

NEU 401: CELLULAR AND MOLECULAR NEUROSCIENCE

FALL 2024 SYLLABUS

Course Introduction

Welcome to NEU 401, an advanced course on cellular and molecular neuroscience! In this course, we will discover the fundamental cellular and molecular processes that underlie neuronal development, maintenance, and function. In particular, we will explore 9 major questions:

1. What cellular specializations contribute to neuronal function?
2. How do neurons communicate through synapses and what is synaptic plasticity?
3. What unique cellular and molecular mechanisms underlie visual perception?
4. How does the olfactory system detect and encode a nearly unlimited number of odors?
5. How does development ensure the proper wiring and function of the nervous system?
6. What is the role of genetics in nervous system function and sexual behavior?
7. How are our essential functions regulated?
8. What are the underlying causes of neurodevelopmental and neurodegenerative disorders?
9. What techniques are used to study cellular and molecular neuroscience?

Instructor Info

Instructor: Dr. Cameron Prigge (pronounced “Prigga”)

Pronouns: she/her

Email: priggeca@msu.edu

Office Hours: Thursdays 2-4pm in BPS 2205 or by appointment

About Dr. Prigge: I received my PhD in neurophysiology from Oakland University, where I studied synaptic communication between neurons of the retina. After my PhD, I was a researcher at Duke University for seven years, where I investigated the cellular and molecular basis for neural circuit formation. I enjoyed doing scientific research, but ultimately decided to pursue teaching full-time because teaching students was always my favorite part! In my classroom, I strive to create an inclusive and warm learning environment where every student is encouraged to be themselves and geek out on neuroscience! The success of each student is very important to me, so please reach out if you need additional support. Outside MSU, I enjoy spending time with my husband and two kids, gardening, and being overly competitive in playing sports.

Office hours Zoom link: <https://msu.zoom.us/j/2806912862>

Meeting ID: 280 691 2862 **Passcode:** synapse

Tips for Success in NEU 401

- **Be prepared.** Complete assigned readings and quizzes prior to class.
- **Ask questions.** If you have a question, there’s a good chance someone else is wondering the same thing! Never assume your question is dumb or naïve. There are no bad questions!
- **Draw it out.** Organizing concepts into diagrams is great way to solidify learning.
- **Challenge yourself.** Dive deeper into topics you’re interested in. Ask questions outside of class. Find out if someone on campus is doing related research and talk to them about their work.

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Course Description

Overview of the cellular and molecular processes that underlie neuronal and circuit function. Topics include synaptogenesis, olfactory and visual systems, developmental wiring, neurogenetics, regulatory systems, and neurodevelopmental and neurodegenerative disorders. Three credits.

Prerequisites

NEU 301 and NEU 302. If you find that you are not proficient in skills and concepts that are needed for you to succeed in this course, please express your concerns with the instructor. They will be happy to refer you to outside resources (e.g. the writing center, tutors, peers, reputable internet resources, readings, etc.) in order to become fully prepared.

Course Structure

We will meet twice weekly, on Tuesdays and Thursdays, in Hubbard Hall G31 from 12:40-2pm. Recorded lectures will be posted on D2L following each class.

The course will be organized by weekly modules on D2L. Each weekly module contains the following subsections:

Pre-class materials

Items listed here are required to be completed before class. This section contains the Learning Objectives, which will be the focus of assessments. Items to complete before class may include videos, scientific papers, or other reading. There will be a short quiz on the pre-class material.

In-class materials

Lecture slides will be posted on D2L before class begins. Some days we will have in-class activities that will be posted as material on D2L. We will use Kahoot! for in-class activities. Recorded lectures will be posted on D2L following the live class.

Homework

Homework will be assigned each week based on that week's lectures and will be due the following week after our Tuesday class. These worksheets will be your study guides for the exams. Please see "Assessments and Grading" for additional information.

Enrichment

Activities/readings listed here are optional and are entirely for your interest! These materials will NOT be included on assessments.

Course Materials

1. "Principles of Neurobiology" by Liqun Luo. 2nd edition. Print or online edition. Required.

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Course materials will be provided on D2L (Pre-class materials, Quizzes, Homework, Enrichment materials, Lecture Slides and Recordings)

If you need technical assistance at any time during the course or to report a problem, you may:

- Visit the [MSU Tech Support Help Site](#)
- Visit the [Desire2Learn Help Site](#)
- Call the MSU IT Service Desk at (517) 432-6200, (844) 678-6200, or e-mail at ithelp@msu.edu

Course Schedule

A tentative course schedule for your section is provided on D2L. An accessible version of the schedule in the form of checklists are also provided on D2L.

Students are responsible for carefully consulting the schedule regularly, completing the assigned readings and the assignments by their specified dates and times.

If the schedule needs to be modified due to unforeseen circumstances, students will be alerted of changes via email to their MSU account or as a D2L announcement in a timely manner.

Assessments and Grading

11 Quizzes @ 10 pts each

12 Homeworks @ 30 pts each

5 Exams @ 90 pts each

920 pts total

5 Anonymous Unit Surveys @ 5 pts each

25 bonus pts total

Quizzes (total number = 11)

Each week there will be a quiz on D2L on the pre-class material. You will have one attempt to take the quiz, so make sure you have completed the required reading and taken notes. Quizzes are due by the start of class. Due to exams being in class, some quizzes will be due on Tuesdays and some will be due on Thursdays (exam weeks). We may substitute surveys for a quiz and they will be graded as credit/no credit.

Homework (total number = 12)

Homework will be assigned each week in the form of a worksheet to be used as a study guide for the exam. The worksheet will be released after the Thursday class and is due the following Tuesday by 11:59pm (ex. Week 1 worksheet is assigned 1/11 and is due 1/16). The homework key will be released to you once you have submitted the homework or automatically after the deadline. The specific due dates are listed on the schedule. The homework is graded on completion, so if you effortfully attempt each question you can get full credit; copying and pasting text from the slides or not attempting to answer part of the question will result in a loss of points. You may use late passes on homework; however, ALL homework must be turned in by the day of the exam to receive credit.

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Exams (total number = 5)

There will be five exams covering three weeks of material each. The quizzes and homework are meant to be used as study guides to prepare you for these assessments. Exams will be taken in class on Tuesdays. They will be a combination of multiple choice, short answer, matching, and fill-in-the-blank. On occasion, we may opt to offer limited opportunities to re-attempt certain questions for credit.

Grading scale

Percentage	Grade Point	Percentage	Grade Point
>90%	4.0	70-74.99%	2.0
85-89.99%	3.5	65-69.99%	1.5
80-84.99%	3.0	60-64.99%	1.0
75-79.99%	2.5	<60%	0

Late Passes

Assignments must be turned in on time to receive credit. The exception to this policy is that each student is granted three assignment extensions:

- Two 24-hour extensions
- One 1-week extension
- These extensions may be used only for quizzes or homework assignments, not exams.
 - The final homework assignment in a unit is due BEFORE the exam, so if you are using a 1-week extension on it, it will be due by the time class starts and we take the exam.
- When you upload/submit the assignment to D2L, you must add a note that states "Using one of my (24-hour or 1-week) free extensions".
- You are also required to send your Instructor an email telling them when you have completed a late assignment, so they are aware that it is ready to grade.

You are advised to save free extensions for an unanticipated event that prevents you from submitting on time. You may not take back a previously used free extension to use again.

Inclusivity

This course will be conducted in an atmosphere of mutual respect and affirms people of all identities. The instructors were provided with a class roster with your name as you provided it to MSU. However, if you prefer to be called a different name than what is on the roster, please let Dr. Prigge know. You are also invited to share your pronouns.

Tardiness/Absence Policies

You are required to attend the first day of class. After that, attendance at lectures is not mandatory but is strongly encouraged! If I notice you are not performing well I may request that you begin attending lectures. All lectures will be recorded and posted on D2L. Attendance at exams is required. Please see the schedule for specific exam dates.

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Academic Integrity

Detailed policies on Academic Integrity can be found on D2L. In brief, plagiarism or sharing of course materials will result in an academic dishonesty report (ADR), a failing grade on those materials, and possibly additional sanctions depending on the severity of the offense. You are not allowed to obtain assignments from another student enrolled in the current or a previous semester. All ideas and answers must be original to you. Violations discovered after course completion can result in a grade change for the course, including a failing grade. Publishing course content online without the instructor's permission is intellectual property theft and academic misconduct and will result in severe penalties. So don't do it, ok?!

Please see D2L for additional information about policies pertaining to **Mandatory Reporting** and requests for **Letters of Recommendation**.

Please note that this syllabus is a "living document" and is subject to change. If any changes are made you will be informed in class and via email.