

COURSE SYLLABUS
NSCI 320: Developmental Neurobiology - 3 credits
Fall 2017; Tuesday & Thursday 2:45 - 4:00, HSRF 300 & Given C447

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Prerequisites: Graduate standing or Permission of instructor

A. Course Summary:

This is an advanced level course for graduate students, and senior Neuroscience majors, with a background in fundamental Neuroscience. The aim of the course is to explore the cellular and molecular mechanisms underlying neural development. Foundational learning will be achieved by reading the required textbook *Development of the Nervous System* (3rd edition, 2012) by DH Sanes, TA Reh and WA Harris (Elsevier, ISBN 978-0-12-374539-2) or instructor provided review articles prior to group discussion combined with didactic lectures. Students will then apply their knowledge and hone their oral communication skills during a journal club style presentation of a primary research article. Students will also hone their written communication skills by writing a *News & Views* style summary of a primary research article of a neurodevelopmental disorder.

B. Course Expectations:

The course combines lecture, discussion and independent study. There will be two 75-minute meetings per week. Students should expect to study at least 2-3 hours for each meeting. This includes reading assigned textbook chapters or review articles prior to attending class, reading primary research articles to actively participate in discussion of the data presented, and oral and written presentation of primary research articles. Instructor PowerPoint presentations will be posted on Blackboard and printed for students to reference in class. Attendance is critical since the meetings will not be recorded. Students are expected to be respectful of faculty and classmates and to demonstrate professionalism through adherence to course and university policies.

C. Course Learning Objectives:

1. Describe basic principles of developmental neurobiology emphasizing the cellular and molecular events that regulate formation of the nervous system.
2. Describe how molecular, physiological, and behavioral studies have contributed to our understanding of nervous system development and function.
3. Summarize key contributions of historical scientific papers to our current understanding of developmental neurobiology.
4. Describe the experimental tools used by neuroscientists to study nervous system development.
5. Critique experimental approaches used and data interpretation presented in scientific literature.
6. Design experimental approaches to resolve neuroscience problems in feasible ways.
7. Demonstrate effective oral and written communication skills.

D. Course Schedule:

Date	Topic	Reading	Instructor	Location
Tues 8/29	Course Intro & Development Intro	TBD	DMJ	HSRF 300
Thurs 8/31	Neural induction - proneural genes	Chapter 1	CJF	HSRF 300
Tues 9/5	Polarity and Segmentation	Chapter 2	CJF	HSRF 300
Thurs 9/7	Neurogenesis	Chapter 3	DMJ	HSRF 300
Tues 9/12	Migration	TBD	DMJ	HSRF 300
Thurs 9/14	Article:		CJF	HSRF 300
Tues 9/19	Determination & differentiation	Chapter 4	DMJ	HSRF 300
Thurs 9/21	Glial Development	TBD	DMJ	HSRF 300
Tues 9/26	Axon Growth and Guidance	Chapter 5	CJF	HSRF 300
Thurs 9/28	Article:		DMJ	HSRF 300
Tues 10/3	Target Selection	Chapter 6	CJF	HSRF 300
Thurs 10/5	Neuronal Tiling	TBD	CJF	HSRF 300
Tues 10/10	Myelination	TBD	DMJ	Given C447
Thurs 10/12	Article: Science (2107) 356: 406-11 & 11-14		CJF	Given C447
Tues 10/17	Naturally-occurring Neuron Death	Chapter 7	DMJ	HSRF 300
Thurs 10/19	Synaptogenesis	Chapter 8	DMJ	Given C447
Tues 10/24	Refinement of Synaptic Connections	Chapter 9	DMJ	HSRF 300
Thurs 10/26	Article:		DMJ	Given C447
Tues 10/31	Growth factors	TBD	CJF	HSRF 300
Thurs 11/2	Activity-dependent plasticity	TBD	DMJ	Given C447
Tues 11/7	Environment & epigenetics	TBD	DMJ	HSRF 300
Thurs 11/9	Article:		DMJ	Given C447
Tues 11/14	News & Views preparation - NO CLASS			HSRF 300
Thurs 11/16	Behavioral Development	Chapter 10	CJF	Given C447
11/21 & 23	Thanksgiving break			
Tues 11/28	Maltreatment and Ecophenotype	TBD	CJF	Given C447
Thurs 11/30				Given C447
Tues 12/5	Article:			HSRF 300
Thurs 12/7	Hold: additional student presentation or topic			Given C447
Tues 12/12	Final Exam 1:30- 4:15			HSRF 300

E. Course Resources:

1. Required textbook: *Development of the Nervous System* (3rd edition, 2012) by DH Sanes, TA Reh and WA Harris (Elsevier, ISBN 978-0-12-374539-2)
2. Blackboard: Other assigned review articles, primary research articles and power point presentations will be posted on Blackboard. Blackboard is the primary means of communication between the instructors and the class. All announcements posted on Blackboard will also be sent to the student's UVM e-mail account. It is the student's responsibility to ensure that their "In box" has sufficient available space to receive updates. The instructors are not responsible for students missing announcements due to a full In box.
3. Handouts of the instructor and student power point presentations will be distributed before each lecture. Color electronic copies of the presentations are also available on Blackboard for students to print themselves.

F. Grading:

1. Student presentation (30%): Students will present a primary research article in a journal club style presentation. In addition to preparing a power point presentation summarizing the anatomy and physiology of the system used, the salient data presented in the manuscript and an explanation of the methodologies utilized, students will act as a discussion leader to engage fellow classmates in a critique of the strengths and weakness of the manuscript.
2. Quizzes (25%): A 10 question quiz testing the student's understanding of the assigned reading (i.e., textbook chapter or review article) will be taken at the beginning of each session. The quiz consists of two parts. In the individual readiness assessment test (IRAT), each student completes the quiz independently. In the group readiness assessment test (GRAT), the quiz is completed by the group. The aggregate score (i.e., 75% IRAT + 25% GRAT) will be recorded in Blackboard. Since all quiz answers are discussed in class, **there is no opportunity for make-up quizzes** and missed quizzes will result in a score of zero (except in emergent situations). Quiz scores will be posted to the grade book in Blackboard, and can be seen under the 'My Grades' tab.
3. Final Exam (20%): Completed in class, Tuesday December 12th 1:30-4:15, HSRF 300. Students will select one of several research scenarios and use the knowledge gained in the course to design experiments to resolve the question posed. Students will not use computers; thus, there will be no access to resources, other than the student's own knowledge.
4. News & Views report (15%): Effective 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 research area, it becomes more difficult to convey information in a manner that the general public can grasp and become excited about. Students will hone their communication skills by writing a one page *News & Views* style summary of a primary research article on a neurodevelopmental disorder. Students must obtain instructor approval of the article to be summarized. Sample reports and guidelines are posted on Blackboard.
5. Attendance & participation (10%): Because this course is based on discussion of preparatory readings and critique of primary literature, it is essential for students to be present and engaged. Therefore, students will receive a grade for attendance (5%) and participation (5%) for each session. Absences will result in a score of zero (except in emergent situations).

6. **Grading:** A numerical grade (on a 100 point scale) will be assigned for each activity listed above and combined as indicated to generate the final letter grade. Letter grades are assigned and reported to the Registrar’s office as follows:

Graduate Students		Undergraduate or Non-degree Students			
Numerical Grade	Letter Grade	Numerical Grade	Letter Grade	Numerical Grade	Letter Grade
97-100	A+	97-100	A+	67-69	D+
93-96	A	93-96	A	63-66	D
90-92	A-	90-92	A-	60-62	D-
87-89	B+	87-89	B+	<60	F
83-86	B	83-86	B		
80-82	B-	80-82	B-		
77-79	C+	77-79	C+		
73-76	C	73-76	C		
70-72	C-	70-72	C-		
<70	F				

University Policies:

Student Learning Accommodations: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus.

ACCESS: A170 Living/Learning Center; 656-7753; access@uvm.edu; <http://www.uvm.edu/access>

UVM’s policy on disability certification and student support:

<http://www.uvm.edu/~uvmppg/ppg/student/disability.pdf>

Academic Integrity: The policy addresses plagiarism, fabrication, collusion, and cheating.

<http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf>

Grade Appeals: If you would like to contest a grade, please follow the procedures outlined in this policy: <http://www.uvm.edu/~uvmppg/ppg/student/gradeappeals.pdf>

Grading: For information on grading and GPA calculation, go to <http://www.uvm.edu/academics/catalogue> and click on Policies for an A-Z listing.

Code of Student Rights and Responsibilities:

<http://www.uvm.edu/~uvmppg/ppg/student/studentcode.pdf>

FERPA Rights Disclosure: The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.

<http://www.uvm.edu/~uvmppg/ppg/student/ferpa.pdf>

Religious Holidays: Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to the course director in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.