



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

1. **Course: ZOOLOGY 595 – Evolutionary Perspectives in Neurobiology**

Lecture Section: L01 TR 09:30-10:45 BI 561 WINTER 2019  
Instructor: Dr. W. Wildering BI 462 220-5283 wilderin@ucalgary.ca

Course materials, announcements and other course related information will be communicated through D2L (accessible under the following URL:

D2L: ZOOL 595 L01 - (WINTER 2019) - COMP NEUROMUSCULAR PHYSIOLOGY (W2018ZOOL595L01))

Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. **PREREQUISITE(S):** Zoology 461

**ANTIREQUISITE(S):** Credit for both Zoology and Neuroscience 541 will not be allowed.  
See section 3.5.C in the Faculty of Science section of the online Calendar  
(<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

<b>Student presentation (30 min)</b>	<b>30 %</b>
<b>Final report (written)</b>	<b>35 %</b>
<b>Participation</b>	<b>35%</b>

There will not be a final exam scheduled by the Registrar's office.

Each piece of work (presentation and final report) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components 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. Each course participant presents a seminar on a topic commensurate with the course's goal. Participation will be graded on the basis of in class participation and questions about student presentations submitted to the course coordinator by email one day prior to each presentation.

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	96	91	86	82	78	74	70	65	60	55	50

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.3](#) of the University Calendar

5. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours. N/A

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.**

6. **Course Materials:** N/A

7. **Examination Policy:** Students should also read the Calendar, [Section G](#), on Examinations.

8. **Writing across the curriculum statement:** In this course, the quality of the student's writing in reports will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

## 9. 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 Biological Sciences 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 Department 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 by the Department of Biological Sciences 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.

10. Students are expected to be familiar with Section SC.4.1 of the University Calendar.

### 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 **15 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 immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a reassessment of the work if, and only if, the student has sufficient academic grounds. 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.

## 11. 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 Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. 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](mailto:svsa@ucalgary.ca)) or phone at 403-220-2208 .
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. **These are only examples.**

- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.
- f. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#). Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head, Undergraduate of the Department of Biological Sciences, Heather Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-6979. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See Section E.4 of the University Calendar.
- g. **Safewalk:** Campus Security will escort individuals day or night (See the Campus Safewalk website). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. **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.
- i. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: 403-220-3913 Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).
- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **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.

Department Approval \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date \_\_\_\_\_

Department Approval  
 For NO Final Exam: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_  
 Z595 co W19; 1/7/2019 2:47 PM

## LEARNING OUTCOMES

This is a lecture/seminar course based on topics selected to present an overview of the organization and function of nervous system with a particular focus on its evolution of the nervous system. The course explores form, function and performance of invertebrate and vertebrate neurons and nervous systems through examination of physical, biochemical, metabolic, (neuro)physiological and behavioral constraints and trade-offs.

The course will cover a range of topics that may include; mitochondrial function and dysfunction, integration/regulation of energy demand and supply, plasticity of the nervous system, metabolic cost of learning and information processing, the economics of cell size, reliability and robustness of nervous system functions, and neural circuit organization. Other topics will be identified during the course in consultation with all participants on the basis of their interests and learning needs. References to key concepts will be given in advance and all students are expected to gain some familiarity and understanding of the subject prior to the relevant class. Seminars will be presented by students, faculty and guest lecturers. The course adopts problem-oriented, collaborative learning methods, emphasizing student initiative, in-class participation and problem solving skills.

### Tentative 2019 Lecture Schedule

- Lecture 1 – Introduction to the course
- Lecture 2 – Evolutionary origins of neurons and nervous systems
- Lecture 3 – Does being smart come at cost?
- Lecture 4 – Neuroenergetics I: energy budget of the nervous system
- Lecture 5 - Glutaminergic synapses I: molecular foundations of learning and memory
- Lecture 6 – Glutaminergic synapses II: performance and energy budget.
- Lecture 7 - Neuroenergetics II: economy of nervous system function and structure.
- Lecture 8 – Biophysical determinants of nervous system and sensory performance
- Lecture 9 – Primer to functional diversity ion channels
- Lecture 10 - Visual ecology of insects: electrophysiology of visual speed and sensitivity.
- Lecture 11 – Guest lecture on topic to be determined
- Lectures 12-24 – Student presentations on topics commensurate with course theme.

Note: topics of lectures may be varied without prior notice depending on instructional needs of class participants