

**Seminar in Neuroscience:  
Nervous System Injury and Disease**  
*NEUR 411-001: Spring 2023*

**Instructor:** Dr. Gwendolyn (Wendy) Lewis  
**Instructor e-mail:** [glewis13@gmu.edu](mailto:glewis13@gmu.edu)  
**Course Time:** Tuesday 1:30 - 4:10pm  
**Course Location:** Krasnow 229  
**Credits:** 3

**TA:** Diego Alonso Gonzalez  
**TA e-mail:** [dgonza3@gmu.edu](mailto:dgonza3@gmu.edu)  
**TA office hours:** Friday 3pm (Zoom link in BB) and by appointment

**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.

- **Monday 12pm-1pm. virtual** <https://gmu.zoom.us/j/4952912681> **or in person in Krasnow 254**
- **Thursday 2pm-3pm virtual** <https://gmu.zoom.us/j/4952912681> **or in person in Krasnow 254**

**Course Overview**

Most likely, you know someone that has been affected by a nervous system disorder. From Traumatic Brain Injury to Alzheimer's Disease, nervous system disorders affect millions of families and have long fascinated doctors, scientists, and the general public. In this course, we will explore what happens when things go wrong in the nervous system. Specifically, we will explore a wide variety of nervous system disorders, focusing primarily on cellular and molecular mechanisms. We will also examine the history, significance, symptoms, and treatment of these disorders. We will accomplish this through a combination of lectures, student-led presentations and discussions, writing exercises and assignments. This course is designed to develop your skills in reading, analyzing, and interpreting scientific data, while emphasizing practical scientific writing and presentation skills.

**This course fulfills the Writing Intensive (WI) requirement for the Neuroscience major.** Writing intensive courses are required to assign a minimum of 3500 words, provide constructive feedback on drafts, and allow revision of at least one graded assignment. This course meets and exceeds this requirement through the 500-word news article, 2000-word grant application, and 7x500-word journal entries. Constructive feedback will be given on assignments. You will be able to revise portions of the grant application, based on feedback, before the final assignment is due.

**Course Modality**

This is an in-person, face-to-face course. There will be no concurrent instruction, meaning the class will not be streamed online, and students will not be able to attend virtually. If you are unable to come to class due to illness or other issue, please see the policy under Attendance and Late Work below.

**Safe Return to Campus**

All students taking courses with a face-to-face component should review and follow the university's current public health and safety procedures outlined on the university Safe Return to Campus webpage (<https://www2.gmu.edu/safe-return-campus>). **If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. DO NOT ATTEND CLASS IF YOU ARE SICK!**

**Textbook**

No textbook is required. Some material in the course was adapted from: Diseases of the Nervous System by H Sontheimer, ISBN:9780128002445.

**Learning Goals:**

By the end of this course, you should be able to...

- Interpret and analyze primary scientific literature

- Think critically about science and question scientific findings
- Clearly present, explain, and facilitate discussions about scientific data to your peers
- Describe the hallmarks of specific nervous system diseases and explain the cellular and molecular mechanisms involved
- Compare and contrast the mechanisms of different diseases
- Recognize and identify common themes in disease mechanisms
- Examine, analyze, and interpret data from primary literature related to nervous system diseases
- Describe types of disease models and experimental tests used in disease research
- Communicate scientific data for a variety of audiences through translational writing
- Evaluate and critique other's writing
- Develop a unique grant proposal
- Effectively respond to edits and make changes in writing

**Course Format:**

This course is divided into sections. Each section will begin with a lecture spotlighting a specific disease. After each disease lecture, there will be one or more student-led discussions about scientific journal articles related to the current disease. In preparation for each discussion, every student will write and submit a brief journal entry. There will be 2 additional larger writing assignments. One is a scientific news article, due near the middle of the term, and the other is a mock grant application, due at the end of the course.

**Grading and Assessments:**

There are no exams in this course. You will be assessed throughout the course based on a combination of assignments, discussion leading, and participation.

|                               |     |
|-------------------------------|-----|
| Discussion Leading            | 15% |
| Journal Entries               | 25% |
| News Article                  | 15% |
| Grant Application             | 25% |
| Participation and Assignments | 20% |

**Total Grade** **100 %**

**Grading Scale:**

*Blackboard grades are rounded to the nearest whole number.*

A+ 98-100%    B+ 88-89%    C+ 78-79%    D 60-69%    F 0-59%  
A 90-97%    B 80-87%    C 70-77%

**Assignment Details:**

**Discussion Leading-** You will work in groups to lead a detailed presentation and discussion of a primary journal article. The goal of this assignment is to improve your ability to communicate, evaluate, and question the scientific findings of others. The primary journal article will be assigned to you. Additional details will be provided.

**Journal Entries-** Before each discussion section, you will write a Journal Entry (max 500 words). The goal of these entries is to get you thinking and writing about science on a regular basis. Entries will be written in response to research articles that will be discussed that day. Entries will be submitted in Blackboard and will be graded by the TA with constructive feedback given. Entries are due 1 hour before the beginning of class in which the article will be discussed. The lowest grade will be dropped. **You do not need to complete a Journal Entry for the week you lead discussion.**

**News Article-** You will write a 500-word review of a scientific article, written in the style of a news article. It will be targeted to the general public (i.e. non-scientists). This article should be something that your parents/grandmother/non-scientist can read and understand. This will help you develop translational writing skills that are essential for disseminating scientific information to the public.

**Grant Application-** Based on previously published data, you will develop a plan for future research and develop an NIH-style grant application. The proposal will be written as though you are a student applying for funding from the NIH to complete the proposed research. The application will be written in the style of a Ruth L. Kirschstein Institutional National Research Service Award (NRSA) from the National Institute of Neurological Diseases and Stroke (NINDS) and will include three essential components of the application: 1) Biosketch 2) Specific Aims, and 3) Research Strategy. Through this process you will learn what is expected from a real grant application, how to write one, and most importantly, how to describe and promote yourself and your ideas. The complete application will be approximately 2000 words and will serve as a capstone for the course. You will submit a draft of the specific aims before the final due date, which I will return to you with notes for editing. You will also be required to meet with me individually to discuss the project before it is due.

**Participation and Assignments-** In class participation is vital to your success in this course and will be graded. Attendance is mandatory and included in the participation grade. To receive participation credit, you are expected to arrive on time, be prepared for class, be responsive to questions, participate in discussion sessions, and remain attentive. In order to receive full credit for participation in a discussion session, you must make a meaningful contribution to the discussion, meaning you must talk and your question or comment must represent that you have read the article being discussed. On writing workshop days, you are required to bring a draft of your assignment to class and participate in the workshop. Up to 5 points of participation credit may be earned per day. Additional assignments and completion grades for drafts will also be factored into this portion of the grade. If you are sick, quarantining, or have an excused absence from class, you will be assigned make-up work to earn your participation grade for that day. It is your responsibility to ask what make-up work is required for an absence.

#### **Extra Credit**

You can also receive up to 5 points of extra credit by attending a seminar and writing a summary, which will be added to the Journal Entry grade. Information on the Seminar Summary can be found in Blackboard under the assignments tab. An extra credit quiz will be given on the Student Choice lecture on the last day of class. No additional or individual extra credit will be available.

#### **Attendance and Late Work**

Unexcused absences will result in a 0 for your daily participation credit. Excused absences are given at the discretion of the instructor and may require documentation. E-mailing the instructor before class is highly recommended to obtain an excused absence. Most absences will require make-up work to receive participation credit for the day.

Late work will incur a deduction of 20% and will not be accepted more than 2 weeks after the original due date. No late work will be accepted after May 5<sup>th</sup>. Drafts, extra credit, and in-class assignments are not eligible to be turned in late for credit.

#### **Communication**

If you need to contact me, please do so **from your university e-mail account only**. Include the course name in the subject line and 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 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 announcements made in class, regardless of whether or not you are present.

#### **Student Conduct Policies**

Be kind and respectful to your classmates. Disruptive, disrespectful, or rude behavior will lead to dismissal from class, a potential deduction of points from the course, and an unhappy me. You will also miss out on all the cool things we do in class!

**Cell phones in the classroom:** Please silence phones during class and keep them out of sight. I can see you and it's distracting. Cell phone use/ringing (other than for emergency) during class may result in deduction from the participation grade.

**Computers in the classroom:** Computers are allowed for note taking and course related research only. Failure to observe this rule may result in deduction from the participation grade or loss of computer privileges. It will also make me grumpy.

#### **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. You may **not** use papers from students who have previously taken the class to help you with your assignments. 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."

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>.

#### **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 Mason 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 Services**

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

#### **Add/Drop Deadlines**

Deadlines for the Spring 2023 semester can be found on the [Mason Academic Calendar page](#).

## **Course at a Glance**

### *Nervous System Injury*

#### PNS Trauma

- Lewis and Kucenas. Perineurial Glia are Essential for Motor Axon Regrowth following Nerve Injury (2014)

#### CNS Trauma

- Mez et al. Clinicopathological Evaluation of Chronic Traumatic Encephalopathy in Players of American Football. JAMA. (2017)

### *Neurodegenerative Diseases*

#### Alzheimer's Disease

- Sevigny et al. The antibody aducanumab reduces A $\beta$  plaques in Alzheimer's Disease. Nature. (2016)

#### Huntington's Disease

- Yang et al. CRISPR/CAS9- mediated gene editing ameliorates neurotoxicity in mouse model of Huntington's disease. (2017)

### *Demyelinating Disorders*

#### Multiple Sclerosis

- Deshmukh et al. A regenerative approach to the treatment of multiple sclerosis. Nature. (2013)

### *Nervous System Cancers*

#### Glioblastoma

- Bao et al. Glioma stem cells promote radioresistance by preferential activation of the DNA damage response. (2006)

### *Infectious Diseases*

#### Prion Diseases

- Fang et al. A neuronal culture system to detect prion synaptotoxicity. (2016)

### *Student Choice Topic*

TBA

**Course Schedule**  
NEUR 411-001, Spring 2023

| Date                     | Topic                                                                                                                                                                                                                    | Assignments Due<br><i>Due 1 hour before class unless noted</i><br><i>All assignments submitted to Blackboard unless noted</i>                                                                                                                                                                 |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b><br>Jan 24  | <ul style="list-style-type: none"> <li>Course Introduction</li> <li>Lecture: Introduction to Scientific Writing</li> <li>Activities: Form discussion groups, assign papers, review Journal Entry instructions</li> </ul> | <ul style="list-style-type: none"> <li><b>Syllabus Quiz</b> (in class)</li> </ul>                                                                                                                                                                                                             |
| <b>Week 2</b><br>Jan 31  | <ul style="list-style-type: none"> <li>Review Discussion Leading instructions</li> <li>Groups meet</li> <li>Lecture: PNS Trauma</li> </ul>                                                                               | <ul style="list-style-type: none"> <li><b>Read Plagiarism and Citation material and take quiz</b> (in Blackboard)</li> <li>Read: "How to Read a Scientific Article" and your assigned article</li> <li><b>Journal Entry 1</b> on assigned article (practice/completion grade only)</li> </ul> |
| <b>Week 3</b><br>Feb 7   | <ul style="list-style-type: none"> <li>Discussion: PNS Trauma, (Lewis and Kucenas, 2014)</li> <li>Lecture: CNS Trauma</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li><b>Journal Entry 2</b> on PNS Trauma (Lewis and Kucenas, 2014)</li> </ul>                                                                                                                                                                              |
| <b>Week 4</b><br>Feb 14  | <ul style="list-style-type: none"> <li>Discussion: CNS Trauma (Mez et al., 2017)</li> <li>Lecture: Alzheimer's Disease</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li><b>Journal Entry 3</b> on CNS Trauma (Mez et al., 2017)</li> </ul>                                                                                                                                                                                     |
| <b>Week 5</b><br>Feb 21  | <ul style="list-style-type: none"> <li>Discussion: Alzheimer's Disease (Sevigny et al., 2016)</li> <li>Lecture: Huntington's Disease</li> </ul>                                                                          | <ul style="list-style-type: none"> <li><b>Journal Entry 4</b> on Alzheimer's Disease (Sevigny et al., 2016)</li> </ul>                                                                                                                                                                        |
| <b>Week 6</b><br>Feb 28  | <ul style="list-style-type: none"> <li>Discussion: Huntington's Disease (Yang et al. 2017)</li> <li>Writing a News Article</li> </ul>                                                                                    | <ul style="list-style-type: none"> <li><b>Journal Entry 5</b> on Huntington's Disease (Yang et al. 2017)</li> <li><b>"Read the News" Assignment</b></li> </ul>                                                                                                                                |
| <b>Week 7</b><br>Mar 7   | <ul style="list-style-type: none"> <li>Lecture: Peer Review</li> <li>Workshop: News Article Peer Review</li> </ul>                                                                                                       | <ul style="list-style-type: none"> <li><b>News Article Draft Due: bring 2 printed copies of your draft to class</b></li> </ul>                                                                                                                                                                |
| <b>Week 8</b><br>Mar 14  | <b>No Class: Spring Break</b>                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                               |
| <b>Week 9</b><br>Mar 21  | <ul style="list-style-type: none"> <li>Lecture: Experimental Design/ Grant Planning</li> <li>Lecture: Multiple Sclerosis</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li><b>Read Harrington Chapter 3</b></li> <li><b>Final News Article Due</b></li> </ul>                                                                                                                                                                     |
| <b>Week 10</b><br>Mar 28 | <ul style="list-style-type: none"> <li>Discussion: Multiple Sclerosis (Deshmukh et al 2013)</li> <li>Writing a Grant</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li><b>Journal entry 6</b> on Multiple Sclerosis (Deshmukh et al 2013)</li> </ul>                                                                                                                                                                          |
| <b>Week 11</b><br>Apr 4  | <ul style="list-style-type: none"> <li>Lecture: Glioma</li> <li>Workshop: Specific Aims Peer Review</li> </ul>                                                                                                           | <ul style="list-style-type: none"> <li><b>Specific Aims Draft Due: upload to BB (for completion grade with instructor feedback) AND bring 2 printed copies to class</b></li> </ul>                                                                                                            |
| <b>Week 12</b><br>Apr 11 | <ul style="list-style-type: none"> <li>Discussion: Glioma (Bao et al. 2006)</li> <li>Lecture: Prion Diseases</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li><b>Journal entry 7</b> on Glioma (Bao et al. 2006)</li> <li><b>Sign up for individual meeting</b></li> </ul>                                                                                                                                           |

| Date                                                | Topic                                                                                                                                | Assignments Due<br><i>Due 1 hour before class unless noted</i><br><i>All assignments submitted to Blackboard unless noted</i>                                                                     |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 13</b><br>Apr 18                            | <b>No Class:</b> Individual meetings via Zoom<br><a href="https://gmu.zoom.us/j/4952912681">https://gmu.zoom.us/j/4952912681</a>     | <ul style="list-style-type: none"> <li>Be prepared to explain and discuss your aims in the meeting</li> </ul>                                                                                     |
| <b>Week 14</b><br>Apr 25                            | <ul style="list-style-type: none"> <li>Discussion: Prion Diseases (Fang et al. 2016)</li> <li>Workshop: Grant Peer Review</li> </ul> | <ul style="list-style-type: none"> <li><b>Journal entry 8</b> on Prion Diseases (Fang et al. 2016)</li> <li><b>Full Grant Draft Due: bring 2 printed copies of your draft to class</b></li> </ul> |
| <b>Week 15</b><br>May 2                             | <ul style="list-style-type: none"> <li>Workshop: Writing Exercises/ Self Critique</li> <li>Student Choice Lecture</li> </ul>         | <ul style="list-style-type: none"> <li>Bring a copy of Journal Entry 1 to class (digital or printed)</li> </ul>                                                                                   |
| <b>Final Grant Due on Thursday May 4 at 11:59pm</b> |                                                                                                                                      |                                                                                                                                                                                                   |

**NOTE: This schedule is subject to change at any time. You are responsible for all announcements and syllabus modifications made in class each week whether you are present or not.**  
BB = Blackboard