

NSCI 095 Introductory Neuroscience

Instructor: Patrick Mullen, PhD

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Marsh Life Sciences 102

802-656-0454

Course meeting: We will meet virtually via Microsoft Teams **Monday-Thursday 10:00 – 11:00 EST**

Office Hours: **Friday 10:00 – 11:00 EST** I will hold drop-in office hours on Microsoft Teams. Please email to set up an appointment if those times do not work.

Course Description: The aim of this course is to introduce fundamental concepts in Neuroscience. The course will be broken into four modules; 1. Electrical properties of the neuron, 2. Synapses and networks, 3. Sensory systems, and 4. Beyond the cell. In addition, throughout the course there will be a student-led discovery of expression, structure and function of a gene of interest and how it relates to human disease. There will be four lectures each week (except the first week with the holiday).

Learning Objectives:

- Acquire foundational knowledge in Neuroscience emphasizing the breadth in the field.
- Investigate the function of a gene of interest from a cellular and molecular level leading to mechanisms of human disease.
- Collect data and generate a poster to present data in a visual format.

Technology requirements: Students will need to have access to internet, word processing and PowerPoint. All videos and assignments will be posted through Brightspace and Microsoft Teams. Office hours will be weekly on Microsoft Teams.

Evaluation:

Quizzes and Exams: There will be short quizzes following each lecture. Additionally, weekly exams will be assigned at the end of each of the first three modules. They will be assigned Friday at 8:00 AM and are due Sunday at 11:59 EST. All quizzes and exams will be given on Brightspace. There will be no make-up exams without prior approval and late work will not be accepted.

Assignments: For the gene discovery project, students will be completing 8 assignments on their assigned gene of interest. All modules will be posted at the beginning of the course to allow students to progress at their own pace. There will be a short write-up due after each module.

Final project: At the beginning of the last week of the course, students will generate a poster on their discoveries on their gene of interest. There will be virtual poster session on Brightspace where students will look at each other's posters and make comments.

Points Breakdown and grading (subject to change)

Exams: 50 pts each X 3	150 pts
Daily quizzes: 5 pts each X 16	80 pts
Online assignments: 5 pts each X 8	40 pts
Final Project:	<u>30 pts</u>
	300 pts

Points Breakdown and grading (subject to change)

Lecture content	Gene Discovery	Due Dates
Week 1: Electrical properties of the neuron (July 1-5) No class July 4th		
History of Neuroscience and techniques	Gene expression patterns	
Anatomy of Neurons and Glia	BLAST searches	Week 1 quizzes Friday 5:00
The Action Potential	Multiple sequence alignments	Exam 1 Friday-Sunday
Week 2: Signaling and Development (July 8-12)		
Ion Channel Diseases and Toxins	Phylogenetic trees	
Synaptic Transmission	Protein domain prediction	
Neurotransmitters and receptors	Biological function (GO analysis)	Week 2 quizzes Friday 5:00
Development of Neurons and Glia		Exam 2 Friday-Sunday
Week 3: Sensory systems (July 15-19)		
Cellular signaling pathways	String analysis	
Vision	Human disease mutations	
Auditory and Vestibular		Week 3 quizzes Friday 5:00
Taste and Smell		Exam 3 Friday-Sunday
Week 4: Beyond the cell (July 22-26)		
Touch and Pain		
Diseases of the Nervous System		Posters due Wednesday
Regeneration and Adult Neurogenesis		Week 4 quizzes Friday 5:00
Brain rhythms and sleep		Poster session Thursday-Friday

Course Policies:

Course conduct: It is expected that all students do independent work. Copying another student's assignment or exam questions will not be tolerated and a zero will be given for the exam or assignment in question. This course will move quickly so please stay on top of the material daily.

Student learning accommodations: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students to create reasonable and appropriate accommodations via an accommodation letter to their professors as early as possible each semester.

Contact ACCESS: A170 Living/Learning Center - 802-656-7753 - access@uvm.edu.

- **ACCESS Office** <http://www.uvm.edu/~access/>
- **Policy on Disability Certification and Support—Students**
<http://www.uvm.edu/~uvmppg/ppg/student/disability.pdf>

Religious holiday policy: Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.

Student responsibilities and rights:

- **Code of Academic Integrity**
This policy addresses plagiarism, fabrication, collusion, and cheating.
<http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf>
- **Policy on FERPA Rights Disclosure**
The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.
<http://www.uvm.edu/~uvmppg/ppg/student/ferpa.pdf>