Psychology 363: Laboratory in Behavioral Neuroscience

General Course Information			
Class Details	Professor	Teaching Assistant	Teaching Assistant
Classroom: SELE 3069 Time: Wednesdays 2-6pm	Dr. James Maniscalco jmanis@uic.edu Office: BSB 2056A Office Hours: by appointment	Sineadh Conway *conway5@uic.edu*	Sami Corwin *scorwi3@uic.edu*

Course Objectives

1. You will develop a deep knowledge of behavioral neuroscience through lectures, laboratory exercises, and readings on numerous and diverse behavioral neuroscience topics.
2. You will develop a broad knowledge about the field of neuroscience.
3. You will develop skills in reading and critically evaluating primary neuroscience literature.
4. You will develop an understanding of neuroscience hypothesis generation, research design and methods, techniques, statistical data analysis, drawing conclusions and insights.
5. You will develop communication skills for presenting neuroscience research.

Course Overview

The goal of this laboratory course is to provide you with both an understanding of the structure and function of the brain as it relates to (and interacts with) the world around us as well as an understanding of how we arrive at the "facts" that fill our textbooks in Behavioral Neuroscience. The conclusions we've reached about how the brain and nervous system generates behavior are based on empirical data collected from experiments conducted in laboratory settings. In this course, you will learn about neuroanatomy, neurophysiology, and neurobiological contributions to behavior. All of the course objectives will be met through "hands on" experience and experimentation as well as review of primary neuroscience literature. Thus, you'll gain a strong appreciation for the scientific process in general.

Course Content

The course will begin with lectures that provide a critical understanding of both the cellular level information about individual brain cells (neurons and glia) and their place within the nervous system. We will then expand this view of neural circuits to place them within the functional neuroanatomy of the brain, and cover how single neurons communicate with one another within the brain. At this point, you will have been introduced to the basics of neural structure and function at the micro, meso, and macro levels.

As the brain does not operate in isolation, the next section will focus on processing of incoming sensory information as well as generation of movement and motor behavior. As key examples of the many sensory modalities, we will likely cover basic processing of auditory and visual information. With an understanding of how the brain processes incoming sensory information, we will cover movement, as the generation and coordination of motor behavior is one of the most fundamental roles of the brain, allowing for interaction with the rest of the world. To apply the sensory and motor topics learned, we will use the information covered thus far to analyze the neuroscience behind how a baseball player hits a fastball.

After covering neural structure and function, processing of sensory information, and generation of motor behavior, we will discuss the "behavioral basics" – i.e., some principal neural drivers of behavior – starting with an investigation of how the brain processes emotions, which result from our sensory experiences and drive our behavioral choices. We will highlight the neurobiology of stress and anxiety in particular. Following this, we will delve into the neural substrates of learning and memory, the process by which previous experience can drive future behavior. After understanding how the brain processes these integral behavioral phenomena, we will cover the neural substrates underlying body fluid homeostasis, a critical physiological need that influences all other behaviors. To finish the course, we will review the concepts of consciousness and sleep, two brain states that are the most basic determinants of any behaviors.

Each class will begin with about 45-60 minutes of lecture/discussion. Slides, made available on blackboard, will be used to introduce the day's lab exercise. This material will often serve to help you craft assigned written work (see below). Thus, it will be imperative that you listen carefully and ask questions if you do not understand the material being presented. In addition, you will read original, peer-reviewed research articles related to experiments conducted in the lab course. Readings should be completed before the class date for which they are assigned.

It is our hope that each student learns the material and succeeds. If at any point you are struggling with the material it is imperative that you meet with myself or one of the TAs!

Class Schedule						
****Note: all readings & assignments will need to be completed prior to the class day listed below****						
Week	Date	Topic	Lab	Readings	Quizzes	Lab Report Assignments
1	8/24/16	Introduction & Neuroanatomy	Histology Rotations			
2	8/31/16	Neuroanatomy	Sheep brain dissection	Portraits of the Mind – Ch. 2 Biological Psychology – Ch. 2	Quiz 1	1-page report on brain area due
3	9/7/16	Neuroanatomy	Sheep brain dissection	Biological Psychology – Ch. 2	Quiz 2	
4	9/14/16	Lab Practicum				
5	9/21/16	Nerve Conduction Velocity	Ulnar Nerve Lab	Carlson – Ch. 2 (41-51) Wei et al. (2005)	Quiz 3	
6	9/28/16	Action Potential	Recording APs (Spiker Box)	Carlson – Ch. 2 (51-64) Rothman, 2008	Quiz 4	Abstract on conduction velocity due
7	10/5/16	Sensation, Perception, Movement	Just Noticeable Difference	TBD Your Brain on Cubs – Ch. 3	Quiz 5	Abstract on action potential due
8	10/12/16	Stress & Anxiety	Salivary cortisol	Carlson – Ch. 17 (601 – 606) Sapolsky et al. (1985)	Quiz 6	Abstract on JND due
9	10/19/16	Emotion	Salivary cortisol	Sapolsky et al. (1990)	Quiz 7	
10	10/26/16	Learning & Memory I	Conditioned Taste Aversion	TBD	Quiz 8	Stress Lab Report – Draft 1 Due: Title, Abstract, Introduction, & Methods
11	11/2/16	Learning & Memory II	Conditioned Taste Aversion	Bernstein et al. (1982) Barot et al. (2008)	Quiz 9	
12	11/9/16	No Class – Comer Symposium Attendance (*Stress Lab Report – Draft 1 returned*)				
13	11/16/16	Body Fluid Homeostasis	AngII & Thirst in Rats	Carlson – Ch. 12 (394 – 402) Buggy & Fisher (1976)	Quiz 10	Comer Symposium Summary Notes Stress Lab Report – Draft 2 Due: Results, Discussion, References, Figures, and Figure Legends
14	11/23/16	No Class - Thanksgiving				
15	11/30/16	Consciousness & Sleep	Brain wave (EEG) recordings	Carlson – Ch. 9 (289-293, 299-308, 315-317)		*Stress Lab Report – Draft 2 returned*
16	12/7/16	No Class – Final Lab Report Due				

Grading

Grading Philosophy:
Your grade on each graded item starts at zero, and then increases in relation to the quality of your work. Please do not ask "why did you take points off for this or that?", since that question implies that the points were yours to begin with, and had been taken from you. To ensure you are receiving the highest level of education possible, UIC requires students to earn their degrees. Accordingly, the burden is on you to demonstrate why you earned the points in question. This approach has you assume a proactive role in your education –an excellent habit to acquire early in your lifelong journey of learning!

Grading Procedure: Please follow the procedure below if you would like me to reconsider the grade that you received on any graded item. It is your responsibility to submit, in writing, the reason(s) you believe that your grade should be changed. Please do not ask "why was this graded this way?". Instead, politely state why you believe your response is worthy of the points you seek. This written statement from you must be submitted to me within one week after you have received your grade on the item(s) in question. I will provide a written response to your written statement. Most importantly, because our time in class is limited, and structured so that you will learn new concepts and/or refine existing ones, class time will not be used to discuss grades. Grades are important, but they shouldn't prevent you from getting an education!

Grading Rubric		
Assignment	Total Possible Points	My Score
Weekly Quizzes (x10)	50 points	
Report on brain area of interest	10 points	
Lab Practicum	60 points	
Abstract on conduction velocity	10 points	
Abstract on action potential	10 points	
Abstract on movement	10 points	
Lab Report – Draft 1	20 points	
Comer Symposium attendance	10 points	
Comer Symposium summary notes	10 points	
Lab Report – Draft 2	20 points	
Final Lab Report	100 points	
Total	**310 points**	

Policies

Attendance & Punctuality:
Attendance, defined as being present at the start of class and remaining present for the duration of the class period, is essential for your success in this course and is considered mandatory. Absences will only be excused under extreme circumstances, and will require documentation. To ensure weekly attendance, your final grade will be reduced by 5% for each unexcused absence. *Please note: regardless of whether an absence is excused or not, you are responsible for the material and assignments discussed in sessions that you do not attend.* Punctuality is also essential. To make the most of each session and to reduce distractions to other students, you are expected to be in your seat at the start of each class (2:00pm). My laptop clock will be the time keeper for our course. Your final grade will be reduced by 2% for each unexcused lateness.

Assignments
All assignments must be handed in by the start of class on the due date. No extra credit will be given and no evaluations can be dropped. Cheating and plagiarism will not be tolerated. Any evidence of cheating or plagiarism will result in disqualification and a 0 will be entered for that evaluation.
This course meets the Psychology major requirement for writing in the discipline. As such, we will provide feedback on your writing which you will then use to improve the document. There will be several small writing assignments where you will not receive feedback. However, ~1/3 of your final grade will be based on a single lab report. You will be asked to hand in drafts of sections of the lab report and you will receive feedback on these drafts.
For ALL assignments (e.g. smaller writing assignments, drafts, final lab report) your score will be reduced by 10% for each day that the assignment is late. In the case of ungraded drafts, your final score on the lab report will be reduced. Exceptions will be made for only the most serious of documented circumstances.

Appropriate Use of Course Materials
The materials distributed in this class, including the syllabus, quizzes, handouts, study aids, and in-class presentations, may be protected by copyright and are provided solely for the educational use of students enrolled in this course. Please discuss any redistribution of course materials with me. Do not post course materials or your notes from lectures and discussion on commercial websites. Unauthorized uses of course materials may be considered academic misconduct.

Students with Disabilities
Accommodations are available for students who have disabilities. Any student who feels he or she may need an accommodation based on the impact of a disability should contact me privately as soon as possible (and before the second week of class) to discuss his or her specific needs. Students with disabilities who require accommodations for access and participation in this course must be registered with the Office of Disability Services (ODS). Please contact ODS at 312-413-2183 (voice) or 312-413-0123 (TTY).

Academic Integrity Policies

I do not anticipate any issues with academic integrity, but I am obligated to note the following at the outset of this course. Please reach out to me directly if there are any questions or concerns about academic integrity policies or standards.

(copied directly from the UIC Academic Catalog here)

As an academic community, the University of Illinois at Chicago is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community—students, staff, faculty, administrators—share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students, and as defined herein, shall be handled pursuant to the *Student Disciplinary Policy,* which can be found online at http://www.uic.edu/depts/dos/docs/Student%20Disciplinary%20Policy.pdf.

Academic dishonesty includes, but is not limited to:

Cheating: Either intentionally using or attempting to use unauthorized materials, information, people, or study aids in any academic exercise, or extending to or receiving any kind of unauthorized assistance on any examination or assignment to or from another person.

Fabrication: Knowing or unauthorized falsification, reproduction, lack of attribution, or invention of any information or citation in an academic exercise.

Facilitating Academic Dishonesty/Plagiarism: Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

Bribes, Favors, Threats: Bribing or attempting to bribe, promising favors to or making threats against, any person, with the intention of affecting a record of a grade, grade, or evaluation of academic performance. Any conspiracy with another person who then takes or attempts to take action on behalf or at the direction of the student.

Examination by Proxy: Taking or attempting to take an exam for someone else other than the student is a violation by both the student enrolled in the course and the proxy or substitute.

Grade Tampering: Any unauthorized attempt to change, actual change of, or alteration of grades or any tampering with grades.

Nonoriginal Works: Submission or attempt to submit any written work authored, in whole or part, by someone other than the student.

Course Notes

- Are you squeamish? Don't deal well with biological specimens or rodents? This course is meant to be hands on, you will be handling sheep brains, rat brain tissue, and working with live laboratory rats. If you feel that you'll have difficulty with any of the above, please come speak to me privately.

- Primary literature takes A LOT of time and patience to read, please plan accordingly.
    - We will review primary literature readings in class.
    - These readings are assigned to give you a background for the lab exercises and the data that is collected in neuroscience research.
    - These readings will give you an understanding of what is expected from your lab report.
    - Pay careful attention not only to the overall structure and themes, but to the details: how are the statistics represented and discussed, how are figure legends written.