

BIOLOGY 316: NEUROBIOLOGY

(Lectures + Laboratory—4 Credits)

Instructor	Professor Alexia E. Pollack Office: W-3-005 Phone: (617) 287-6618 e-mail: alexia.pollack@umb.edu Office Hours: MF 10-11 & W 12-1 (or by appointment) E-mail is the best way to schedule an appointment or to ask a question.
Lectures	MWF 1:00-1:50 Room: W-2-200
Laboratory	Monday or Wednesday from 2-5pm Room: M-1-310
Textbook	Bear M.F., Connors B.W., Paradiso M.A. <u>Neuroscience: Exploring the Brain</u> , 3 rd edition, Philadelphia, Lippincott Williams & Wilkins, 2007.
Course Description	How does the brain and nervous system allow us to sense, move and behave? First, we will examine nerve cells (neurons), learn about their excitable membranes and how they communicate with one another. Next, we will discuss groups of neurons and how they comprise sensory and motor systems. Finally, we will examine the neurobiological basis of behavior by focusing on normal functions and disease states.
Course Objectives	To gain a sense of what is known (and <u>not</u> known) about the brain To understand underlying concepts in neurobiology—membrane properties, synaptic transmission, information coding To ‘think’ like a scientist—using the scientific method
Teaching Methods	Lecture + activities: thought questions, group work or class discussions. Reading the assigned chapter <i>before coming to class</i> will aid in your understanding and retention of the material. <i>PowerPoint lecture slides & other handouts are on “Blackboard Learn”</i> <i>Go to: https://umb.umassonline.net/</i> <i>Log in with your e-mail address (<u>without</u> @umb.edu) & your e-mail password</i>

Course Grade

Determined by the following distribution:

Three <i>highest</i> Exams	65% of course grade
Ten Quizzes	10% of course grade
Laboratory	25% of course grade

Laboratory grade consists of:

Neuroanatomy practical exam	10%
Five Written Abstracts (10%/each)	50%
Four Lab Quizzes	10%
Laboratory Final Exam	30%

Your **course grade** will be determined by computing a **course score**, which takes into account the **three highest exam grades** (65%), overall score on **ten quizzes** (10%) and **laboratory grade** (25%). Your course score will be a number between 0 and 100; these numbers correspond to a *letter grade* for the course in the following manner:

$\geq 90 = A$	69-66 = C
89-86 = A-	65-62 = C-
85-82 = B+	61-58 = D+
81-78 = B	57-54 = D
77-74 = B-	53-50 = D-
73-70 = C+	below 50 = F

Exams

There will be four (50 minute) in-class Exams.

Questions will be modified True/False, fill-in-the-blank, and short answer. Questions will focus on the material presented in class, including lectures, demonstrations, videos, discussions, as well as the required reading.

Your lowest exam grade will be dropped. There are NO make-up exams.
There is NO FINAL EXAM for lecture portion of the course.

Quizzes

There will be 11 quizzes scattered across the semester. Each quiz is worth 1 point, and your quiz grade will count up to 10 points. Quizzes will occur at random, which is why it is important to attend class – arriving on time & staying until the end.

If you miss a quiz (absent, arrive late or leave early), you will receive a zero. There are no make-ups for the quizzes; you have to attend class to receive credit. Quizzes will account for 10% of your course grade.

POLICIES – Please read carefully**Exams:****THERE WILL BE NO MAKE-UP EXAMS.****Your *lowest* hourly exam grade will be *dropped*.**

If for any reason (including illness) you cannot take an hourly exam, this will be the hourly Exam grade that is dropped. A subsequent absence from another Exam will receive a ‘zero’.

Laboratory Section:

Lab will meet from the week of Sept 9 through the week of Nov 4.

Lab sections will not meet Oct 14/16, Nov 11/13, Nov 18/20, Nov 25/27.

Lab Final Exam will be on Dec 2 (Monday Lab) & Dec 4 (Weds Lab).

You MUST attend every meeting of your laboratory section.

There are no make-up sessions. Failure to attend a laboratory section will result in a ‘zero’ for the assignment associated with that week’s experiment.

Written Assignments:

If you have a legitimate conflict with the due date of a written assignment, talk to me BEFORE the due date about an extension.

If you hand in an assignment after the due date without obtaining an extension first, a minimum of 1 point will be deducted. Written assignments will *not be accepted beyond one week after the due date* (unless you present written documentation as to extenuating circumstances).

Hard copies of written assignments should be handed in during the lecture class indicated on the syllabus. Written assignments sent by EMAIL will NOT be accepted unless it is an extenuating circumstance.

Plagiarism:

You must take care **to use your own words** in all written assignments. The use of someone else’s ideas, words or data *without referencing the original source* constitutes plagiarism. However, even if you cite the original source you must take care not to copy the source verbatim or only slightly change the wording of the source. Written assignments have to be your own work, which reflect your own thoughts and considerations.

Examples of ‘sources’ include, but are not limited to, published books and articles, web sites or any information from the Internet, course handouts and fellow classmates. Special Note: if students hand-in identical written work, all parties will be punished – regardless of whom copied from whom.

Any student accused of plagiarism will receive a letter from me with copies of this letter forwarded to the Biology Department Chair, the appropriate College Dean, and Assistant Director of Undergraduate

Studies. Plagiarism is a serious offense with punishment ranging from ‘zero’ for the assignment to ‘F’ for the course.

Students with Disabilities: Students with a physical or mental disability should register with the Ross Center for Disability Services (CC-UL-211). The Ross Center will determine the nature of any accommodations, and they will convey this information to me. Students should not ask me to make special accommodations without registering with the Ross Center first.

****Special Note**** In cases of **serious illness** (flu), accommodations *may be* made on a case-by-case basis - **requiring documentation of illness** – in order to make-up assignments or an Exam, *when one has already been dropped*.

CLASS SCHEDULE

SEPTEMBER	4	What is neurobiology?	
	6	Neurons/Glia	Ch. 2
	9	Resting Membrane Potential	Ch. 3
	11	Action Potential	Ch. 4
	13	Synaptic Transmission	Ch. 5
	16	Receptors	Ch. 5
	18	Techniques	Ch. 6
	20	Neurotransmitter Systems	Ch. 6
	23	Neurotransmitter Systems	Ch. 6
	25	EXAM I (Sept 6 – Sept 23)	
<i>APSim Abstract due</i>	27	Structure and Development	Ch. 7
	30	Video – "Secrets of the Mind"	
OCTOBER	2	Taste	Ch. 8
	4	Smell	Ch. 8
	7	The Eye	Ch. 9
	9	Visual System	Ch. 10
	11	Auditory System	Ch. 11
	14	NO CLASS – Columbus Day	
	16	Somatic Sensory System	Ch. 12

OCTOBER	18	Nociception/Pain	Ch. 12
	21	EXAM II (Sept 27 – Oct 18)	
<i>Percept Abstract assigned</i>	23	Experiments in Perception – YOU MUST ATTEND CLASS	
	25	Movement—Spinal Control	Ch. 13
	28	Movement—Brain Control	Ch. 14
<i>Percept Abstract due</i>	30	Reaction Time Demonstration	
NOVEMBER	1	Parkinson’s Disease (PD)	Scientific American
	4	Reward, Drugs & Addiction	Ch. 15 & 16
	6	Hypothalamus/ANS	Ch. 15
<i>E-Fiz Abstract due</i>	8	Eating and the Brain	Ch. 16
	11	NO CLASS – Veteran’s Day	
	13	Sex and the Brain	Ch. 17
<i>EMG Abstract due</i>	15	Emotion	Ch. 18
	18	EXAM III (Oct 23 – Nov 15)	
	20	Mental Illness	Ch. 22
<i>AMPH Abstract due</i>	22	Language	Ch. 20
	25	Language – guest speaker – Prof. Mohinish Shukla	
	27	NO CLASS – Thanksgiving	
	29	NO CLASS – Thanksgiving	
DECEMBER	2	Wiring the Brain	Ch. 23
	4	Learning and Memory – Systems	Ch. 24
	6	Learning and Memory – Cellular	Ch. 25
	9	Alzheimer’s Disease (AD)	
	11	Student Evaluations & Brain Magic!	
	13	EXAM IV (Nov 20 – Dec 11)	

LABORATORY SCHEDULE

<u>Date</u>	<u>Laboratory</u>	<u>Assignment</u>	<u>Due</u>	<u>Points</u>
Sept 9/11	Introduction to the Laboratory	None		
Sep 16/18	APSim Computer Program	APSim Abstract	Sept 27	10
Sep 23/25	Neuroanatomy/Sheep Brain	None		
Sep 30/Oct 2	Neuroanatomy/Sheep Brain	Lab Practical Exam	same day	10
Oct 7/9	Animal Electrophysiology (E-Fiz)	None		
Oct 14/16	NO LABORATORY – COLUMBUS DAY			
Oct 21/23	Animal Electrophysiology	E-Fiz Abstract	Nov 8	10
Oct 28/30	Human Electrophysiology (EMG)	EMG Abstract	Nov 15	10
Oct 30	Perception Abstract due (from “Exp in Perception” on Oct 23)			10
Nov 4/6	Animal Neuropharmacology	AMPH Abstract	Nov 22	10
Nov 11/13	NO LABORATORY – VETERAN’S DAY			
Nov 18/20	NO LABORATORY			
Nov 25/27	NO LABORATORY - THANKSGIVING			
Dec 2/4	Laboratory Final Exam		same day	30
***Four Quizzes	will be administered <u>at random</u> starting at 2:00 (beginning of lab section)			10