

NRO 199: Methods in Neuroscience I

1 credit

Fall 2014

M 2:05-4:00

Telfer 315 – Neuroscience Laboratory

Instructor: Jacqueline K. Morris, Ph.D., Neuroscience Director
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Course Description

Required Text: None.

Course Description: This lab course consists of a survey of laboratory techniques required in Neuroscience research including animal handling, solution preparation, graphing and data collection, lab safety and hazardous waste disposal.

Learning Objectives:

1. You will be able to prepare a sterile solution to be used in histology, biochemistry or surgical animal procedures.
2. You will be able to handle rats and zebrafish and identify animals in distress or poor health.
3. You will be able to explain laboratory safety procedures used in the Neuroscience laboratory.
4. You will be able to make observations and record them in a laboratory notebook.
5. You will be able to analyze raw data and represent it in a graphical format.

Classroom Policies

Your courses assessment will be based on the number of points you accumulate in the class. You collect points by completing activities. Points will be awarded according to the following tiered point structure:

| Activity | Number/ Semester | Maximum Points (each) | Maximum Points (activity) | Maximum Points (Tier) |
|--------------------------|---------------------|--------------------------|------------------------------|--------------------------|
| Tier 1 | | | | |
| TED Talk Reflections | Up to 5 | 20 | 100 | 300 |
| Career Reflections | Up to 5 | 40 | 200 | |
| Informational Interviews | Up to 2 | 40 | 80 | |
| Cool Science | Up to 5 | 10 | 50 | |
| Tier 2 | | | | |
| Practical Exams | Midterm/Final (2) | 50 | 100 | 200 |
| Online Quizzes | Complete 5 | 10 | 50 | |
| In Class Activities | Complete 5 | 5 | 25 | |
| Online CITI Training | Complete 10 | 5 | 50 | |
| Tier 3 | | | | |
| Lab Notebook | At least 10 | 5 | 50 | 300 |
| Updates an SOP | Up to 3 | 50 | 150 | |
| Create an online module | Up to 2 | 50 | 100 | |
| Graph Assign | 1 | 100 | 100 | |

Course will be graded on a pass/fail. You will receive a pass for earning 500 points.

Absences or Late Policy

I expect that you will be to lab on time. If you are late or absent, you will NOT be able to make up the assignments or tests that you missed on that day. If you miss more than one laboratory for this course you will receive a U for the course. Even if you are late come to class as important information will be shared in each lab course.

Vertebrate Animals will be used in this laboratory course. If you are allergic to animals or have other concerns regarding the care and use of laboratory animals please see the instructor prior to continuing in the course.

TED Talk Reflections Several TED talks have been posted to the Blackboard site. You can earn 20 pts. by watching a TED Talk and writing a reflection. This is NOT a summary, but your reflection on the topic. Did you enjoy the speaker and why? What questions did you want to know from watching the video? Write 100-200 words each and turn in to Dr. Morris. You can earn a maximum of 20 pts. for each reflection. You can only turn in one TED talk each week in lab.

Career Reflections. Explore careers in Neuroscience. Go to the Society for Neuroscience website (link in Bb) and choose a video to watch on different career paths. Write your reflection on this career path. What did you learn? Are you interested/not interested in this career path? Why? Other thoughts? Write 500 words for each career reflection.

Informational Interviews. Identify a Neuroscientist, BW alumnus or other individual in a career path that you are considering. Write a reflection about the interview that discusses how you met these objectives. Also include reflection on how this helped you in your future career path. Write 250 words.

The objectives of informational interviews:

1. Obtain information about prospective careers, jobs, industries, or companies to narrow (or broaden) your career exploration or job search.
2. Learn about professional or trade organizations in your chosen career or industry.
3. Make contacts and build your network. Be genuine and interested. Let them know who you are.
4. Obtain names of others to interview, for information or employment.
5. Build your marketability and confidence for the job search.

Cool Science. If you find an article, online learning site or other interesting new finding in science. Write a 100-200 words describing it. Include a copy of the article/website, etc. Turn in at any time. Limit 5

Practical Exams. These will be in class written exams to test your knowledge of the information we are learning in the Neuroscience lab. You **must complete** these exams to pass the course.

Online Quizzes – Online assessments pertaining to safety training must be passed with a score of 80%. You can take the quizzes as many times as you wish until you pass them. You must

pass at least 5 of these quizzes: Chemical safety, General lab safety, Anesthesia, Animal Handling and Fire Safety.

In class assignments – You will be given assignments to complete in class. You must complete at least 5 in class assignments.

Online CITI Training. Our institution has a license with the Collaborative Institutional Training Initiative (CITI) for animal training that is in accordance with the Institutional Animal Care and Use Committee. The purpose of these online training modules is to familiarize yourself with the guidelines that demonstrate humane use of research animals. You must complete 10 of the modules that you choose. Print your certificate upon module completion and bring to lab so you may receive credit.

Lab Notebook – Each week you can earn 2-5 pts. for keeping good notes. (max 50 pts.)

Lab Notebook Grading

Lab participation is required. You will be able to earn 5 participation points during each lab by writing your observations, data, and procedures in a notebook. At the end of every lab the instructor or lab assistant will check your notebook for notes. ***If you are late or absent from lab, you will NOT be able to earn these points.***

Lab notebook points will be awarded according to the following point structure:

0 points – unexcused absence; using cell phone during class;

NOT following safety procedures (ie drinking beverage in lab; eating in lab; forgetting lab notebook.)

3 points – excused absence (only one per semester); coming late to lab; poor documentation in your lab notebook

5 points – following rules, writing notes, purpose, procedures, times, amounts, and solutions in a detailed organized manner.

Graphing exercise –We will conduct a behavioral assay using planaria. You will be required to prepare a graph with averages, error bars, etc. In addition you will need to write a brief description of the data. 100 points max.

Update SOPs or create online modules. During the semester we will be compiling a lab manual for use in the Neuroscience lab. You can update, revise or create a new standard operating procedure for a task you learn during the lab.

Additionally if you wish to create a video “How To” for a lab procedure that will also be accepted. Please discuss with Dr. Morris so that other students do not overlap SOP.

Laboratory Schedule

| Date | Topic | Activities |
|---------------------------------|------------------------------------|---|
| Week 1 Aug 25 | Introduction | Introductions. What is Neuroscience? Lab Notebook How Tos. |
| Week 2 Sept 1 | Labor Day | No Class Today. |
| Week 3 Sept 8 | Chemical Safety pH and Molarity | Calculations on Molarity and Solutions |
| Week 4 Sept 15 | General Lab Safety | Discussion on careers in Neuroscience Water Maze – SOP |
| Week 5 Sept 22 | Animal Health IACUC | Rat Handling, Calculating Dilutions, Injections |
| Week 6 Sept 29 | Surgical Procedures | Anesthesia Overview, Suture Techniques Equipment safety and common anesthetics. How to prepare anesthetics. |
| Week 7 Oct 6 | Animal Breeding | Rats- Overview of breeding procedures. How to detect Estrus. |
| Week 8 Oct 13 | Zebrafish breeding and handling | Water chemistry and nitrogen cycle. |
| Week 9 Oct 20 | Histological procedures. | How to use the sliding microtome and cryostat. |
| Week 10 Oct 27 | Microscopy. | How to use a microscope |
| Week 11 Nov 3 | Cell culture | Sterile technique and equipment. |
| Week 12 Nov 10 | Planaria behavior experiment. | Design experiment and prepare dilutions – practice. |
| Week 13 Nov 17 | Planaria behavior experiment. | Conduct experiments. |
| Week 14 | Graphing | Sigma plot. |
| Week 15 | Ethics | Case study |
| Finals Week | | Lab Quiz/ Wrap Up |