

## NEUR327/Cellular Neuroscience Summer 2024-ONLINE Synchronous

**INSTRUCTOR:** N KABBANI

Contact Information: [nkabbani@gmu.edu](mailto:nkabbani@gmu.edu)

Online meeting times: M/W/F, 9-11AM

**OBJECTIVE:** This is a fundamental neuroscience course that presents basic concepts of cellular and molecular neuroscience including the structure of neurons, cell membranes, regulation of electrical properties, and intracellular signaling and synaptic plasticity. The accompanying textbook is **Neuroscience 5/e, Purves et al. or any other edition.**

**GRADING:** There will be 2 exams and a comprehensive final. Each exam will be worth 25% of your final grade while the comprehensive will be worth 40%. **10% of your grade is based on attendance and participation in the course (based on your assigned presentation).**

**Attendance and participation.** Regularly attending the Zoom lecture, with camera turned on, and an engaged presence is required for success in the course. The slides provided are not complete notes nor are they substitutes for attending the lecture.

**EXAMS:** Your exams will be posted on Blackboard on the scheduled day from 9am to 5pm that day. Exams are timed to 60 minutes with only one attempt. The exam **is not** open book or open notes. You are asked to use the GMU Honor Code throughout the exam. **Make-up exams are not allowed.**

### **SCHEDULE (subject to minor modification as the we progress)**

Week of 5/13: M: Introduction to the Course W: Studying the Nervous System Ch.1 F: Electrical Signals of Nerve Cells, Ch.2
Week of 5/20: M: Electrical Signals of Nerve Cells, Ch.2, begin Ch. 3 W: Voltage Dependent Membrane Permeability, Ch.3 F: <b>EXAM 1 (Ch. 1-3)</b>
Week of 5/27: M: <b>No class Memorial Day</b> W: Channels and Transporters, Ch. 4 F: Synaptic Transmission, Ch.5
Week of 6/3: <b>M: EXAM 2 (Ch. 4 &amp; 5)</b> W: Neurotransmitters and their Receptors, Ch.6 F: Neurotransmitters and their Receptors, Ch.6
Week of 6/10: M: Molecular Signaling within Neurons, Ch. 7 W: Molecular Signaling within Neurons, Ch. 7, begin Ch. 8 F: Synaptic Plasticity, Ch.8
Week of 6/17 <b>FINAL EXAM (Ch. 6-8 + comprehensive)</b>

## **Presentation:**

**Give a 10 min presentation on a technique or method. Summarize the concept and discuss (in broad terms) how the method is applied or used. You will be assessed based on content and clarity of presentation each counting for 50%.**

Week of 5/20

Amira Anwar: Single Nucleotide Polymorphism (SNP)...Techniques to identify SNPs (Mon)

Krishna Chad: Immunostaining (histochemistry) of Brain Slices (Wed)

Duncan Carter: Whole cell recording technique (Wed)

Hongmei: Voltage sensor dyes (Wed)

Week of 5/27

Ibraheem A: In vivo recoding (electrophysiology) in animals (Wed)

Nour J.: Protein detection through Western blotting assays (Wed)

Haneen A.: Evolutionary analysis of genes based on DNA sequence alignment (Wed)

Jessica O.: NMR based analysis of protein structure (Fri)

Aida M.: Cryo-EM (electron microscopy) to study protein structure (Fri)

Week of 6/3

Roshanay: Phosphorylation assays (Wed)

Amanda H.: Ligand binding assays neurotransmitter receptors (Fri)

Sajud A.: Structural modeling of ligand-receptor interactions in drug development (Fri)

Week of 6/10

Tugce B: cAMP measurement assay (Mon/Wed)

Leah Y: calcium measurement in cells (Mon/Wed)

Wajeha: electrophysiology measures *in vivo* (Wed)

Kiran: Long term potentiation (LTP) in hippocampal slice culture

Jackie L: Sensitization/Sensitization *in vivo* (Fri)