

PSY 413W: Laboratory in Behavioral Neuroscience (FS22, 4 credits)
Tue/Thur EST 12:40-3:30 pm

Giltner Hall, 227

To take this course, you already should have fulfilled your Tier I writing requirement, taken and passed either ZOL 402 (Introduction to Neurobiology) or PSY 209 (Brain and Behavior), as well as successfully completed PSY 295 (Data Analysis in Psych Research/Statistics).

Instructor: Prof. Lily Yan (she/her/hers), phone number: 432-8189. *email:* yanl@msu.edu. *Office hours:* Monday 1-2 pm over zoom or by appointment made through email. Email is the best to reach the instructor, please send it through D2L or put PSY413 in the subject line. The instructor will need 24 hours to reply to student emails.

Teaching Assistant: Taryn Meinhardt (she/her/hers); email: meinhar6@msu.edu. *Office hours:* Wednesdays 11am-12pm over zoom, or by appointment.

Course Description: A Tier II writing course focusing on theories and hands on experience in the study of behavioral neuroscience, i.e. the relationship between brain and behavior.

Required Materials: A short, paperback book is required, “Atlas of the Sheep Brain” by Northcutt, Williams, and Barber (1966). You will also need a set of laboratory dissecting tools, and a 3-ring notebook for taking notes and filing protocols and readings we provide throughout the semester. All of these can be purchased from the Student Bookstore or on Amazon. A sheep brain and Play-Doh for building brain models will be distributed at the beginning of the semester. All other course materials will be distributed on D2L.

Recommended Texts & Other Readings: will be distributed on D2L.

Course Overview: The class will focus on some of the principles and techniques used in Behavioral Neuroscience research through discussions, demonstrations, and hands-on experimentation. The class will start with a neuroanatomy session, which will involve building 3D brain models and dissecting sheep brain. The following sessions will involve conducting 4 different research projects via collecting data/results, and writing 4 lab reports/papers in a format appropriate for this field. Through the course, students will be given readings and short writing assignments as well.

Instructional Objective and expectations: The objectives of this laboratory course are to provide students with a basic understanding of some of the principles and techniques used in Behavioral Neuroscience research. Discussions, demonstrations, and hands-on experimentation will provide a fundamental appreciation of this field. You will also learn how to present and interpret your results in the context of an existing scientific literature by writing papers in a format appropriate for this field. Students are expected to be interested and involved in what we do in the class, including attending zoom sessions and participating in all data collections and discussions. In addition, students will be responsible for knowing the material covered in class and in the required readings. For the initial exercise dissecting the sheep brain, there is a lab guide that students are expected to read. For the remaining exercises, students are expected to read any scientific articles or book chapters that the instructors provide as background. Information covered in class and in the selected readings will provide background information for the four laboratory write-ups. The details on how each assignment will be graded are available on D2L following the requirement of each assignment.

Course Schedule

Date	Topic/Task
9/1 (Thur)	General Introduction, ORCBS training
9/6 (Tue)	Neuroanatomy: Overview, key concepts, brain facts, 3D brain app, drawing
9/8 (Thur)	Neuroanatomy: Sheep brain dissection (Meninges, surface structures)
9/13(Tue)	Neuroanatomy: Sheep brain dissection (sagittal, horizontal)
9/15 (Thur)	Neuroanatomy: Sheep brain dissection (coronal)
9/20 (Tue)	Neuroanatomy Exam
9/22 (Thur)	Review Exam, Introduction to scientific writing and APA style (reading assignment)
9/27 (Tue)	Experiment #1 Introduction – Stress and anxiety (reading assignment)
9/29 (Thur)	Analyze anxiety-like behavior: EPM, L/D box
10/4 (Tue)	Compile and analyze data for Experiment #1, plot figures
10/6 (Thur)	Discuss assigned readings and lab report #1
10/11 (Tue)	Experiment #2 Introduction – Learning and memory (reading assignment)
10/13 (Thur)	Discuss assigned readings; Lab #1 write-up due
10/18 (Tue)	Experimental design for object memory and location memory
10/20 (Thur)	Compile and analyze behavioral data, Review lab report #1, discuss lab report #2
10/25 (Tue)	Break Day – no Class
10/27 (Thur)	Experiment #3 Introduction – Histology (reading assignment)
11/1 (Tue)	Freezing microtome; Sectioning rat brains
11/3 (Thur)	Mounting sections on slides, discuss assigned readings; Lab #2 write-up due
11/8 (Tue)	Cresyl-Violet staining/cover slip
11/10 (Thur)	Microscope analysis
11/15 (Tue)	Society for Neuroscience Conference - Writing lab report #3
11/17 (Thur)	Experiment #4 Introduction – Circadian rhythms and sleep (reading assignment)
11/22 (Tue)	Discuss assigned readings; complete the CSM Questionnaire Lab #3 write-up due
11/24 (Thur)	Holiday - University closed
11/29 (Tue)	Circadian rhythm and Mental health, Compile data, identify research questions
12/1 (Thur)	Analyze data, plot figures
12/6 (Tue)	Review lab report #3, develop outline for lab report #4
12/8 (Thur)	Present outline for lab report #4, writing the lab report
12/13 (Tue)	Lab report #4 write-up due

Grading Policy: Course grades will be based on the following:

Total points = **500**

1) Neuroanatomy exam: 10% total grade, **50 points**

2) Written summaries of the assigned readings: 10% total grade, **50 points** (details on D2L)

3) Experiment write-ups:

Experiment I – Stress and Anxiety - 15% total grade or 75 points:

Title page = 5 points

Abstract = 10 points (2 points for each of the 4 components, 2 points for overall writing)

Introduction = 15 points (at least 3 paragraphs, with a theme sentence for each paragraph)
Methods = 20 points (subjects: 4 points; procedure: 8 points; data analysis: 8 points)
Results = 20 points (text: 10 points; figures and legends: 10 points)
References = 5 points (cite at least 10 articles published in scientific journals)

Experiment II – Learning and Memory - 20% total or 100 points:

Title page = 5 points
Abstract = 10 points
Introduction = 20 points (at least 4 paragraphs, with a theme sentence for each paragraph)
Methods = 10 points
Results = 20 points (text: 10 points; figures and legends: 10 points)
Discussion = 20 points (at least 4 paragraphs, with a theme sentence for each paragraph)
References = 15 points (cite at least 15 articles published in scientific journals)

Experiment III – Histology - 15% total grade or 75 points:

Title page = 5 points
Methods = 30 points (sectioning using microtome: 10 points; staining: 10 points;
microscopic analysis: 10 points)
Results = 40 points (figures and legends: 20 points; accurately identify brain regions on 4X
and 10X images: 20 points)

Experiment IV – Circadian Rhythms and Sleep - 20% total or 100 points:

Title page = 5 points
Abstract = 10 points
Introduction = 20 points (at least 4 paragraphs, with a theme sentence for each paragraph)
Methods = 10 points
Results = 20 points (text: 10 points; figures and legends: 10 points)
Discussion = 20 points (at least 4 paragraphs, with a theme sentence for each paragraph)
References = 15 points (cite at least 15 articles published in scientific journals)

5) Attendance and participation in class: 10% total grade or 50 points:

Attendance/Participation 2 points/day = max. 50 points

6) Grading Scale (% points out of 500 total):

>90% = 4.0	85-89% = 3.5
80-84% = 3.0	75-79% = 2.5
70-74% = 2.0	65-69% = 1.5
60-64% = 1.0	<60% = 0.0

Attendance: Each student will be allowed one medical, religious, or legal excused absence if documentation of the excuse can be provided to the instructor within one week of the missed day. Attendance will count for 10% of the final grade.

Academic Honesty and Integrity: MSU has strict guidelines regarding academic honesty and integrity. These rules will be followed in this course and no student is exempt for any reason. Please refer to your Student Handbook to see details of these guidelines. Academic Honesty Article 2.3.3 of the Academic Freedom Report states, “The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards.” In addition, the Psychology Department adheres to the policies on academic honesty specified in General Student Regulation 1.0 - Protection of Scholarship and Grades, the all University Policy on Integrity of Scholarship and Grades (<http://splife.studentlife.msu.edu/regulations/general-student-regulations>). Therefore, unless authorized by the instructors, you are expected to complete all course assignments without assistance from any source. You are not authorized to use the Koofers.com web site or similar sites to complete any work in this course. Students who violate MSU rules will receive a penalty, including but not limited to a failing grade on the assignment or in the course. If you have any questions or concerns about whether any particular activity is permitted while you carry out the work for this course you are urged to see the web site of the University Ombudsman at www.msu.edu/unit/ombud, especially the section on Academic Honesty. The

ombudsman has some very specific information about the kinds of activities that are or are not appropriate. Also, please do not hesitate to discuss concerns or questions about these issues with us.

Limits to Confidentiality:

Please be aware that class materials are generally considered confidential pursuant to the University's student record policies. However, all University employees, including instructors, cannot maintain confidentiality when it conflicts with their responsibility to report certain issues based on external legal obligations or health and safety considerations of MSU community members and others. As the instructors, Professor Yan and others must report the following information to other University offices if you share it with them:

- Suspected child abuse/neglect, even if this maltreatment happened when you were a child
- Allegations of sexual assault or sexual harassment when they involve MSU students, faculty, or staff
- Credible threats of harm to oneself or to others

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In almost all cases, it will be your decision whether you wish to speak with that individual or not. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the MSU Counseling Center (<http://www.counseling.msu.edu/students>).

Accommodations for Disabilities: Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored. If you require testing accommodations (additional time, less disruptive room, etc.) you must contact the instructor or the TA and present your VISA *at least two weeks before the exam date* to schedule an alternative exam.

Course Recordings: Meetings of this course may be recorded. The recordings may be available to students registered for this class. This is intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Recordings may not be reproduced, shared with those not in the class, or uploaded to other online environments. Doing so may result in disciplinary action. If the instructor or another University office plan other uses for the recordings beyond this class, students identifiable in the recordings will be notified to request consent prior to such use.