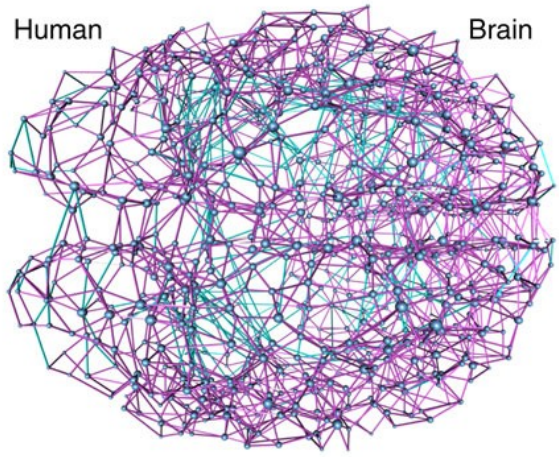
NEUR 335 – Molecular, Developmental, and Systems Neuroscience
Spring 2023
Section 01, Section 02



Instructor: Dr. L. Ren Guerriero (they/them)
Their email: lguerrie@gmu.edu
Their phone #: 703-993-5901
01 Meeting time: Tues/Thurs 10:30-11:45 am EST
01 Meeting location: Horizon 3012
02 Meeting times: Tues/Thurs 12:00-1:15 pm EST
02 Meeting location: Horizon 3012
Office Hours:
Office Location: Krasnow 253 and Zoom

What is this class?

This course is one of the required Neuroscience courses for majors. Developmental neuroscience is the study of the cellular and molecular events during embryonic development of the nervous system. We will cover patterning of the nervous system, cell differentiation, axon guidance, synapse formation, and neural death. Systems neuroscience involves the study of neural circuits, organized into sensory and motor systems, whose activity gives rise to complex functions. For each of these systems, pathways of information flow, information processed at each level, overall function, and consequences of injury/damage will be discussed. Students are also expected to become familiar with the scientific methods used to tackle questions in developmental/systems neuroscience as well as current questions and/or controversies in the field.

What will I get out of this class?

Learning Outcomes:

(1) Describe molecules and pathways responsible for neurodevelopmental processes.
(2) Outline the specific pathways through which sensory information is transmitted from peripheral receptors to brain regions for higher-order processing and integration.
(3) Outline the specific pathways within the brain and spinal cord responsible for control of simple and complex motor behaviors.
(4) Gain an appreciation for the clinical applicability of developmental and systems neuroscience research.
(5) Begin to hone skills in communicating about peer-reviewed developmental or systems neuroscience research to a wider audience.

How do I do well in this class?

This class relies heavily on material presented in the book. You are expected to read the chapters and the material presented in lecture will be over that content. I recommend skimming the chapter before we talk about them in class, and then reading again after lecture and when doing classroom activities. Also, communication is key to doing well in this course. You will be graded on your written and oral communication, but communication is necessary when you are confused in class. To make sure we all know how to act in class, our first day we will write and vote on a code of conduct, which will them be added to the syllabus. This will include both instructor and student responsibilities. It is then our job to uphold ourselves and other to the code of conduct.

Required Textbook:

Purves, D., et al. (2017) *Neuroscience, 6th Edition.* Sinauer Associates. ISBN: 9781605353807

Online Resources: oup-arc.com/access/purves-6e (includes animations, flashcards, etc.)

What are our responsibilities? (Code of Conduct)

These will be written and voted on in our first meeting of the class.

Student responsibilities:

Instructor responsibilities:

- COVID Policies: All students, instructors, and TAs are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (https://www2.gmu.edu/safe-return-campus). Similarly, all students, instructors, and TAs in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students, instructors, and TAs who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.
- All class members are required to follow Mason's current policy about facemask-wearing. As of August 11, 2021, all community members are required to wear a facemask in all indoor settings, including classrooms. An appropriate facemask must cover your nose and mouth at all times in our classroom.

How will I be graded in this class?

Grading Scale:

A+ 97-100%	B+ 87-89%	C+ 77-79%	D 60-69%	F 0-59%
A 93-96%	B 83-86%	C 73-76%		
A- 90-92%	B- 80-82%	C- 70-72%		

Chapter Assignments (13, 12 points) – For every chapter you will be assigned either an in-class activity or out of class quiz to take. These are designed to get you thinking more deeply about lecture content and apply to other situations. Some examples of assignments are analyzing case studies, completing an in-class activity, or interpreting data. Quizzes will be completed online using Blackboard and are open source, with a time limit of 20 minutes (so make sure your notes are organized well and you studied them).

Exams (3, 50 points) – There will be a total of three exams consisting of multiple choice, fill in the blank, and short answer questions. Exams are on paper in class, not open book/note, and will be timed. There is an optional cumulative final exam which may be taken to replace the lowest of your 3 exam scores.

News & Views Report (30 points) You will hone your written communication skills by writing a 1-2 page "News & Views" style summary of a primary research paper. Sample reports and guidelines are posted on Blackboard. These reports may be submitted at any time leading up to the deadline; all reports must be uploaded to Blackboard no later than April 24.

Participation and Assignments (50 points) – Attending class is an essential component of the learning process for the majority of students. The instructor will be monitoring your attendance and participation in the class. If you do not work with your group, raise

questions during lecture, or are absent (unexcused), you will not receive credit for the day.

I missed class or an assignment, what do I do?

Life is unpredictable and illness (both physical and mental) should be taken seriously. If you know you will not be in class, email Dr. Guerriero. Holidays, illnesses, and university sanctioned events likely count as an excused absence, but only if you notify Dr. Guerriero either before the event or as soon as you decide you're too ill to come to class. Next, if you miss class, look at Blackboard for the information covered in class. If the slides are confusing, email Dr. Guerriero.

Missed Assignments

- "Life Happens Pass" – For one written assignment this semester you can get an automatic 48-hour extension on the due date, no questions asked. **You must inform Dr. Guerriero in writing (email) to get this pass.**
- All other missed assignments will get a 20% deduction for being late. It is to your benefit to turn in assignments late, no matter how long it takes. Most of the points are better than no points! You have until **MAY 9** for all assignments to be turned in for partial credit.

I'm struggling in this class. How do I get help?

I don't understand the class material, assignments, my grades – email Dr. Guerriero. When emailing us, you have to use your gmu.edu email account or we cannot verify that the email came directly from you.

I'm stressed, anxious, angry, or mentally unwell – Counseling and Psychological Services have drop-in hours or virtual services, including a text line, online chat, and video chats. If its outside business hours, they have an after-hours crisis counselor (call 703-993-2380 and selection option 1).

I need help with time management, note taking, or other study skills – Talk to Dr. Guerriero or reach out to Learning Services for a personalized appointment and online tools.

I'm struggling with social issues that impact my identity, my culture, or me personally – College and higher education is inherently exclusionary, racist, sexist, and classist, and I'm committed to helping change that. Mason is also committed to this, with lots of resources:

Center for Culture, Equity, and Empowerment (includes bias incident reporting form)
First-Gen+ Center (resources for first-generation, undocumented, refugee, and limited income students)
LGBTQ+ Resources Center (including crisis, community, and gender transition resources)
Student Support and Advocacy Center (resources for financial help, sexual and interpersonal violence support, and drug/eating disorder recovery)

I need class accommodations for a disability, illness, or other reason – First talk to Disability Services office. They will meet with you virtually and help you with your individual needs. We can only activate your accommodations after you talk with Disability Services. Then talk to Dr. Guerriero about this class; they are happy to help you with what you need.

Tentative Schedule – Spring 2023
SECTION 01
Subject to change (check Blackboard for the most recent version)

Last Day to Add – Jan 30
Last Day to Drop – Feb 6 (100% refund), Feb 13 (50% refund)

Date	What we are discussing	How to prepare for class	When are things
Week 1 – Jan 24	- Course introduction	- Watch lectures online	- Pre-class survey due Jan 30 at
Jan 26		- Watch lectures online	
Week 2 – Jan 31	- Code of Conduct - Early Brain	- Read Ch 22	
Feb 2	- Early Brain Development	- Read Ch 22	- Ch 22 Early Brain Development Quiz due Feb 6 at 11:59 pm
Week 3 – Feb 7	- Construction of Neural Circuits	- Read Ch 23	- Ch 23 assignment due Feb 8 at 11:59 pm
Feb 9	- Construction of Neural Circuits	- Read Ch 23	- Ch 23 resubmission due Feb 13 at 11:59 pm
Week 4 – Feb 14	- Vision	- Read Ch 11	- Ch 11 Quiz due Feb 15 at 11:59 pm
Feb 16	- Central Visual	- Read Ch 12	
Week 5 – Feb 21	- Central Visual Pathways	- Read Ch 12	- Ch 12 Visual System: Assignment due Feb 22 at 11:59 pm
Feb 23	- **Exam 1 Prep**	- Bring questions	
Week 6 – Feb	- **Exam 1**	- Study	
Mar 2	- Auditory System	- Read Ch 13	
Week 7 – Mar 7	- Auditory System	- Read Ch 13	- Ch 13 Auditory System Assignment due Mar 8 at 11:59 pm
Mar 9	- Vestibular System	- Read Ch 14	
Week 8 - Mar 14	- Spring Recess. Relax and get some sleep		
Mar 16			

Week 9 - Mar 21	- Vestibular System	- Read Ch 14	- Ch 14 Quiz due Mar 22 at 11:59 pm
Mar 23	- Chemical Senses	- Read Ch 15	- Ch 15 Quiz due Mar 27 at 11:59 pm
Week 10 - Mar 28	- Somatosensory System	- Read Ch 9	Ch 9 Mini-Lessons due Mar 29 at
Mar 30	- Somatosensory System	- Read Ch 9	
Week 11 – Apr 4	- **Exam 2**	- Study	
Apr 6	- Pain - Lower Motor Neurons	- Read Ch 10	- Ch 10 Quiz due Apr 10 at 11:59 pm
Week 12 – Apr 11	- Lower Motor Neurons	- Read Ch 16	- Ch 16 Case Study due Apr 12 at 11:59 pm
Apr 13	- Upper Motor Neurons	- Read Ch 17	
Week 13 – Apr 18	- Upper Motor Neurons	- Read Ch 17	- Ch 17 Assignment due Apr 19 at 11:59 pm
Apr 20	- Basal Ganglia	- Read Ch 18	- **News and Views paper due Apr 24 at 11:59 pm**
Week 14 – Apr 25	- Basal Ganglia - Cerebellum	- Read Ch 18	- Ch 18 Assignment due Apr 26 at 11:59 pm
Apr 27	- Cerebellum	- Read Ch 19	- Ch19 Quiz due May 1 at 11:59 pm
Week 15 – May	- **Exam 3 Prep**	- Bring questions	
May 4	- **Exam 3**	- Study	
Finals - May 9	- **Optional Final Exam Prep**	- Bring questions	
May 16	- **Optional Final Exam (All Chapters)**	- Study	Final from 10:30 – 1:15 pm

Tentative Schedule – Spring 2022
SECTION 02
Subject to change (check Blackboard for the most recent version)

Last Day to Add – Jan 30
Last Day to Drop – Feb 6 (100% refund), Feb 13 (50% refund)

Date	What we are discussing	How to prepare for class	When are things
Week 1 – Jan 24	- Course introduction	- Watch lectures online	- Pre-class survey due Jan 30 at
Jan 26		- Watch lectures online	
Week 2 – Jan 31	- Code of Conduct - Early Brain	- Read Ch 22	
Feb 2	- Early Brain Development	- Read Ch 22	- Ch 22 Early Brain Development Quiz due Feb 6 at 11:59 pm
Week 3 – Feb 7	- Construction of Neural Circuits	- Read Ch 23	- Ch 23 assignment due Feb 8 at 11:59 pm
Feb 9	- Construction of Neural Circuits	- Read Ch 23	- Ch 23 resubmission due Feb 13 at 11:59 pm
Week 4 – Feb 14	- Vision	- Read Ch 11	Ch 11 Quiz due Feb 15 at 11:59 pm
Feb 16	- Central Visual	- Read Ch 12	
Week 5 – Feb 21	- Central Visual Pathways	- Read Ch 12	Ch 12 Visual System: Assignment due Feb 22 at 11:59 pm
Feb 23	- **Exam 1 Prep**	- Bring questions	
Week 6 – Feb	- **Exam 1**	- Study	
Mar 2	- Auditory System	- Read Ch 13	
Week 7 – Mar 7	- Auditory System	- Read Ch 13	Ch 13 Auditory System Assignment due Mar 8 at 11:59 pm
Mar 9	- Vestibular System	- Read Ch 14	
Week 8 - Mar 14	- Spring Recess. Relax and get some sleep		
Mar 16			

Week 9 - Mar 21	- Vestibular System	- Read Ch 14	- Ch 14 Quiz due Mar 22 at 11:59 pm
Mar 23	- Chemical Senses	- Read Ch 15	- Ch 15 Quiz due Mar 27 at 11:59 pm
Week 10 - Mar 28	- Somatosensory System	- Read Ch 9	Ch 9 Mini-Lessons due Mar 29 at
Mar 30	- Somatosensory System	- Read Ch 9	
Week 11 – Apr 4	- **Exam 2**	- Study	
Apr 6	- Pain - Lower Motor Neurons	- Read Ch 10	- Ch 10 Quiz due Apr 11 at 11:59 pm
Week 12 – Apr 11	- Lower Motor Neurons	- Read Ch 16	- Ch 16 Case Study due Apr 13 at 11:59 pm
Apr 13	- Upper Motor Neurons	- Read Ch 17	
Week 13 – Apr 18	- Upper Motor Neurons	- Read Ch 17	- Ch 17 Assignment due Apr 20 at 11:59 pm
Apr 20	- Basal Ganglia	- Read Ch 18	- **News and Views paper due Apr 24 at 11:59 pm**
Week 14 – Apr 25	- Basal Ganglia - Cerebellum	- Read Ch 18	- Ch 18 Assignment due Apr 27 at 11:59 pm
Apr 27	- Cerebellum	- Read Ch 19	- Ch19 Quiz due May 2 at 11:59 pm
Week 15 – May	- **Exam 3 Prep**	- Bring questions	
May 4	- **Exam 3**	- Study	
Finals - May 9	- **Optional Final Exam Prep**	- Bring questions	
May 11	- **Optional Final Exam (All Chapters)**	- Study	From 10:30 – 1:15 pm