BioMed 509 Introduction to Neurobiology
Spring 2021
MWF 3:30 – 4:30 PM

Course Overview

Course director: Dr. Jonathan Brigman, Fitz 237, 505-272-2868, jbrigman@salud.unm.edu
Course Graduate Teaching Assistant: Natalie Pinkwoski, Fitz 277. npinkowski@salud.unm.edu

Registration:
Principles of Neurobiology (Biomed 509) meets one selective requirement for all first year Biomed Science graduate students. All other graduate and undergraduate students wishing to enroll must obtain permission from the course director. The course is intended to give students an introduction to neurosciences including its different sub-disciplines: neuroanatomy, neurochemistry, neurophysiology, system biology and neuropathology.

Textbook:
Reading assignments are from Squire et al, "Fundamental Neuroscience" 4th Edition, which can be accessed using the following HSC library link: https://hslic-unm.on.worldcat.org/oclc/830351091. A textbook adds important breadth and an alternative dimension to the material covered in lecture and we strongly recommend that you read the assigned chapters. Other material may be assigned by the faculty during the course and will be put online in the course blackboard website currently under development.

Interactive Lectures:
Class will be held Monday, Wednesday and Friday via Zoom and attendance is required. In advance of the class lecture handouts and other materials will be posted via BlackBoard. Lecture captures will be posted following the class. However, interaction and back-and-forth questions between faculty and students is essential for integrating this material so any student not attending a session must contact the Course Director prior to class. Multiple absences that impact course performance will be dealt with on a case by case basis.

Grade Calculation:

Integrative tests (48%):
Each unit will wrap up with a take home test (released Wed. morning) and due at the next class session (Fri. by class time) that integrates material from that unit. They will be posted on-line on the specified date and will be due by the following class. You are free to use the text, notes, slides and lecture capture **but not to discuss** the questions with other class members.

Assigned paper discussions (22%):
There will be 8 class discussions of assigned papers that are related to each of the blocks of material in the course. All assigned papers for the group discussions will be posted online. Groups will be pre-assigned for each paper and given a specific aspect of the paper to present, although all students are required to come to class prepared to discuss the whole paper.

- Groups will be expected to prepare a 10-15 minute PowerPoint presentation in advance of class.
- Every member of the group is expected to contribute equally to preparing the presentation.
- Paper feedback will be sent to each group by the Course Director, Teaching Assistant and Teaching Faculty for the paper.
- On the rare occasion when it is necessary for one member to miss the presentation session, the

student must to send the course director a **short written description** of what they contributed to the group effort.

Research Paper and Oral presentations (30%):
Reading and interpreting the scientific literature, formulating your own ideas based on this information, and presenting your ideas to others are essential skills for any scientist. The final assignment for this course is intended to provide experience in developing these skills. Many aspects of your scientific career (including the qualifying exam and grant writing) are based on hypothesis formation. While hypothesis formation is usually followed by designing experiments to test the hypothesis, this assignment is directed only at the aspect of making and supporting a hypothesis via the scientific literature.

Research Paper and Oral Presentation Deadlines and Evaluation Metrics:

Fri, Feb 12: Identify a Faculty Paper Mentor: Choose an area of interest neuroscience related to the topics of this course and based on this topic, work with the Course Director to identify a faculty member to be your Paper Mentor.

Fri., Feb 26: Meet with your Paper Mentor: Hold at least 1 meeting with your identified Paper Mentor to discuss and refine your specific research hypothesis. The hypothesis should be specific and testable via a literature review, not so broad that you cannot state it was supported, not supported, or partially supported.

Mon., Apr 2: Submit First Draft (5%): A first draft of the paper must be turned in to your Paper Mentor for feedback and direction.

The draft should include:

- Clear statement of your hypothesis
- Introduction establishing relevance of hypothesis
- Primary literature cited supporting the hypothesis
- An adequate critique of the hypothesis

Mon., Apr 23: Submit Final Paper (10%)

A final draft of your Research Paper (Maximum 10 pages), incorporating feedback from your draft will be submitted to your Paper Mentor and Dr. Brigman.

The final paper must include:

- Clear statement of your hypothesis
- Introduction establishing relevance of hypothesis
- Primary literature cited supporting, or failing to support the hypothesis
- An adequate critique of the hypothesis (too broad, too specific, didn't incorporate an important aspect, too few studies done to date, etc.
- Technical aspects (bibliography, figures, etc.)
- You may also include figures or graphs from primary sources (properly cited) to establish support for your hypothesis.

Mon, Apr 26 to Fri, May 8: Student Presentations (15%)

During the last two weeks of class, students will be scheduled for individual 15-minute oral presentations followed by a 5-minute question period. Utilizing the presentations skills you developed during the Group Presentations sessions, you will present your Research Paper findings to the class and your Paper Mentor.

Your presentation will be graded on how well you cover the following areas:

- Hypothesis: Was the hypothesis clearly stated and well established?
- Knowledge: Did the student demonstrate an understanding of the material?
- Delivery: Was the presentation well organized and presented?
- Questions: Were the questions answered in a thoughtful manner?

3 students will present per session, so **a strict 15 minute presentation time** will be maintained.

2021 Class Schedule

General Topic	Faculty	Test	Date	Lecture	Reading assignment
Neuroanatomy	Brigman		W 20 Jan	Course Overview	
	Cunningham		F 22 Jan	Gross Brain Anatomy	Ch. 2
	Cunningham /Brigman		M 25 Jan	Neurons & Glia	Ch. 3
	Brigman	**Integrative test 1**	W 27 Jan	Virtual Brain Dissection	
Development	Weick		F 29 Jan	Early Development	Ch. 13 & 21
	Weick		M 1 Feb	Cell Fate Determination	Ch 15
	Weick		W 3 Feb	Synapse Formation	Ch. 17 and 18
	Weick		F 5 Feb	Synapse Stabilization	
	Cunningham		M 8 Feb	Adult Neurogenesis	Ch. 15
	Weick	**Integrative test 2**	W 10 Feb	***Paper 1: Development***	
	Morton		F 12 Feb	Ion Channels	Ch. 5
	Weick		M 15 Feb	Cellular Potentials	
	Weick		W 17 Feb	***Paper 2: Electrophysiology***	
Sensory & Autonomic	Brigman		F 19 Feb	Sensory Transduction	Ch. 22.
	Milligan		M 22 Feb	Spinal Reflexes	
	Shuttleworth	**Integrative test 3**	W 24 Feb	Autonomic Functions	Ch. 34
	Weick		F 26 Feb	Vesicular Release	Ch. 7
Neurotransmitters	Mellios		M 1 Mar	Norepinephrine, Dopamine & Serotonin	Ch. 6
	Savage		W 3 Mar	G-protein coupled Neurotransmitter Receptors	Ch. 8 & Ch. 9
Student Research Day			F 5 Mar	No Class	
	Savage		M 8 Mar	***Paper 3: GPCRs***	
	Mellios	**Integrative test 4**	W 10 Mar	Acetylcholine & GABA & receptors	Ch. 6 & Ch. 8
	Mellios		F 12 Mar	Glutamate and Glycine & receptors	Ch. 6 &Ch. 8
Spring Break			15-19 Mar	Spring Break	
	Mellios		M 22 Mar	***Paper 4:***	

				Neurotransmitters	
	Mellios	**Integrative test 5**	W 24 Mar	Gene Expression	
	Milligan		F 26 Mar	Peptides & Non-conventional Transmitters	
	Milligan		M 29 Mar	Neurotrophic Factors	
Learning & Behavior	Brigman		W 31 Mar	Synaptic Plasticity	Ch. 47
	Brigman		F 2 Apr	Reward and Addiction	Ch. 41
	Brigman		M 5 Apr	***Paper 5: Substance Abuse***	
	Brigman		W 7 Apr	Learning & Memory	Ch. 48
	Brigman		F 9 Apr	Executive Function	Ch. 50
	Brigman	**Integrative test 6**	M 12 Apr	***Paper 6: Behavioral Phenotyping***	
Pathology	Cunningham		W 14 Apr	Neurodegenerative Diseases	
	Mellios		F 16 Apr	Developmental disorders: Rett and Autism	
	Mellios		M 29 Apr	Neuropsychiatric disorders: Schizophrenia and Bipolar disorder	
	Mellios		W 21 Apr	**Paper 7** ***iPSC models of psychiatric disorders***	
Connectome	Brigman		F 23 Apr	***Paper 8: Connectome***	
Student Presentations		M 26 Apr – F 7 May		*To Be Scheduled*	

Accommodation Statement

Accessibility Services (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner. If you need local assistance in contacting Accessibility Services, see the Bachelor and Graduate Programs office.

Title IX Statement

A Note About Sexual Violence and Sexual Misconduct: As a UNM faculty member, I am required to inform the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu) of any report I receive of gender discrimination which includes sexual harassment, sexual misconduct, and/or sexual violence. You can read the full campus policy regarding sexual misconduct at https://policy.unm.edu/university-policies/2000/2740.html. If you have experienced sexual violence or sexual misconduct, please ask a faculty or staff member for help or contact the LoboRESPECT Advocacy Center.

Academic Integrity

The University of New Mexico believes that academic honesty is a foundational principle for personal and academic development. All University policies regarding academic honesty apply to this course. Academic dishonesty includes, but is not limited to, cheating or copying, plagiarism (claiming credit for

the words or works of another from any type of source such as print, Internet or electronic database, or failing to cite the source), fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. The University's full statement on academic honesty and the consequences for failure to comply is available in the University Catalog and in the Pathfinder.

Cell Phones and Technology

As a matter of courtesy, please turn off cell phones, pagers, and other communication and entertainment devices prior to the beginning of class. Notify me in advance if you are monitoring an emergency, for which cell phone ringers should be switched to vibrate.