

BI 437 Neurobiology, CRN 11179
Western Oregon University
Spring 2024

Contact Information

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114 DeVolder
Office Hours: W 9:00 – 11:00 a.m.
R 11:00 a.m. – 12:00 p.m.

Meeting times and location

WF 11:00 – 11:50 a.m. NS 216

Course description

This course is an introduction to fundamental concepts in neurobiology. Content includes the anatomy and physiology of neurons, the molecular basis of cell communication and the emergent properties of nervous systems. Integrated topics include animal behavior, research methods and drugs used in neurobiology research. Learning will take place using lectures, demonstrations, simulations, and discussions of outside readings. Four hours of class meetings per week.

Course Goals

- Understand the cellular structures of the nervous system, the chemical basis of action potentials, and the chemical basis of cell-to-cell communication.
 - Aligned to Biology Program Learning Outcome #1: Demonstrate mastery of key concepts from the many disciplines within the biological sciences.
- Learn about the higher-order processing behind major brain functions.
 - Aligned to Biology Program Learning Outcome #1: Demonstrate mastery of key concepts from the many disciplines within the biological sciences.
- Interpret and discuss data presented in primary literature research articles.
 - Aligned to Biology Program Learning Outcome #2: Demonstrate critical thinking through laboratory experimentation, field research, data analysis and interpretation.
 - Aligned to Undergraduate Learning Outcome Inquiry and Analysis.

Assigned Materials

None, hopefully, but you may need to purchase Crescent Loom, which we will be using several times this term. Crescent Loom will allow us to build some simple nervous systems and see them in action. I think we'll be able to do everything using the web interface. If you have to buy the game, it will cost \$19.

Overview of Course Structure

This course is a 4-credit course, which is the equivalent of four 50-minute in-person meetings and 8-12 hours of out-of-class work. Generally we will “meet” online twice per week and in-

person twice per week. For online class “meetings” I will post lecture videos. The lecture videos for a 50-minute in-person lecture are typically about 20-25 minutes long. In order for you to keep up during our in-person meetings, you will need to **watch the posted lecture videos prior to coming to class each week.**

I have decided to move away from a print textbook for this course. There are lots of resources online that explain the topics that I will cover in the lecture videos. Links to those resources will be included with the lecture videos.

Our in-person meetings will include “simulations” of neurons, building neural circuits in Crescent Loom, and primary literature discussions. I plan to record those class meetings, but the recordings won’t be the same as attending in person.

Attendance

In the case of an unplanned situation that will keep you from attending class, you may **submit a student absence notification request form at: www.wou.edu/advising/absence**. This form allows the Student Success and Advising office to relay the information regarding your absence to faculty members in a timely manner. The notification sent to your faculty will serve as a courtesy notice and does not excuse your absence. It will still be your responsibility to communicate with your faculty members to discuss any work missed during your absence. Information submitted through the Student Absence Notification System must be truthful in accordance with the Student Code of Responsibility.

Evaluation and Expectations

On the first day of class, we will discuss the exams, discussion, and in-class exercises, as well as how each of those components should contribute to your final grade. If you did not select an alternative point distribution on the Class Policies survey, your grade breakdown is below.

Exams

There will be two midterm exams (50 minutes each) and one final exam (110 minutes). Approximately half of the final exam will cover new material and the other half will be cumulative. The exams will cover lecture material, in-class exercises and assigned readings. The exams will consist primarily of multiple choice and short answer essay questions. The goal of the exam is to evaluate your understanding of the class material, your ability to explain concepts and ideas, and your ability to apply concepts and ideas to new problems.

Discussion

We currently have 4 discussions of primary literature scheduled. A week before the discussion, I will post the paper and discussion questions on the course Canvas site. You are expected to submit your answers to the discussion questions by noon the day before the discussion. I will grade your answers and return them to you at the beginning of class. Your discussion grade will be based on the assignment that you submit before class and participation in the paper discussions. Once we have the class discussion, you cannot submit the pre-class questions for a grade. Your lowest score on your discussion questions will be dropped.

In-Class Activities

On class meeting days that are not exams or discussions, we will be using neuron and nervous system simulations to reinforce the lecture concepts and to better understand how neural circuits and nervous systems work to create animal behavior.

Grading		Letter grades (in percentage)	
Exam 1	60	A	90 – 100
Exam 2	60	B	80 – 89
Final	120	C	70 – 79
Discussion (15 each, drop 1)	45	D	60 – 69
<u>In-class (9 each, drop 2)</u>	<u>56</u>	F	< 60
Total	341		

Learning/Physical Disability

Western Oregon University values diversity and inclusion; we are committed to fostering full participation for all students. Accommodations are collaborative efforts between students, faculty, and the Disability Services office. Please notify your instructor if there are aspects of the instruction or design of this course that result in disability-related barriers to your participation. If you would like to apply for disability-related accommodations please contact the Office of Disability Services at: 503-838-8250, Academic Programs & Support Center (APSC) 405, ods@wou.edu

Academic Integrity

Academic integrity is a responsibility of all students. The work you turn in is expected to be your own, and information from others is expected to be cited appropriately. Please review: www.wou.edu/student/residences/pdfs/the_code_of_student_responsibility.pdf

Students who commit acts of academic misconduct are subject to in-class penalties imposed by the instructor and to a hearing before Judicial Affairs with possibilities of additional penalties.

Tentative Schedule

Date	Topic
Online	Unit 1: Introduction to neurons
Sept 27 (W)	Course Introduction, Finalize Syllabus
Sept 29 (F)	No meeting—Online: Unit 2: Electrical properties of Cells
Online	Unit 3: Action potentials
Oct 4 (W)	Simulations of equilibrium potentials
Oct 6 (F)	Simulations of cell potentials
Online	Unit 4: Action Potential Propagation
Oct 11 (W)	Simulations of action potentials
Oct 13 (F)	Discussion: Hodgkin and Katz. 1949. J Physiol 108:37-77
Online	Unit 5: Ion Channels
Oct 18 (W)	EXAM #1 (Units 1-5)
Oct 20 (F)	No meeting—Online: Unit 6: Synapses
Online	Unit 7: Neurotransmitters
Oct 25 (W)	Simulations of Synapses
Oct 27 (F)	Discussion: Neurotransmitters
Online	Unit 8: Synaptic Plasticity
Nov 1 (W)	Crescent Loom Introduction
Nov 3 (F)	Crescent Loom: Behavioral Observations and Circuits
Online	Unit 9: Neural circuits
Nov 8 (W)	Crescent Loom: Solving Circuits
Nov 10 (F)	EXAM #2 (Units 6-9)
Online	Unit 10: Photoreception
Nov 15 (W)	Crescent Loom: Network oscillators
Nov 17 (F)	Discussion: Neural circuits
Online	Unit 11: Visual system
Nov 22 (W)	Visual system simulation
Nov 24 (F)	NO CLASS: THANKSGIVING
Online	Lecture topic TBD
Nov 29 (W)	In-class activity TBD
Dec 1 (F)	Discussion TBD
Dec 4 (M)	FINAL EXAM: 10:00-11:50 a.m.

LINKS TO ADDITIONAL RESOURCES

Student Health:

WOU students taking all online classes must opt into the \$150 health service fee to access medical and counseling services at WOU's Student Health and Counseling Center (SHCC). Students taking in-person or hybrid classes will be automatically assessed the above fee and will gain access to SHCC services. For more information, please go to <https://wou.edu/health/> or call the SHCC at (503) 838-8313.

Responsible Employee

As an employee at Western Oregon University, I am required by federal law to report any incident of sexual misconduct. If you wish to talk with me about something that has occurred to you or another student, I must inform university personnel. Reporting this information helps the university to safeguard students and get students the help and support needed. You have the right to maintain your privacy. I will only report what you confide in me. If you would like additional information about sexual misconduct response at WOU, please visit the website at: <http://www.wou.edu/student/sexualmisconduct-resources/sexual-assault-care/>

Military Absence Policy

If you are Active Duty, a Reservist, or a National Guardsman and have upcoming mandatory training (drill), special details, or deployments, the Military Absence Policy was created for you. As soon as you learn of your upcoming service you are required to do two things:

- Submit the Student Absence Notification System Form (SANS) as linked through the QR code below as soon as possible, preferably during the first week of the term.
- Email your professors notifying them of the dates you will be absent and begin creating a plan together.

Orders, drill schedules, or an official letter from command with dates are sufficient forms of evidence.

Faculty members are required to work with you in making alternative or extended arrangements to complete assignments, exams, and presentations. It is our pleasure to support you in your service to our nation.

Note: The Veterans Resource Center (VRC) is here to advocate and support you with any complications, questions, etc. Contact them at wouveterans@wou.edu or 503-838-9246, or visit them in WUC 108.

Free Tutoring

Are you searching for a personalized learning experience and support from a fellow WOU student who is qualified in their subject area? Do you want to polish your performance in a subject or skill? Look no further than WOU Free Tutoring!

WOU Free Tutoring features peer tutoring from the Math Center, Science Center, Writing Center, Computing Science tutoring, English Tutoring Center (English as a Second Language), and

Student Success and Advising (SSA) tutoring (for other general education and introductory major courses as well as study skills tutoring).

Additionally, WOU Free Tutoring includes technology tutoring for academic projects (Digital Media Center), peer coaching for improving leadership and creative problem solving skills (Center for Leadership and Creativity), and advising help for Psychology majors and minors (Psychology Peer Advising).

For more information on how to access these tutoring centers and services, please visit: wou.edu/freetutoring/.

Wolf Connection System

If your faculty member at any point in the term is concerned about your academic progress and ability to succeed in the course, they may make a referral to Student Success and Advising through the Wolf Connection System (WCS). If a referral is created, an Academic Success Advisor from SSA will connect with you via email or telephone to discuss challenges you may be facing and your plan to overcome those obstacles and achieve success. This referral process is in place as a way to support you in this class and not a punishment.

Anytime you want to discuss strategies for academic success, you may schedule an appointment with an Academic Success Advisor by calling 503-838-8428, emailing studentsuccess@wou.edu, or online by logging into the Portal, selecting WCS and selecting Get Advising.