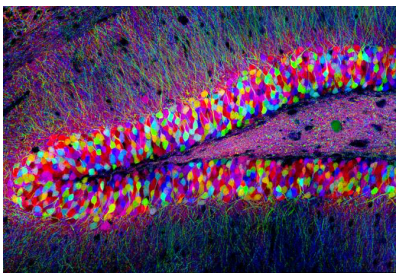
Introduction to Neuroscience

NEUR 101-DL1, Fall 2023



Instructor: Dr. Gwendolyn (Wendy) Lewis
Instructor email: glewis13@gmu.edu
Course Format: Online, asynchronous **in Blackboard**
Credits: 3
Instructor Office: Krasnow 254
Office Hours: Drop-in office hours are held during the times below. If you are unable to attend a drop-in time, please email me to schedule an appointment. I will do my best to accommodate.

- **Wednesday/Friday 1pm-2pm.** Virtual https://gmu.zoom.us/j/4952912681 or in person in Krasnow 254.
    - If multiple students need to meet at once, in-person visitors will get priority. I'll meet with students in the Zoom room in the order they entered. Please be patient if you are in the Zoom waiting room!
- **Friday 2pm-3pm *Synchronous Review*** (virtual only) https://gmu.zoom.us/j/4952912681
    - During this session, I will review questions that have been posted to the Ask the Instructor discussion board, as well and any other topics that student's request.

Course Overview

The nervous system controls everything we think, do, and feel. But how does it do this? And what happens when things go wrong? In this course, we will answer these questions by providing an introduction to the study of the brain (neuroscience). We will cover basic concepts in neuroscience such as neurons, action potentials, and synapses and examine their involvement in everyday life. We will explore what neuroscience has already uncovered about human development, aging, and disease. This course is meant serves an introduction to neuroscience for students of all majors.

Mason Core: Natural Science, Non-lab

This is a Natural Science, non-lab Mason Core course. This course aims to enhance your understanding of scientific inquiry by an introducing you to the tools and methods of neuroscience as well as the application of emerging neurotechnologies for personal, medical, and social purposes.

Course Modality

This course is fully **online and in an "asynchronous" format**, meaning you will NOT be required to log into live virtual sessions. Video lectures will be posted to Blackboard. Exams and quizzes will be taken in Blackboard. Keep in mind that although the course does not meet live, assignments still have firm due dates (see schedule).

Blackboard Login Instructions

To access the course blackboard site, log in to mymason.gmu.edu and select the Courses tab. Under the course list, select the current semester (Fall 2022) and click the course number for NEUR-101-DL1.

Blackboard Login Instructions

Assignments will be posted and submitted to Blackboard. To access the course Blackboard site, log in to mymason.gmu.edu and select the Courses tab. Under the course list, select the current semester (Spring 2023) and click the course number for NEUR-101-001.

Office Hours and Course Help

Getting help is easy. I am available for office hours every week during the times listed at the top of the syllabus. Please check Blackboard Announcements for any adjustments to office hours. You can also get help by posting questions to the *Ask the Instructor* discussion forum in Blackboard.

Technology Requirements

This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be built into your computer (internal webcam) or can be the type of webcam that plugs in with a USB cable (external webcam). See instructions for *Installing and Using LockDown Browser*, or watch *this short video* to get a basic understanding of LockDown Browser and the webcam feature.

You will need the following system requirements for online exams:

- Windows: 10, 8, 7
- Mac: OS X 10.10 or higher
- iOS: 10.0+ (iPad only). Must have a compatible LMS integration.
- Web camera (internal or external) & microphone
- A reliable internet connection
- Prior to your first exam, you must install LockDown Browser following the step-by-step instructions.

Software

- Web browser (see Blackboard Support for supported browsers). Your browser must be up to date and running the most recent version on Java.
- Respondus LockDown Browser, (free Respondus download from MyMason)
- Adobe Acrobat Reader to view pdf files (free Acrobat download)
- Microsoft Word and Powerpoint (Microsoft 365 Apps for enterprise available free to students here)

Natural Science Core Learning Goals

Natural science learning goals and the course activities that support them are listed below.

- Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding:
  a) evolves based on new evidence
  b) differs from personal and cultural beliefs
    - Evidence Based Science Unit
    - Neuroscience and Society Project

- Recognize the scope and limits of science.
    - Evidence Based Science Unit
    - Neuroscience and Society Project

    - Neuroethics Unit

- Recognize and articulate the relationship between the natural sciences and society and the application of science to societal challenges (e.g., health, conservation, sustainability, energy, natural disasters, etc.).
    - Neuroscience and Society Project
    - Methods and Emerging Technologies Unit

- Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information).
    - Evidence Based Science Unit
    - Sources Unit
    - Neuroscience and Society Project

Neuroscience Learning Goals

Neuroscience content-specific learning goals are listed below.

- Describe how the human nervous system is organized from development into adulthood.
- Understand the key mechanisms of brain activity such as action potentials and brain waves.
- Describe how the brain mediates our daily activities from sleep to eating to remembering.
- Appreciate how the nervous system controls complex activities such as movement.
- Understand the basis of key human brain diseases such as Alzheimer's and Parkinson's Disease.
- Find and interpret various types of scientific literature, distinguish the quality of and relevance of sources.
- Evaluate current ethical debates in neuroscience.
- Describe how current technology is used to advance understanding in neuroscience.

Textbook and Materials

No textbook is required. Open educational resources will be provided from various sources.

Grading Scale:

Final weighted grades in Blackboard are rounded to the nearest whole number.
A+ = 97-100%, A = 90-96%, B+ = 87-89%, B = 80-86%, C+ = 77-79%, C = 70-76%, D = 60-69%, F = 0-59%

Grading and Assessments

Quizzes and Activities	25%
Neuroscience and Society Project	15%
Exams (3 x 20% each)	60%
Total Grade	**100%**

Quizzes and Activities At the end of each weekly lesson, you will take a quiz covering that week's material. Quizzes will be open note. They are not timed and will allow 2 attempts. After the first attempt, you will be able to see which answers were incorrect. The highest grade will be recorded in

the grade center. These are meant to serve as practice for exams. Most weeks there will also be an activity to complete. These could be discussion boards, blog posts, short papers, etc.

Neuroscience and Society Project: The goal of this assignment is to apply your new knowledge of neuroscience to examine a current problem or social issue. Possible problems include:

- Drug and behavioral treatment for a mental illness in children
- Animal models of human brain disease (examples: Alzheimer's Disease, Schizophrenia)
- Human-machine interface technologies
- Treatment for nervous system disease
- Genetic testing for brain disease and/or intelligence
- Gene editing to treat brain disease

You will research your topic through primary scientific literature and prepare an informational flyer that defines and examines the problem through the lens of scientific evidence. Further details of the project will be provided.

Exams: There will be 3 regular exams, with the last exam (non-cumulative) held during finals week. These exams may consist of multiple choice, matching, fill in the blank, or short answer questions. Exams will be administered through Blackboard using the **Respondus LockDown Browser** and Monitor. Exams will be timed. Please contact the instructor if you have accommodations that allow for extra time. Students are allowed one 8.5 x 11 sheet of paper notes (front and back) during the exam. You may also use additional blank scrap paper. You may not use other notes, digital resources, or the internet. Exams will be timed.

Policies

Attendance: Attendance is expected and is essential for succeeding in the course. Material will be covered in class that is not contained in the slides.

Late Work: Unless prior arrangements are made, late work will incur a deduction of 20% and will not be accepted more than two weeks after the due date. No late work will be accepted after Sunday, December 3rd. Late exams and exam extensions are not accepted except in cases of emergency or illness. It is imperative that you contact me as soon as possible regarding any issues that may affect your ability to complete assignments.

Extra Credit: You can earn up to 5 points of extra credit by sharing something to the "Cool Stuff" discussion board forum. You can earn 3 points for posting something interesting and neuroscience related to this forum, and 1 point for responding to another students post. You can earn an additional 5 points of extra credit by attending a seminar and writing a summary (details in the Assignments area of Blackboard). Extra credit will be added to the Exams grade at the end of the course. No additional or individual extra credit will be available.

Communication: If you need to contact me, please do so using e-mail **from your university account only**, and **include the course name in the subject line and include your name in the e-mail**. Check your e-mail and course Blackboard account daily and before each class meeting. I will use e-mail and Blackboard to communicate with you regarding changes related to the course, syllabus, and other

essential information. You are responsible for all announcements posted and sent via Blackboard and e-mail, in addition to announcement make in class.

Conduct: Be kind and respectful to your classmates. Disrespectful behavior will lead to a potential deduction of points from the course, and an unhappy me. For a guide to online behavior, see these core rules for Netiquette.

Academic Integrity: Honesty and integrity are issues at the very core of this course and of science as a whole. George Mason has an honor code with clear guidelines for academic integrity. A few of the most important rules that pertain to this course are: 1) All work submitted must be your own should be done individually unless explicitly stated otherwise. You will be encouraged to discuss ideas, collaborate, and brainstorm with your classmates, but actual assignments need to be completed individually. 2) When referencing the work of others (this includes published and non-published work or ideas), full credit must be given through appropriate citations. 3) If you are ever unsure about the rules for an assignment, ask for clarification. Cheating and plagiarism of any form is not tolerated. Plagiarism means using the exact words, opinions, or information from another person without giving the appropriate credit. Per the Office of Academic Integrity, "subcategories of plagiarism include:

- Self-plagiarism: Intentionally or unintentionally using portions of one's old work for new assignments without appropriate attribution and/or advanced permission from the current course instructor
- Failure to adequately quote and/or cite sources or material
- False citation: This includes but is not limited to referencing work that does not appear in the indicated source."

Sharing of instructor-created materials, particularly materials relevant to assignments or exams, to public online "study" sites is considered a violation of Mason's Honor Code. For more information, see the Office of Academic Integrity's summary of information about online study sites.
Any offense will be referred to the academic integrity office and be dealt with in accordance with university regulations. Get more information about the Office of Academic Integrity here: https://oai.gmu.edu/. Get more information about plagiarism here https://oai.gmu.edu/mason-honor-code/what-is-plagiarism/ and tips for avoiding it here https://writingcenter.gmu.edu/writing-resources/citing-sources/plagiarism.
Use of Generative-AI tools should be used following the fundamental principles of the Honor Code. This includes being honest about the use of these tools for submitted work and including citations when using the work of others, whether individual people or Generative-AI tools.

AI Text Generators: When explicitly stated by the instructor, Generative AI tools are allowed on the named assignment. Use of these tools on any assignment not specified will be considered a violation of the academic integrity policy. All academic integrity violations will be reported to the office of Academic Integrity. Use of Generative AI tools will sometimes be in alignment with the learning outcomes for this course; when meeting the outcome requires original human action, creativity or knowledge, AI tool use would not align with the stated course goals. Work produced with the aid of Generative AI is not without risk. You will be responsible for any incorrect, biased, or unethical information that is submitted and you must be transparent with your use, even on assignments where you are required to use Generative AI. A statement-of-usage is always required when using generative AI. Citations for source material are always required whether using generative AI or not.

Disability Accommodations

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474; http://ods.gmu.edu) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Mason Diversity Statement*

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth. An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.
** This is an abbreviated statement; full statement is available at http://ctfe.gmu.edu/professional-development/mason-diversity-statement/*

Privacy and E-mail Use

Students must use their MasonLive email account to receive important University information, including communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address. Student privacy is protected under FERPA (https://registrar.gmu.edu/ferpa/).

Student Services

- Learning Services (learningservices.gmu.edu/keeplearning/)
- University Libraries (library.gmu.edu)
- Writing Center (writingcenter.gmu.edu)
- Counseling and Psychological Services (caps.gmu.edu)
- See a longer list of Mason student support services posted on The Stearns Center website.

Add/Drop Deadlines

Deadlines for the Fall 2023 semester can be found on the Mason Academic Calendar page.

All policies may be modified at the discretion of the instructor.

Course Calendar

NEUR 101-DL1 Fall 2023

All due times are in Eastern Standard Time (EST)

Week	Lessons	Assignments	Due Dates
Week 1 Aug 21- Aug 27	Introduction & Cells	• Read Welcome page • Review Syllabus and Course Calendar • Watch Course Introduction Videos • Watch *What is Neuroscience?* Lecture Videos • Watch/Read *Cells of the Nervous System* Material • Week 1 Activity- Post to the "Welcome" Discussion Board (1 post and 2 comments) • Take the Week 1 Quiz • Optional: Post to the "Ask the Instructor" Discussion Board forum and meet me in office hours or Friday Review	Due Sunday 8/27 11:59pm • Week 1 Activity- "Welcome" Discussion board post and 2 comments • Week 1 Quiz
Week 2 Aug 28- Sept 3	Development	• Watch /Read *Building a Brain: Development* Material • Do Week 2 Activity • Take the Week 2 Quiz • Optional: Friday Review	Due Sunday 9/3 11:59pm • Week 2 Activity • Week 2 Quiz
Week 3 Sept 4- Sept 10	Organization of the Nervous System	• Watch/Read *Organization of the Nervous System* Material • Do Week 3 Activity • Take the Week 3 Quiz • Optional: Friday Review	Due Sunday 9/10 11:59pm • Week 3 Activity • Week 3 Quiz
Week 4 Sept 11- Sept 17	Action Potentials and Synapses	• Watch/Read the *Action Potentials and Synapses* Material • Do Week 4 Activity • Take Week 4 Quiz • Test Respondus (to ensure Respondus is working for next week's exam) • Optional: Friday Review	Due Sunday 9/17 11:59pm • Week 4 Activity • Week 4 Quiz • Test Respondus
Week 5 Sept 18 – Sept 24	Exam 1	• Prepare for Exam 1 • **Take Exam 1 (Open Monday 12:00am – Sunday 11:59pm)** • No Friday Review this week	Due Sunday 9/24 11:59pm • Exam 1
Week 6 Sept 25- Oct 1	Scientific Principles: Evidence-Based Science	• Read *What Makes Everyday Scientific Reasoning So Challenging?* By Shah et al., 2017 • Watch *Scientific Principles: Evidence-Based Science* Lecture • Do Week 6 Activity • Take Week 6 Quiz • No Friday Review or Office Hours this week	Due Sunday 10/1 11:59pm • Week 6 Activity • Week 6 Quiz

Week	Lessons	Assignments	Due Dates
Week 7 Oct 2- Oct 8	The Senses	• Watch/Read *The Senses Part 1* and *The Senses Part 2* Material • Do Week 7 Activity • Take Week 7 Quiz • Optional: Friday Review	Due Sunday 10/8 11:59pm • Week 7 Activity • Week 7 Quiz
Week 8 Oct 9- Oct 15	Movement & Stress	• Watch/Read the *Movement* Material • Watch/Read the *Stress* Material • Do Week 8 Activity • Take Week 8 Quiz • Optional: Friday Review	Due Sunday 10/15 11:59pm • Week 8 Activity • Week 8 Quiz
Week 9 Oct 16- Oct 22	Scientific Principles: Sources & Neuroscience and Society Project Intro	• Watch/Read the *Scientific Principles: Sources* Material • Read the Neuroscience and Society Project guidelines • Watch the *Neuroscience and Society Project* Video Description • Do Week 9 Activity • Take Week 9 Quiz • Optional: Friday Review	Due Sunday 10/22 11:59pm • Week 9 Activity • Week 9 Quiz
Week 10 Oct 23- Oct 29	**Exam 2**	• Prepare for Exam 2 • **Take Exam 2 (available Monday 12:00am – Sunday 11:59pm)** • No Friday Review this week	Due Sunday 10/29 11:59pm • Exam 2
Week 11 Oct 30- Nov 5	Emotion, Blood, Feeding and Motivation	• Watch/Read the *Emotion* Material • Watch/Read the *Blood and Barriers* Material • Watch/Read the *Feeding and Motivation* Material • Do Week 11 Activity • Take Week 11 Quiz • Optional: Friday Review	Due Sunday 11/5 11:59pm • Week 11 Activity • Week 11 Quiz
Week 12 Nov 6- Nov 12	Learning and Memory & Sleep and Circadian Rhythms	• Watch/Read the *Learning and Memory* Material • Watch/Read the *Sleep and Circadian Rhythms* Material • Do Week 12 Activity • Take Week 12 Quiz • Optional: Friday Review	Due Sunday 11/12 11:59pm • Week 12 Activity • Week 12 Quiz
Week 13 Nov 13- Nov 19	Scientific Principles: Methods and Emerging Technology & Neuroethics	• Watch/Read the *Scientific Principles: Methods and Emerging Technologies* Material • Watch/Read the *Scientific Principles: Neuroethics* Material • Do Week 13 Activity • Take Week 13 Quiz • Optional: Friday Review • No Mon/Wed Office Hours this week	Due Sunday 11/19 11:59pm • Week 13 Activity • Week 13 Quiz

Week	Lessons	Assignments	Due Dates
Week 14 Nov 20- Nov 26	**Thanksgiving Recess**	• Enjoy the Break	Nothing Due!
Week 15 Nov 27- Dec 3	Injury and Disease	• Watch/Read the *Injury and Regeneration* Material • Watch/Read the *Neurodegenerative Diseases* Material • Take Week 15 Quiz • Finish and submit Neuroscience and Society Project • Study for Exam 3 • Optional: Friday Review	Due Sunday 12/3 11:59pm • Week 15 Quiz • **Neuroscience and Society Project**
Exam 3 (non-cumulative): Open Monday 12/4 12:01am – Friday 12/8 11:59pm			