

METHODS IN COMPARATIVE NEUROSCIENCE  
SPRING 2015

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**Prerequisites:**

Bisc 327, Bisc 330, Psy 319, or Psy 390 and permission of the instructor

**Course Description:**

The course is designed to 1) elucidate the principles of comparative, behavioral neuroscience through hands-on experimental procedures and 2) teach several commonly used experimental procedures in neuroscience. This course will provide a brief overview of experimental design and statistics. We will review basic neuroanatomy, neurochemistry, neuroplasticity, learning, and cognition. Students who do not have a basic understanding of these phenomena should be sure to review any available materials on the subject. Students will gain brief experience in several fields of study and then focus on detailed study of one area. Students will be required to read primary literature, design and implement experiments, collect and analyze data, and write reports on their findings.

**Learning Outcomes:**

Students will come to understand common methods employed in comparative behavioral neuroscience. At the end of the course students should be able to:

- Understand localization of function: Brain regions perform specific functions
- Design and conduct experiments to test learning capabilities
- Critically analyze literature
- Perform simple data analyses
- Write a research report

**Required material:**

No books are required for this course. All materials will be supplied via blackboard and other web links. You must have a pair of close-toed shoes that can be left in the lab, a lecture notebook, and a laboratory notebook.

**Basic Schedule – detailed schedule will follow:**

Wk 1 Animal Use, Laboratory Safety, Plagiarism Quiz

Lab: IACUC training

Wk 2 Presentations of previous experience

Lab: Introduction to projects, Collect Literature

Wk 3 and 4 Experimental Design, Statistics Overview

Lab: Project Selection: Round robin of basic experimental techniques-

Stereology, Histotechniques, Behavioral Techniques, Stereotaxic Surgery, PCR

Wk 5 – Wk 9 Neuroanatomy, Neuropharmacology, Neuroendocrinology, Learning and Memory

Lab: Work on your experiments in Pairs  
 Wk 10 Project Specific Statics  
 Lab: Analyze results  
 Wk 11 APA and Literature Review  
 Lab: Work on Literature Review  
 Wk 12 Posters, Presentations, Lit Review Due  
 Wk 13 Work on Posters  
 Wk 14 Paper Draft Due, Present Posters and Neuroscience Conference  
 Wk 15 Final Paper Due, Presentations

**Attendance:** You are expected to attend all lectures, and you will be held responsible for all announcements made during the lectures. Attendance is required at all laboratory sessions unless you have an excused absence for illness. You may be required to make up laboratory time.

**Grading:** You will be evaluated on your performance in both the lecture and laboratory portions of this course. Your final grade will be determined by (1) standard percentage scale where 90-100% is an “A”, 80 – 89% is a “B”, etc., and (2) obvious breaks in the distribution of total points.

Exam 1	Experimental Design and Statistics	15%
Exam 2	Neuroplasticity and Neuroanatomy	15%
Exam 3	Pharmacological and Biological Basis of Learning and Memory	15%
Lab Notebook	Quality of Notes and Overall Participation	15%
Literature Review	Intro. for paper	5%
Paper Draft	Draft	10%
Final Paper	Paper	15%
Presentation	Poster and Presentation	10%

**Make-up exams:** Make-up exams will be given at the discretion of the instructor under the following circumstances: major illness with physician documentation, family emergency with documentation and contact person, or a University-sponsored function with written documentation from the sponsoring department. Advance notification for a missed exam is essential except under extreme circumstances, in which case the instructor **MUST** be notified by 5pm the day of the exam.

**Student conduct:** (1) Academic dishonesty of any kind will NOT be tolerated. (2) All cell phones and pagers must be turned off during class. If you are on call for employment related purposes, you must provide documentation from your employer.

**Inclement Weather:** In the event that the University cancels classes due to inclement weather, we will adjust the schedule accordingly.

### **Laboratory Information**

**Lab notebooks:** You will work in groups of 2-4 students for each lab and for the research project. However, each student will need to maintain a lab notebook and be responsible for any lab reports. A spiral bound notebook is sufficient.

It is important that you keep careful notes during lectures and labs especially when you are developing and performing your group experiments. You do not need to recopy the protocols but should reference them accurately and note any adjustments that have been made to standard methods. You should include a summary of the results obtained and your comments on why things worked or did not work. Your notebook should be dated and legible but you should not waste time making it perfect.

**Safety:** We will review safety practices at the beginning of the semester and go over safety concerns particular to each lab. If you have health concerns, are pregnant, or may become pregnant during the semester, please let the professor know so that we can work together to be certain you avoid teratogenic or mutagenic reagents. If we wish to keep such information private, please read the MSDSs carefully and consult your doctor about his/her recommendations.

All students must read the MSDS for chemicals that we will use. Do not come to labs exhausted or inattentive. Wear your safety glasses, lab coats, and gloves whenever necessary. Be cautious when working with knives.

If you have known allergies or sensitivities to latex or any particular chemical compounds such as formalin or any others it is imperative that you let me know at the beginning of the semester.

**Daily Laboratory Protocol, Techniques and Rules:**

- 1) Any laboratory readings **MUST** be finished prior to starting the laboratory!
- 2) Though I have selected labs using chemicals with the greatest safety margin, we will still be working with some very hazardous chemicals. It is essential that you use a great deal of caution in the lab and consistently follow laboratory safety rules.
- 3) Active participation is expected during all laboratory sessions. Participation will involve asking questions, answering my questions, and assisting other students.
- 4) You will be expected to clean up after yourselves. We will review proper methods for washing lab containers.
- 5) You will be working in pairs, do not let your lab mate down. It will show in the quality of your final reports if you have not been contributing.