Psychology 363: Laboratory in Behavioral Neuroscience

General Course Information		
Class Details	Professor	Teaching Assistant
Classroom: SELE 3069 Time: Wednesdays 2-5:50pm	Dr. Mitchell Roitman mroitman@uic.edu Office: BSB 1042C Office Hours: by appointment	Jillian Seiler *seiler3@uic.edu* Office Hours: by appointment

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 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. Here, you will learn about neuroanatomy, neurophysiology and neurobiological contributions to behavior. All of the teaching goals will be met through "hands on" experience and experimentation. Thus, you'll gain a strong appreciation for the scientific process in general.

Each class will begin with about 60 minutes of discussion/lecture. 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, students 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. The course is designed to give students a basic understanding of Behavioral Neuroscience though experimentation and the reading of primary literature.

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.

After covering neural structure and function, we will discuss the "behavioral basics" – i.e., some principal neural drivers of behavior – starting with an investigation of how the brain regulates body fluid homeostasis, a critical physiological need that influences all other behaviors. We will then cover some of the neural underpinnings of stress, anxiety, and emotion, 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. Our penultimate class will focus on drugs of abuse and the neural systems mediating reward and pleasure, a circuitry that – arguably – influences behavior as much as any other. 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 ~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 <u>prior</u> to the class day listed below****						
Week	Date	Topic	Lab	Readings	Quizzes	Assignments
1	1/11/17	Introduction & Neuroanatomy	Histology Rotations			
2	1/18/17	Neuroanatomy	Sheep brain dissection	Portraits of the Mind – Ch. 2 Biol. Psych. – Ch. 2 (24-38)	Quiz	1-page report on brain area due
3	1/25/17	Neuroanatomy	Sheep brain dissection	Biol. Psych. – Ch. 2 (39-49)	Quiz	
4	2/1/17	Lab Practicum/Stereotaxic surgery				
5	2/8/17	Communication Within a Neuron	Ulnar NCV Lab	Carlson – Ch. 2 (41-51) Wei et al. (2005)	Quiz	
6	2/15/17	Communication Between Neurons	Recording Action Potentials	Carlson – Ch. 2 (51-64) Rothman, 2008	Quiz	Abstract on NCV Due
7	2/22/17	Sensation, Perception, Movement	Two-Point Discrimination	Carlson Ch. 6-8 (Bb for details) Your Brain on Cubs – Ch. 3	Quiz	Abstract on Action Potentials Due
8	3/1/17	Body Fluid Homeostasis	AngII & Thirst in Rats	Carlson – Ch. 12 (394 – 402) Buggy & Fisher (1976)		
9	3/8/17	Stress & Anxiety	Salivary Cortisol – Literature Review	Carlson – Ch. 17 (601 – 606) 5 Primary Lit. Papers		Abstract on AngII Due Stress Article Presentation
10	3/15/17	Alternative Careers in Neuroscience Symposium; Public Speaking Article Assignment				
11	3/22/17	No Class – Spring Break				
12	3/29/17	Emotion	Salivary Cortisol – Results & Data Analysis			Stress Lab Report – Draft 1 Due
13	4/5/17	Learning & Memory I	Conditioned Taste Aversion			
14	4/12/17	Learning & Memory II	Conditioned Taste Aversion	Bernstein et al. (1982)		*Stress Lab Report – Draft 1 returned* Stress Lab Report – Draft 2 Due
15	4/19/17	Drugs of Abuse	Amphetamine Sensitization	Robinson and Becker (1982) Robinson and Kolb (1997)	Quiz	
16	4/26/17	Consciousness & Sleep	Brain wave (EEG) recordings	Xie et al. (2013)	Quiz	*Stress Lab Report – Draft 2 returned*
17	5/3/17	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 Rubric		
Assignment	Total Possible Points	My Score
Weekly Quizzes (x7)	35 points	
Report on brain area of interest	10 points	
Lab Practicum	60 points	
Abstract on Nerve Conduction Velocity	10 points	
Abstract on Action Potentials	10 points	
Abstract on Angiotensin II	10 points	
Stress Article Presentation	10 points	
Public Speaking Article Assignment	10 points	
Alternative Careers in Neuroscience Attendance	5 points	
Lab Report – Draft 1	50 points	
Lab Report – Draft 2	50 points	
Final Lab Report	40 points	
Total	**300 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. 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.