Molecular, Developmental and Systems Neuroscience
NEUR 335-001 Spring 2020

Instructor: Dr. Jennifer Brielmaier **E-mail/phone:** jbrielma@gmu.edu / 703-993-1469
Class time: R 12-1:15 pm and Online **Location:** Krasnow Bldg 229 (R) and Online
Office hours: M 2:30-3:30 pm **Office location:** Fairfax, DK 2044

Course description:

Developmental neuroscience refers to the study of the cellular and molecular events underlying the emergence of the nervous system during embryonic development and beyond. Topics include 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.

Course format:

This course follows a blended, flipped design. Students will view recorded lectures and additional animations/videos and will take end of chapter quizzes online. Classroom meetings will be dedicated to reviewing information and completing active learning exercises in teams. For each class contact hour, students are expected to spend twice as much time reading, viewing lecture videos, and preparing for and taking quizzes. There are weekly deadlines and exams will be given in class on specific dates. All course tasks are described in detail below.

A typical week is outlined below:

1. View lecture videos and accompanying module content (at home)
2. Complete the end of chapter quiz (at home)
3. Class meeting (working in teams):
    - Chapter quiz review
    - Active learning exercise(s)
    - Exit reflection

Required textbook:

- Purves, D., et al. (2017) *Neuroscience, 6th Edition*. Sinauer Associates. ISBN: 1605353809

Optional recommended materials:

- Diamond, M.C., Scheibel, A.B., & Elson, LM. The Human Brain Coloring Book. Coloring Concepts, Inc. ISBN: 978-0064603065

Learning goals:

By the end of the semester, students should be able to:

- Describe molecules and signaling pathways responsible for various neurodevelopmental processes.

- Outline the specific pathways through which sensory information is transmitted from peripheral receptors to brain regions responsible for higher-order processing and integration.
- Outline the specific pathways within the brain and spinal cord responsible for control of simple and complex motor behaviors.
- Apply information learned in lectures to complete active learning exercises in teams (e.g. problem sets, inquiry-base activities, case studies, peer teaching, concept mapping, finding real-life examples).
- Communicate the findings of a developmental or sensory neuroscience research study in terms an educated layperson can understand.

Course tasks:

- **Chapter Quizzes:** To ensure preparation for the in-class activities, you will take an online quiz (via Blackboard) after completing each online module. All quiz questions are multiple-choice and cover topics that will appear on exams. Quizzes are open book/note but there is a time limit. You may only take each quiz once. **Quizzes must be completed by the start of class on the Thursday on which they are due.** There will be a total of 12 chapter quizzes, and your lowest two quiz grades will be dropped. Thus 10 quizzes will count toward your final grade for a total of 10% of your final grade.

- **Participation:** The online portion of the class is asynchronous, meaning students can work through the modules (lecture videos, additional videos/animations, chapter quizzes) at their own pace as long as they are completed prior to each Thursday meeting. Humans learn best when they are actively engaged in tasks and with each other. Thus, active participation is required in the Thursday class meetings. Though most of the work will be done in groups, each student will be graded on his or her individual participation during class (see rubric below). Each student must also complete an exit reflection (see Blackboard for instructions and rubric) at the end of each class meeting. Each of the 12 regular Thursday meetings are worth 6 participation points (3 pts. for participation in the activities, 3 pts. for the exit reflection) for a total of 72 possible points. Participation accounts for 20% of your final grade in this course. I understand that life happens. Thus, the final participation grade will be calculated out of 60 points (i.e., two class meetings can be missed without penalty). Please note that the final point total may be subject to change if the schedule changes. No one can earn more than 100% for participation.

Excellent (3)	**Average (2)**	**Poor (0-1)**
Arrives on time and preparation before class is very evident. Participation is active and effective (e.g. contributing to small group and whole class discussion, asking and answering questions, taking a leadership role).	Preparation is somewhat evident. There is some participation but also a fair amount of passive listening within the group and whole class discussions. May have arrived a few minutes late or engaged in off-task behavior on a single occasion.	Did not attend class, was extremely late, was present but showed no evidence of participation, or was disruptive/disrespectful (e.g. rude to others, texting during class).

- **Exams:** There will be a total of three non-cumulative exams consisting of multiple choice, fill in the blank, and/or short answer questions. **Exams will be taken in class** on the Thursday dates noted in the schedule (see below). Each exam will account for 20% of your final grade. There will also be an OPTIONAL final exam (cumulative, all multiple-choice) that can be used to replace a low score on Exam 1, 2 or 3.

- **News & Views Report**: Effective oral and written communication is a "transferable skill" that transcends disciplines. The ability to engage the lay public is critical to garner financial support for research. However, as we delve deeper into our particular research area, it becomes more difficult to convey information in a manner that the general public can grasp and become excited about. Thus, students will hone their written communication skills by writing a 1-2 page "News & Views" style summary of a review or 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 Thursday, April 23. The report will account for 10% of your final grade.

Grading:

Breakdown: Chapter Quizzes (10%) + Participation (20%) + Exams (3 x 20%) + News & Views Report (10%) = 100%

Grades will be assigned based on the following scale:

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

Incomplete (IN) grades will be assigned only in cases of compelling and documented need, in accordance with policies set forth in the University Catalog.

Makeup policies:

Any chapter quiz not taken by the deadline will receive a grade of zero. Because the lowest two grades will be dropped, chapter quizzes cannot be made up under any circumstances. Because the lowest exam will be dropped, makeups are not allowed. Class participation points cannot be made up outside of the classroom. Permission to postpone work will only be given for very acute and important reasons, with documentation and at my discretion. A 10% per day late penalty may be applied.

Students are responsible for checking the GMU Academic Calendar and making sure they are available to complete coursework throughout the entire semester. For a blended course with an online component this means ensuring you have reliable Internet access from beginning to end. Exams and other work may not be postponed due to travel occurring during the semester, whether planned or not; nor can the final exam be taken earlier than the scheduled timeframe.

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Official communications via GMU email:

Mason uses electronic mail to provide official information to students. Examples include communications from course instructors, notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback. Students are responsible for the content of university communication sent to their Mason email account, and are required to activate that account and check it regularly.

Technology statement:

Required knowledge of technology for this course includes ability to access course materials posted on Blackboard and/or sent via email to your GMU address. To log in to Blackboard, go to the MyMason portal at https://mymason.gmu.edu, enter your PatriotPass credentials (i.e., your Mason email username and password), and select the Courses tab. **Please be sure that you have continuous access to Blackboard and that your GMU email account is active and not over quota.**

The technology requirements for this course are as follows:

Hardware:

- A Windows or Macintosh computer with at least 2 GB of RAM and to a fast, reliable broadband Internet connection (e.g., cable, DSL).
- Recommended computer monitor and laptop screen size of 13 inches or larger, for optimum visibility of course material.
- Computer speakers or headphones to listen to recorded content.
- Enough space on your computer to 1) install the required and recommended software and 2) save your course assignments.

Software:

- Web browser (See Blackboard Support for supported web browsers)
- Blackboard Courses (Log into http://mymason.gmu.edu, select the Courses Tab)
- Adobe Acrobat Reader (free download)
- Flash Player (free download)
- Microsoft Office (purchase)

For hardware and software purchases, visit Patriot Computers.

Copyright statement:

In accordance with university policy, I hold the copyright on all course materials prepared by me (lecture slides/videos, problem set questions, quiz and exam questions, chapter study questions). Reproducing or sharing these materials outside of our course (e.g. on study websites such as Course Hero, Quizlet, or Study Blue) is a copyright violation and will be reported to the Copyright Office. Students who violate the University Copyright Policy may place themselves individually at risk for liability in the event of a claim of copyright infringement.

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Disability accommodations:

All students with questions or concerns about this class are encouraged to contact the professor, preferably during the first 2 weeks of the semester. Students with disabilities should work with the Disabilities Resource Center (DRC) at 703-993-2474 to identify appropriate accommodations and communicate those with the professor. All academic accommodations must be arranged through that office.

Academic integrity:

This course will be conducted in accordance with the GMU Honor Code, and all students are expected to abide by it. The GMU Honor Code, as found in the University Catalog, is as follows: To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work (http://catalog.gmu.edu/content.php?catoid=15&navoid=1039&returnto=search#Honor). Details concerning the university's Honor System and Code can be found in the University Catalog (accessible online at the above link).
If you have questions about when the contributions of others to your work must be acknowledged and appropriate ways to cite those contributions, please talk with the professor or utilize the GMU writing center. Here is an online quiz that you can take to check your knowledge about what is and is not plagiarism:
http://www.easybib.com/guides/quiz-is-it-plagiarism/

Religious holidays:

Please refer to George Mason University's calendar of religious holidays and observations (http://ulife.gmu.edu/calendar/religious -holiday-calendar/). It is the student's responsibility to speak to the instructor in advance should their religious observances impact their participation in class activities and assignments.

Student privacy:

George Mason University strives to fully comply with FERPA by protecting the privacy of student records and judiciously evaluating requests for release of information from those records. Please see George Mason University's student privacy policy
https://registrar.gmu.edu/students/privacy/

Student services:

- **University Libraries:** University Libraries provides resources for distance students. (See http://library.gmu.edu/distance and http://infoguides.gmu.edu/distance_students).

- **Writing Center:** The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. (See http://writingcenter.gmu.edu). You can now sign

up for an Online Writing Lab (OWL) session just like you sign up for a face-to-face session in the Writing Center, which means YOU set the date and time of the appointment! Learn more about the Online Writing Lab (OWL).

- **Counseling and Psychological Services:** The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (See http://caps.gmu.edu).

Add/drop deadlines:

Last day to add Jan 28
Last day to drop with 100% tuition refund Feb 5
Last day to drop with 50% tuition penalty Feb 11

Tentative **Schedule**

NOTE: **You are responsible for all announcements and any syllabus modifications made in class each week whether you are present or not.**

In person meeting dates are **bolded**

Week	Topic	Purves Chapter	Coloring Book Pages	Work Due (by start of class Thurs)
T Jan 21 **R Jan 23**	Course Introduction		1-1 - 1-5, 2-1, 2-3	Pretest
T Jan 28 **R Jan 30**	Early Brain Development	22	3-2 - 3-7, 3-11, 3-12	Ch. 22 Quiz
T Feb 4 **R Feb 6**	Const. of Neural Circuits	23		Ch. 23 Quiz
T Feb 11 **R Feb 13**	Experience-Dependent Plasticity	24		Ch. 24 Quiz
T Feb 18	**Exam Review Session (optional)**			
R Feb 20	**EXAM 1**			
T Feb 25 **R Feb 27**	Central Visual Pathways	12	5-16, 6-7, 6-8	Ch. 12 Quiz
T Mar 3 **R Mar 5**	The Auditory System	13	6-17, 6-18	Ch. 13 Quiz
T Mar 10 R Mar 12	**SPRING BREAK**			
T Mar 17 **R Mar 19**	The Chemical Senses	15	6-5, 6-11	Ch. 15 Quiz

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T Mar 24 **R Mar 26**	Somatosensory System	9	5-34	Ch. 9 Quiz
T Mar 31	**Exam Review Session (optional)**			
R Apr 2	**EXAM 2**			
T Apr 7 **R Apr 9**	Movement: LMNs	16	4-1 – 4-3	Ch. 16 Quiz
T Apr 14 **R Apr 16**	Movement: UMNs	17	4-11 – 4-12	Ch. 17 Quiz
T Apr 21 **R Apr 23**	Movement: Basal Ganglia	18		**N&V Report** Ch. 18 Quiz
T Apr 28 **R Apr 30**	Movement: Cerebellum	19		Ch. 19 Quiz
T May 5	**Exam Review Session (optional)**			
R May 9	**EXAM 3 10:30 am-1:15 pm**			
T May 12	**OPTIONAL Final Exam Due on Blackboard by 11:59 pm**			