

**Neuroimmunology (NEU 492-005)**  
**Michigan State University, Spring 2025**

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He/him/his

**Lectures (in-person):** Life Science B105, Mondays and Wednesdays, 3:00 – 4:20 PM

**Office hours:** Zoom, or in-person at ISTB 5018 by appointment.

Office hours Zoom link is: <https://msu.zoom.us/j/91036150146>

Meeting ID: 910 3615 0146

Passcode: 780127

**COURSE DESCRIPTION:**

This is a one-term lecture course for advanced undergraduate Neuroscience majors. The main focus is to provide i) an understanding of the mechanisms underlying the interactions between neurons and immune cells at the molecular, cellular, and system levels, and ii) the contribution of neuro-immune communications to health and disease. The information will be presented in two ways: 1) lectures delivered by the instructor and 2) presentation and discussion of primary scientific literatures. Every week discusses a different topic, on Wednesdays the instructor does an introductory lecture and on the following Monday, a group of students (2 or 3 students) will present a scientific article related to the topic of the session. The instructor will provide potential articles to present. If the students want to present a different article, they need to seek approval from the instructor.

Students will be expected to participate vocally and consistently in scientific article presentations and discussions.

**Prerequisites:** NEU 301 and 302 or permission of instructor.

**COURSE REQUIREMENTS:**

**Reading:**

There will be a variety of scientific articles that will require reading and the subject of in-depth class discussion. There is no textbook for this course.

**Scientific article Discussions:**

Every Monday (unless instructed otherwise below) a group of 2-3 students will present a research article. Students are expected to prepare a PowerPoint presentation. All students (not only the presenters are expected to read the article before class). All students will be expected to participate vocally in discussion of each section presented. It is expected that you attend class ready to participate during your scheduled class time. Ready to participate entails reading the required readings prior to class. You will need to be prepared for each class so that you can contribute to the class discussion. This course

involves active discussion among the entire class. The ideal student will contribute to discussions in class but will also let others participate.

The proposed scientific articles will be posted on D2L\*. You will need your MSU NetID to log in to the course from the [D2L homepage](#). The [D2L](#) folder **SS25-NEU-492-005-Special Topics. Folder Neuroimmunology** contains:

- Scientific article Materials
- Syllabus

\*Glitches sometimes occur contact me if you cannot access the materials posted on D2L.

## **LEARNING OBJECTIVES FOR NEUROIMMUNOLOGY CLASS**

By the end of this course, students will be able to:

### **1. Understand Neuroimmunology Fundamentals:**

Explain the role of the immune system in neurological and psychiatric diseases, including neuroinflammation and neurodegenerative disorders. Describe how the nervous system regulates immune responses and its implications for health and disease.

### **2. Integrate Knowledge Across Disciplines:**

Connect lecture materials with real-world examples of neuroimmune interactions. Identify key mechanisms and pathways linking the nervous and immune systems.

### **3. Analyze and Interpret Scientific Data:**

Evaluate graphs, figures, and experimental results from neuroimmunology research. Critically assess scientific articles for methodology, significance, and conclusions.

### **4. Develop Oral Communication Skills:**

Present scientific articles clearly and effectively, ensuring depth of content and clarity for peers. Facilitate and engage in discussions, demonstrating the ability to ask meaningful questions and respond thoughtfully.

### **5. Foster Collaborative Learning and Critical Thinking:**

Collaborate with peers to analyze and present research articles, integrating knowledge from lectures and independent readings. Develop the ability to critique and question scientific research constructively.

### **6. Cultivate Lifelong Learning Skills:**

Apply techniques for synthesizing lecture content with contemporary research. Practice formulating questions that explore the intersection of science and societal relevance in neuroimmunology.

These objectives aim to provide students with foundational knowledge in neuroimmunology, critical thinking skills, and the ability to communicate scientific findings EFFECTIVELY PREPARING them for advanced coursework and professional development.

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## **EXAMINATIONS:**

### **Exams:**

There are no formal exams in this course. Assessment will primarily be based on presentations, quizzes, and participation.

### **Presentation of Scientific Articles:**

The presentation of scientific articles serves as the main evaluation component of this course and is graded on a total of 50 points. Grades will be based on the clarity and depth of the presentation as well as the level and quality of discussion it generates among the class. Individual grades within the same group may vary depending on individual performance and contributions. This is a significant part of your overall grade, so preparation and engagement are crucial.

### **Quizzes:**

Each week, before the article presentation, a short multiple-choice quiz (MCQ) will assess whether students have read the assigned article and associated lecture material.

- 10 quizzes total, each consisting of 5 questions worth 1 point each.
- These quizzes are designed to encourage consistent preparation and engagement with the course material.
- Missed quizzes: Students may miss quizzes or presentations for any reason (e.g., illness, appointments, transportation issues, interviews, etc.). However, missing too many quizzes may affect your final grade unless absences are justified per MSU guidelines.

### **Grading Scale:**

To achieve a 4.0 grade, students must earn at least 80 points in total from presentations and quizzes.

### **Attendance and Participation:**

Attendance is not mandatory and will not be recorded. However, it is highly respectful and encouraged to attend peers' presentations.

Active participation in discussions is expected and contributes to the quality of the course. Engaging vocally in the analysis and critique of each section presented is an integral part of the learning experience.

### **Grading Scale:**

80-100 pts	4.0
75-79 pts	3.5
60-74 pts	3.0
55-59 pts	2.5
50-54 pts	2.0
45-49 pts	1.5
30-44 pts	1.0
0-29 pts	0.0

## **ACADEMIC HONESTY:**

Article 2.3.3 of the Academic Freedom Report states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." In addition, we will adhere to the policies on academic honesty as specified in General Student Regulations 1.0, *Protection of Scholarship and Grades*; the all-University Policy on *Integrity of Scholarship and Grades*; and Ordinance 17.00, *Examinations*. *Therefore, you are expected to complete all exams without assistance from any source. Students who violate MSU rules may receive a penalty grade, including - but not limited to - a failing grade on the assignment or in the course.* Contact your instructor if you have any questions about this policy.

(See <http://www.msu.edu/unit/ombud/honestylinks.html> and/or *Spartan Life: Student Handbook and Resource Guide*)

Behavior that is disrespectful to the instructor or fellow students during class will not be tolerated. This includes exchanging electronic or other notes, web-surfing, talking amongst each other, playing with any electronic gadget, etc.

**CLASS SCHEDULE:**

Session	Dates	
1	13-Jan	Breaking the ice/Syllabus Review
	15-Jan	Introduction: Neuroscience refresher and Immunology introduction
	20-Jan	Closed (MLK day)
	22-Jan	Introduction II: Identification of Immune cells
2	27-Jan	Sickness behavior I
	29-Jan	Sickness behavior II
	3-Feb	Article presentation by the instructor
3	5-Feb	Microglia
	10-Feb	Article presentation by students
4	12-Feb	Neuromodulation by cytokines
	17-Feb	Article presentation by students
5	19-Feb	Neurogenic inflammation
	24-Feb	Article presentation by students
6	26-Feb	Anti-inflammatory Reflex
	3-Mar	Spring break
	5-Mar	Spring break
	10-Mar	Article presentation by students
7	12-Mar	Depression I
	17-Mar	Article presentation by students
8	19-Mar	PNS microbes and cancer
	24-Mar	Article presentation by students
9	26-Mar	Depression II
	31-Mar	Article presentation by students
10	2-Apr	Cognition
	7-Apr	Article presentation by students
11	9-Apr	PsychoNeuroImmunology
	14-Apr	Article presentation by students
12	16-Apr	Immune privilege of the CNS (guest instructor)
	21-Apr	Article presentation by students
13	23-Apr	Summary/Wrap up/feedback

PNS: peripheral nervous system

**HONORS OPTION:**

To receive an Honors Option for NEU 492, students must achieve a 3.5 overall grade in the class and complete an additional assignment. Students are required to write a short

review on the topic of Neuroimmunology. The form for the Honors Option (<https://reg.msu.edu/StuRes.aspx>) should be turned in before March 10<sup>th</sup>, 5pm.

The short review may be based on the primary literature presentations made throughout the semester or on different scientific articles. The format of the article is 3-4 pages, single spaced, extensive citation, and with figures or illustrations optional. The article **should NOT be a summary of a scientific article presented in class. If a presented article is referred, no more than one or two short paragraphs should be used to explain the results of this primary article.** The goal should be to introduce the problems that the primary article is addressing by summarizing the state of the field prior to the work in the primary article, and then to integrate the results of the primary article with the field and speculate as to future studies that may stem from this work. Successful assignments will make copious use of other peer-reviewed primary literature (rather than textbooks or Wikipedia-like sources) and will display a deep understanding of the field and of the interpretations of the primary article.

The assignment is due on April 25, 2025.

**Safety Considerations:** Follow [MSU's COVID-19 Directives](#) to keep our community safe. We intend for course modality to remain in-person. However, should there be an emergency or change in the public health that makes it unsafe to hold in-person activities then we will pivot to an online format. **Do not come to class if experiencing COVID symptoms!**

### **Other Course Information:**

#### **Inform Your Instructor of Any Accommodations Needed.**

From the Resource Center for Persons with Disabilities (RCPD): Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at [rcpd.msu.edu](http://rcpd.msu.edu). Once your eligibility for accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form.

Please present this form to Dr. Laumet as soon as possible (preferably within the first two weeks of class) so that accommodation can be made. Requests received after this date may not be honored.

#### **Resource Persons with Disabilities (RCPD)**

- To make an appointment with a specialist, contact: (517) 353-9642 or TTY: (517) 355-1293
- Web site for RCPD: <http://MYProfile.rcpd.msu.edu>

#### **Limits to Confidentiality**

Essays, journals, and other materials submitted or presented for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, may not be

able to maintain confidentiality when it conflicts with their responsibility to report certain issues to protect the health and safety of MSU community members and others. As the instructor, I must report the following information to other University offices (including the Department of Police and Public Safety) if you share it with me:

- Suspected child abuse/neglect, even if this maltreatment happened when you were a child,
- Allegations of sexual assault or sexual harassment when they involve MSU students, faculty, or staff, and
- Credible threats of harm to oneself or to others.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In almost all cases, it will be your decision whether you wish to speak with that individual. If you would like to talk about these events in a more confidential setting you are encouraged to make an appointment with the MSU Counseling Center.

### **Grief Absence Requests**

Course instructors are sensitive to and will accommodate the bereavement process of a student who has lost a family member or who is experiencing emotional distress from a similar tragedy so that the student is not academically disadvantaged in his/her classes. It is the responsibility of the student to: a) notify the Associate Dean of his/her college of the need for a grief absence prior to leaving campus, b) provide appropriate verification of the grief absence as specified by the Associate Dean, and c) complete all missed work as determined by the instructor. It is the responsibility of the Associate Dean or designee to: a) determine with the student the expected period of absence – it is expected that some bereavement processes may be more extensive than others depending on individual circumstances, b) notify the faculty that the student will be absent, and c) receive verification of the authenticity of a grief absence request upon the student's return. It is the responsibility of the instructor to work with the student to: a) make reasonable accommodations and b) to include appropriate language describing such accommodations in their course syllabus, so that the student is not penalized due to a verified grief absence.

Students who believe their rights under this policy have been violated should contact the University Ombudsperson.

For the Grief Absence Request form go to:

<https://reg.msu.edu/StuForms/Stuinfo/GriefAbsenceForm.aspx>.

<http://splife.studentlife.msu.edu/regulations/selected/grief-absence-policy>