from the main exam and might include to write an essay, short answer, multiple choice, or a mix of these options.

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - http://www.yorku.ca/academicintegrity/

Important A note from the Faculty of Science Committee on Examinations and Academic Standards:

Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning, sharing, uploading or publishing these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Student Accessibility Services - https://accessibility.students.yorku.ca

York Accessibility Hub - http://accessibilityhub.info.yorku.ca/

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an accommodation request form

https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf

at least 3 weeks before the exam period begins.

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/