



COURSE OUTLINE

1. **Course:** NEUR 411, Cellular & Systems Neuroscience - Winter 2024

Lecture 01 : TR 12:30 - 13:45 - Online

Instructor	Email	Phone	Office	Hours
Dr Willem Wildering	wilderin@ucalgary.ca	220-5283	BI 462	by appointment only
Co-lecturer: Dr. Grant Gordon	gordong@ucalgary.ca			by appointment only
TA:	Kelsea Chorzo, MSc	kelsea.gorzo@ucalgary.ca		by appointment only

Using a blend of traditional lectures, computer simulation exercises and research-focused assignments, NEUR411 introduces students to the way neurons and neuronal circuits work, from a molecular, cellular, physiological and biophysical perspective at an advanced undergraduate level. The course integrates with NEUR401, but can be taken independently from the latter.

NEUR411 is delivered in online synchronous mode, and use a blend of traditional lecturing and computer simulation exercises in its introduction of biophysical and physiological principles and concepts of neuronal and neuronal circuit function. In this context, students are provided with access to computer simulation software (Neurosim 5) on the University of Calgary's Virtual Desktop Windows 10 infrastructure (VDI). URL's and login information needed to access the University's VDI will be provided in class. Access to the VDI system is platform-independent and only requires a computer (Mac, Windows or otherwise), with a current web-browser and a current University of Calgary IT account. The use of this service is free to NEUR411 participants.

Downloadable version of Neurosim 5 will not be provided by us, but can be obtained for a small fee through external software repositories, including the Microsoft App store. Note that Neurosim 5 is a native Windows software, MacOS users will require additional solutions to run the software locally (course staff can provide information on the latter upon request). The Neurosim 5 software package will also be used extensively in NEUR401. Students enrolling in NEUR401 will therefore also need Neurosim 5. Neurosim 5 VDI licenses are provided for the duration of a valid University of Calgary IT account, and do not need to be acquired separately for NEUR401 and NEUR411.

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

Online Delivery Details:

This course is being offered online in real-time via scheduled meeting times, you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

Lectures, impromptu tutorials and computer simulation instructions will be exclusively delivered online through the Zoom platform. The lectures will be recorded and posted on the the course D2L site within two days after their delivery. Background information and study resources or their URL's will be posted on the the course D2L site.

Course Site:

D2L: NEUR 411 L01-(Winter 2024)-Cellular & Systems Neuroscience

Note: Students must use their U of C account for all course correspondence.

The course is organized around Neurosim 5, a neuronal and neuronal circuit simulation software package and its online tutorials (https://www.st-andrews.ac.uk/~wjh/neurosim/TutorialV5_3/tutorials.html). NeuroSim is written for Windows platforms, and will be made available at no cost to registered students on the University's online virtual Windows environment. Alternatively, students can acquire NeuroSim for a nominal fee through the Microsoft Windows Apps store and run it on their own Windows computer or a Windows emulator environment installed on their non-Windows computer. Several Windows emulation options exist for MacOS platforms, including bootcamp, but also the Crossover for Mac emulator by CodeWeavers. Course staff has extensively and successfully tested NeuroSim in a MacOS Crossover environment. Crossover licenses are also available for Linux and ChromeOS environments through www.codeweavers.com.

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

2. Requisites:

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Zoology 461 and admission to the Neuroscience program, or a minimum grade of "B+" in Zoology 461.

Note(s):

- a. This course is offered as part of an honours program.

3. Grading:

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
assignment 1	30%	Feb 06 2023		
assignment 2	30%	Mar 15 2024		
assignment 3	40%	Apr 09 2024		

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	96 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

Percentages in the above grading scale indicate cutoffs for each letter grade. Final grade percentages will be calculated from the weighted sum of the scores of the assignments. No rounding will be applied in the calculation of the letter grade conversion.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

4. Missed Components Of Term Work:

In the event that a student legitimately fails to submit any online or in-person assessment on time (e.g. due to illness, domestic affliction, etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date, or possible exemption and reweighing of components. Absences not reported within 48 hours will not be accommodated. Students may be asked to provide supporting documentation ([Section M.1](#)) for an excused absence, See [FAQ](#).

If an excused absence is approved, options for how the missed assessment is dealt with is at the discretion of the coordinator or course instructor. Some options such as an exemption and pro-rating among the components of the course may not be a viable option based on the design of this course.

TA - Kelsea Chorus MSc. - e. kelsea.gorzo@ucalgary.ca : by appointment only

5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

6. Course Materials:

The course is build around freely available, public domain resources and does not mandate a particular textbook. Many online resources for self-study will be provided or indicated as the course progresses. However, while the course does not specify or explicitly follow a required or recommended textbook(s), participants may find it useful to consult one or another of the many excellent textbooks available in this field, including, for example:

- JG Nicholls et al., *From Neuron to Brain*: Sinauer Associates.
- L. Squire et al., *Fundamental Neuroscience*: Academic Press.
- L. Luo, *Principles of Neurobiology*: Garland Science.
- Trappenberg, Thomas P., *Fundamentals of Computational Neuroscience: Third Edition*, 3rd edn (Oxford, 2022; online edn, Oxford Academic, 19 Jan. 2023)
- Sterratt D, Graham B, Gillies A, Willshaw D. *Principles of Computational Modelling in Neuroscience*. Cambridge University Press; 2011.
- John H. Byrne, et al, *From Molecules to Networks : An Introduction to Cellular and Molecular Neuroscience*, edited by John H. Byrne, et al., Elsevier Science & Technology, 2014.

Many of these and other relevant titles are available in both hardcopy and electronic (and often rentable) format. Further information will be provided upon request (Note: above titles are only provided as suggestions for course participants wishing to use a comprehensive text as basis for their studies).

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- o A computer with a supported operating system, as well as the latest security, and malware updates;
- o A current and updated web browser;
- o Webcam/Camera (built-in or external);
- o Microphone and speaker (built-in or external), or headset with microphone;
- o Current antivirus and/or firewall software enabled;
- o Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

7. Examination Policy:

No aids are allowed on tests or examinations.

Students should also read the Calendar, [Section G](#), on Examinations.

8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

10. Human & Living Organism Studies Statements:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

STUDIES IN THE BSc NEUROSCIENCE PROGRAM MAY INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.

Students taking laboratory- and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The program strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered in the program should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work [form](#) to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Services:** For more information, see their [website](#) or call [403-210-9355](#).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.
- e. **Student Union Information:** [SU contact](#), Email your SU Science Reps: science1@su.ucalgary.ca, science2@su.ucalgary.ca, science3@su.ucalgary.ca.
- f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on

a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Dr. Willem Wildering by email bscndir@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

- g. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)
[Student Academic Misconduct Policy](#) and [Procedure](#)
[Faculty of Science Academic Misconduct Process](#)
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- h. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.
- i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- j. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

Course Outcomes:

- o Explain (electro)chemical, physical, physiological and anatomical foundations of neuronal excitability and be able to relate these principles to neuron and neuronal network functions and perturbations thereof.
- o Define and classify the main molecular, cellular and circuit elements of neuron function and explain how they relate to neuron and neuronal network function.
- o Describe and explain molecular, cellular and neuronal network foundations of learning and memory
- o Appraise and extract information from primary research literature in the field of neuroscience.
- o Analyze problems in neuroscience and formulate hypotheses and research strategies to solve those problems.
- o Explain major experimental techniques in neurobiology and be able to integrate these techniques in the formulation of research strategies.
- o Communicate and defend analysis of research problems and plans in writing at an advanced level using appropriate scientific methods and standards

Electronically Approved - Jan 09 2024 09:33

Department Approval