

LABORATORY IN PSYCHOBIOLOGY
PSY U606 Course outline

Course Number: PSY U606	Instructor: Professor Jay McLaughlin	TA: Susan Rasakham
Key Number: 09139	Office: 114 Lake Hall	Office: 113 Lake Hall
Semester Offered: Fall 2005	Phone: (617) 373-2361	Phone: (617) 373-7983
Total Credit Hours: 4 credits	E-mail: j.mclaughlin@neu.edu	E-mail: rasakham.k@neu.edu

Office Hours: Tuesday, Wednesday and Thursday, 9:00 – 10:00 a.m., or by appointment

Class meets: Fridays from 8 – 11:35 p.m. in **274 Nightingale Hall**

Lab sections held Tuesdays and Wednesdays from 10 – 3 p.m. in **118 Lake Hall**

COURSE GOALS:

- Understanding and application of biological experimental methods to psychological questions
- Skills preparation for future psychobiology research career, including basic methods in molecular biology (PCR, gel electrophoresis), pharmacology (receptor binding and signal transduction) and animal behavior (locomotion, learning, conditioned place preference and automated data collection systems)
- Development of critical reading, analytical and discussion skills

COURSE STRUCTURE:

Class will be divided weekly into lectures on Fridays, followed by lab work in sections from Tuesday and Friday. Students **must** sign up for and attend one lab section a week.

Lectures will be given in the first 60-90 minutes of each class. These are intended to provide the background necessary to understand and analyze the following week's experiments. Additional time will be spent each lecture summarizing the results of the week's work, and guiding students through analysis and discussion of results.

Laboratory research, and the weekly preparation of results, will comprise the majority of time spent in this course. Experiments are divided into three modules. Each week following the lecture, students will perform the designated experiments in the lab. Please note that students are responsible for all reading material assigned each week **before they come to lab. Attendance in the laboratory during your section is mandatory.** Note that participation and reporting of results from the lab counts significantly towards the final grade.

TEXTS:

None required. Materials used to develop the PowerPoint lectures for this course come from various texts and manuscripts. Weekly reading of protocols and the occasional primary literature article will be assigned (see below). Please note that lecture notes, assigned articles and protocol sheets will be the source of material for all exams.

PowerPoint presentations, lab protocols and research articles covered in class will be made available online through Blackboard. Copies will also be available in the Psychology Main Office (125 Nightingale Hall) for photocopying.

If further references for basic principles are desired, I recommend Biological Psychology, 8th edition. JW Kalat, Wadsworth Publishing, Belmont, CA (2004). This may be of assistance to you, but IS NOT REQUIRED. You can find it at Amazon.com or through the Northeastern University library. Kalat provides excellent background, but with much more material than needed for this course.

GRADING EVALUATION:

Final course grades will be computed using the following point system:

120 pts. Weekly lab reports, covering the eight experiments performed in the course.

20 pts. On-line safety testing. Chemical hygiene and radiation safety exams must be passed!

60 pts. Two exams. Students will be tested with a noncumulative midterm and final.

Additionally, a student can earn an extra credit point each class by posing relevant questions.

All students are encouraged strongly to participate on a regular basis.

To be clear: **every week, each of you** will be performing assigned experiments and submitting a lab report. Keeping up with the assigned experiments and attending each week is therefore critical to passing this class! **Each week's lab report is worth 15 pts; each online safety exam 10 points, and each exam is worth 30 points.**

Scoring of your submitted writings are based on covering the following points in the assigned material:

Weekly lab reports:

- Purpose/hypothesis; introduction where appropriate. No more than 300 words long!
- Materials and methods. This is the procedural protocol, with notes on any deviations
- Experimental data, fully detailed
- Discussion and Conclusions, with analysis. No more than 600 words long!
- References, if any.

STANDARD RULES AND PROCEDURES:

Students are expected to attend each class and lab section. In case of illness or scheduling conflicts resulting in a missed lecture, students are responsible for obtaining lecture materials from other students. With advance permission, students may complete assignments outside their typical section. However, due to the nature of these experiments, students must complete assigned labs in the week assigned; **make ups will not be possible.**

Students are to demonstrate respectful, professional behavior. Users of cell phones, pagers and PDAs are asked to minimize disruptions by stepping outside of the classroom. If you have a special circumstance in this regard, please see me. Likewise, if you have specific disabilities that you believe may require accommodations for this course, please meet with me at your earliest convenience to discuss appropriate measures to assist you. The Disability Resource Center on campus (20 Dodge Hall, x2675) may also help. Bear in mind that the University requires that you provide documentation of your disability to the DRC.

The research sections of this course will be taught in a working laboratory. By its nature, laboratories can be a dangerous place to work. **Safety protocols given the class will be strictly enforced.** In particular, please note the dress code (no open shoes; protective covering) must be maintained for your own protection.

There are five key concepts that will help you succeed in this course:

1. Attend class and lab! Everything you need to know will be presented there.
2. Ask questions! Note that I give points for this, so clearly I **want** questions.
3. Be prepared for lab. If you keep up with the work, I promise this will not be a problem for you.
4. Form study groups. Much of this material makes more sense when approached in a team.
5. Ask for help. I am always available for a student in need.

LABORATORY IN PSYCHOBIOLOGY- PSY U606- SYLLABUS SPRING 2005:

SEPTEMBER:

- 9 Introduction. Lecture: Course responsibilities and safety
Homework: Take on-line lab safety course and exam (due by Sept. 15th)
- 16 Lecture: **Statistics review; using Excel**
Lab 1 (September 16): Normal distributions and statistical analysis
NOTE: Class meets in 36 Dockser Hall for this lecture/lab!!!

MODULE 1: Behavioral effects of stress

- 23 Lecture: **Stress**
Lab 2 (September 27 and 28): Social defeat stress and learned helplessness
- 30 Lecture: **Stress and drug abuse; measures of reward**
Lab 3 (October 4 and 5): Effects of social defeat stress on cocaine-Conditioned Place Preference

OCTOBER:

- 7 Lecture: **Learning and memory**
Lab 4 (October 11 and 12): Effects of social defeat stress on novel object learning
- 14 MIDTERM EXAM (covers all material through Module 1)
Homework: Prepare module research paper 1 (due October 21st)

MODULE 2: Molecular biology of psychobiology

- 21 Lecture: **Working with DNA: Polymerase Chain Reaction**
Lab 5 (October 25 and 16): PCR; site directed mutagenesis
- 28 Lecture: **Analyzing DNA: Restriction enzyme digests and gel electrophoresis**
Lab 6 (November 1 and 2): Restriction enzyme digests and gel electrophoresis

MODULE 3: Receptor pharmacology and signal transduction

NOVEMBER:

- 4 Lecture: **Radiation safety**
Homework: Take on-line radiation safety exam (due by Nov. 11th)
- 11 No class, Veteran's Day/Neuroscience meeting**
- 18 Lecture: **Opioid pharmacology and receptor binding assay**
Lab 7 (November 22 and 23): Opioid receptor binding assay
- 25 No class, Thanksgiving Day Holiday**

DECEMBER:

- 2 Lecture: **Opioid signal transduction**
Lab 8 (December 6 and 7): Opioids and the GTP γ ³⁵S binding assay
- 9 FINAL EXAM (covers statistics and material from Modules 2 and 3)