

NSC 301C: FRI-Research Methods (Fall 2008)

Lecture M and W 9-10am in ENS 116 – Lab M 12-3pm in PAI 4.14 or W 12-3pm in WEL 5.132

Prof: Dr. Stuart Reichler

Office: Bio 6

E-mail: sreichler@mail.utexas.edu

Phone: 471-1074

Office Hours: anytime, contact for an appt.

TA: Sonya (Tsan-Yu) Chiu

Bio 15

sonyachiu@mail.utexas.edu

471-1074

contact for an appointment

Week	Lecture 1	Lecture 2	Lab (M or W 12-3pm)
1. W 8/27		Introduction	<i>no lab</i>
2. 9/1	<i>no class (Labor Day)</i>	Strong Inference	<i>no lab</i>
3. 9/8	Journals	What is an inquiry?	Database Searches and Strong Inference
4. 9/15	Journals	Statistics	Inquiry 1 Proposals
5. 9/22	Statistics	Statistics	Statistics Practice
6. 9/29	What do researchers do?	Experimental Design	Inquiry 1 Presentations
7. 10/6	Ethics	Ethics	Inquiry 2 Proposals
8. 10/13	History of Discovery (M- Dr. Roux, T- Dr. Moon)	Funding Research	Ethics Discussion
9. 10/20	Writing	The Art of Presenting	Group Experiment
10. 10/27	Writing	History of Discovery (Dr. Parmesan)	Inquiry 2 Presentations
11. 11/3	What should I study?	Patents	Inquiry 3 Proposals
12. 11/10	Conflicting Data: human evolution and mtDNA	University Research (Who are all these people?)	Ethics Discussion
13. 11/17	What happens after graduation?	What is success?	Peer Review
14. 11/24	What is a scientific meeting?	<i>no class (Thanksgiving)</i>	<i>no lab (Thanksgiving)</i>
15. 12/1	History of Discovery (Dr. Mabry)	Wrap-up	Inquiry 3 Presentations

The class **webpage** is: www.bio.utexas.edu/courses/stuart/class.html Lecture slides will be posted on the class webpage after each lecture. Updates, changes, and other critical information regarding the class will be posted on the webpage and sent via email. Check the webpage regularly and be certain that your email is correct.

Course Description: The job of a scientist is to explore the unknown. Done correctly each experiment adds to what we know about how the universe works. Being involved in this endeavor is exciting and challenging. No one can teach you how to think, but by seeing what others have done and how they arrived at their successes or failures can give us information about what is, and is not, likely to succeed. We will look at some basic information about designing experiments and analyzing data, as well as about how science is done. The central component of this class will be experiments that you design and carry out. My overall goals are that you begin to develop a sense for how science works, how it fails, what we know, and what the next steps might be.

Lecture: M and W from 9-10am in ENS 116. During lecture I will introduce some specific, and other times general, information about deriving and analyzing data. I expect you to take notes and to think and reflect on what we are discussing in lecture (See the assignments section regarding lecture). Lectures will serve as a basis for experiments and other activities that we will do in lab.

Lab: You are registered for one of two labs either unique #49267 on M 12-3pm in PAI 4.14 or unique #49268 on W 12-3pm in WEL 5.132. Lab will be used for you to apply what you are learning in lecture. Sometimes we will practice principles from lecture. Other labs will be used to prepare for or report on the experiments that you are doing.

Inquiry Descriptions:

Inquiry 1: observational only, no chemicals etc. – (2 weeks) For this inquiry you will work by yourself to develop, carry out, and analyze an experiment. Your experiment should not involve the use of any chemicals or advanced data collecting equipment. You should be able to collect your data through observation. Other than that, you are free to design an experiment to your liking. The proposal is due in lab the week of 9/15 and the written and oral presentations are due in lab the week of 9/29.

Inquiry 2: open design – (3 weeks) For this experiment you will work in groups of 3-5 students. Your group will develop, carry out, and analyze an experiment. You will need to decide what your experiment will be about, and what chemicals and/or data collecting material you will need to order. Each member of your group should have specific jobs, and the work should be divided evenly between all of the members. The proposal is due in lab the week of 10/6 and the written and oral presentations are due in lab the week of 10/27.

Group experiment: (1 lab session) Everyone will do the same experiment, and we will analyze the results together. This will be done in lab during the week of 10/20.

Inquiry 3: open design – (3.5 weeks) For this experiment you will work in groups of 3-5 students. Your group will develop, carry out, and analyze an experiment. You can optimize experiments you did for inquiry #2, or you can design a new experiment. You will need to decide what chemicals and/or data collecting material you will need to order. Each member of your group should have specific jobs, and the work should be divided evenly between all of the members. The proposal is due in lab the week of 11/3 and the written and oral presentations are due in lab the week of 12/1.

- While some preparation of inquiries will occur during lab, most of the work on inquiries will occur outside of the assigned lab times.
- You will need a lab notebook to keep track of your hypotheses and data. This should be a bound type of lab notebook with non-removable pages. It does not need to have carbon paper.

Assignments and Grading: Differently from most courses at UT, the intent of this course is not to assign a grade, but to prepare you to be productive researchers. The assignments and grading scheme are designed to help you attain this goal.

For lecture I will ask you to buy a blue book and each week write about a one-page reflection on the previous week's lectures. We will check these reflections during your lab time. This will be worth 10% of your grade.

Before you carry out any of your experiments, you will need to get approval. This approval will be based on the experimental proposal that you will write for each inquiry. These three proposals will be worth 25% of your grade.

After the completion of each lab, you will submit a written report as well as take part in an oral presentation. These will be worth 50% of your grade.

For some of the lectures, homework will be assigned. This will be announced in class and on the class webpage. The homework will be worth 15% of your grade.