BioSci 1510, Cell Biology Lab, 2016

Class meets Tuesdays 1:00 to 4:50
Langley 148

Instructors:
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412-624-4320
wsaund@pitt.edu

Teaching Assistant:

Course Website:
Course Web: http://courseweb.pitt.edu

Course Description and Goals:
This course is designed for junior/senior science majors and/or premedical students and introduces modern research methodology to study cell structure and function. This is an active research lab, the discoveries you make will be novel, and the results are intended for publication and general public dissemination. In this process you will be expected to learn the following:

1. How to research and formulate hypotheses
2. How to test those hypotheses and how to interpret the results
3. How to write your results and interpretations in a concise and clear matter

We try to cover as many new techniques as possible, but our priority is in discovery so sometimes we will repeat techniques as needed.

We will spend a lot of time discussing what types of conclusions can drawn from the results and how to proceed next. Some outside reading will be assigned to help you prepare for the next class.

We will divide into four groups of three for the course, The last two lectures will be taken to prepare a slide show proposal by the different teams of what you learned during the course.
Grading:

- **Lab Quizzes**: occasional short lab quizzes will be given at the beginning of the labs. They will cover the work done during the last lab and also any handouts given to for the next lab.

- **Lab Notebook**: We will handout notebooks during the first class of lab to be used as Lab Notebooks. This is a recording of the data you collect during the experiments. You also record how the experiments were performed and make any notes about changes in the provided protocol or mistakes made executing the protocol. The grading of this is informal, the instructors will look at notebook entries from past labs and note how well you are recording the data from the current.

We cannot emphasize enough the real world importance of Lab Notebook. In later years your laboratory notebooks will be your most important scientific writing. Notebooks contain the primary data on which all the valid (or flawed) intellectual superstructure will be based. Therefore this is the time to develop good habits of trapping all the facts and getting them straight. More than once somebody has not been able to repeat an experiment because he or she couldn't clearly remember what was done that lucky first time when it worked. You will be required to use a notebook with bound pages as was discussed during the initial class meeting. See your instructor with any additional questions.

Your instructor will review notebooks with you at intervals during the term. Notebooks also provide the primary data for preparation of your Lab Reports. It is essential that you have your notebook in lab and that you keep your notebooks up to date.

**ESSENTIAL ITEMS FOR THE NOTEBOOK:**

1. Reserve the first two sheets, pp. 1 and 2, for a Table of Contents.

2. Title each experiment, and mark each data page with the date of data collection.

3. When you work with a partner or in a group, record the names of these
people on the first page of the exercise.

4. Very briefly, state the objective of each experiment and of each sub-experiment.

5. Write out the protocol to be followed. If a handout is provided, you may attach it to the notebook page instead. If a method or material you have earlier recorded is used, you may simply refer to the notebook page where it is described -- but only if the procedure was done exactly as before. Any changes from previous protocols or the class handout must be noted. Your guideline should be: Can I exactly duplicate this experiment three years from now? Relevant details include quantities of materials used, special conditions (temperature, pH, incubation time, light exposure time, etc.), measured values, and qualitative observations.

7. Write out all computations in a neat manner so they can be understood by another reader or, more importantly, by yourself. Include error and statistical calculations where relevant.

8. Make graphs if useful. The quadrille character of the notebook pages makes is convenient for direct graphing. A picture may be worth a thousand words. Each graph should have labeled axis, a title, and a description.

9. Briefly, draw conclusions. State what is learned about the system. If the results indicate some failure, suggest what may have gone wrong and propose corrective measures to employ in a rerun of the experiment. Write this with the intent of expanding it in the Lab Report.

10. Do not remove or add pages to your notebook. If you wish to rewrite a page simply draw a diagonal line through it and redo it on the next page. If you must add material after the following pages are used, use a later page and include a note to indicate that additional material can be found on page ......

11. Numerical data are usually presented in a Table even if they are graphed. Make sure to label each column and row and include the units, e.g. µM or g/ml etc.
Lab Reports: In addition to the Lab Notebook, you will hand in a Lab Report. It will describe in detail your objectives, results and interpretations for each of the labs. The Lab Report differs from the Lab Notebook, in that is written more carefully, deliberative and with more emphasis on interpretation and discussion. Lab Notebooks are written in hand during the lab. Lab Reports are to be written on a computer after the lab is over. Any part of the Lab Notebook can be copied into the Report. Lab Reports are divided into sections for each lab and are due at the start of the next lab period. Your Lab Report should be your own original description of what was accomplished in the lab and contain your own results or the results of the TA posted on the class web site if you didn’t get any data from the lab.

The Lab Report should be organized into the following sections:

A. Introduction, a description of the context and purpose of each lab.
B. Results. Tables, graphs and/or photographs as appropriate.
C. Discussion of results and problems and analysis of the data including statistics where appropriate.
D. Questions and Answers, answers to the questions asked in the handouts.
E. References, a list of the references you use for the report, if any.

Note: Late lab reports will be subjected to a penalty of 10% for each day they are late.

<table>
<thead>
<tr>
<th>Lab Report Grading Rubric</th>
<th>Content</th>
<th>Accuracy</th>
<th>Structure and writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1. All the labs (7) are included. 2. For each lab, introduction, procedures and materials, results and discussion are presented. 3. All the questions are answered. 4. References are used and listed.</td>
<td>1. All materials are carefully prepared and clearly presented. 2. Contents are addressed accurately, using appropriate scientific concepts. 3. Graphs, tables, and photographs are well labeled and easy to understand. 4. Interpretation and discussion of results show real insight into the</td>
<td>1. Clear and well organized. 2. All the labs and sessions (e.g. introduction, results, discussion, etc.) are separated and labeled. 3. Few, if any, writing errors.</td>
</tr>
<tr>
<td>Grade</td>
<td>Description</td>
<td>Experiments and understanding of concepts being tested.</td>
<td>Questions Answers Correct</td>
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| B     | 1. All the labs (7) are included  
2. For each lab, introduction, procedures and materials, results and discussion are presented.  
3. All the questions are answered.  
4. Few references and some uncited. | 1. All materials are fully prepared and presented.  
2. Most of contents are addressed accurately, using appropriate scientific concepts.  
3. Graphs, tables, and photographs are labeled.  
4. Interpretation and discussion of results show some insight into the experiments.  
5. Answers to the questions are correct but incomplete. | 1. Clear and well organized.  
2. All the labs and sessions are separated and labeled.  
3. A few writing errors and some show lack of understanding data or experimental design. |
| C     | 1. All the labs are included but important pieces of data is missing.  
2. For each lab, introduction, procedures and materials, results and discussion are presented.  
3. Most questions are answered.  
4. No references | 1. Some important experimental results are missing.  
2. Most of contents are addressed accurately, using appropriate scientific concepts.  
3. Most of the graphs, tables, and photographs are labeled; but not accurate or not easy to understand.  
4. Interpretation and discussion of results show some lack of understanding of the experiments.  
5. Most of the answers to the questions are correct. | 1. Most parts are clear and well organized.  
2. All the labs and sessions are included, but some are not separated and labeled.  
3. Significant writing errors show misunderstanding of data or experimental design. |
| D     | 1. One lab is missing or more than one piece of data is missing.  
2. For most labs, introduction, procedures | 1. One entire lab is not presented.  
2. Some of contents are addressed accurately, using appropriate | 1. Most parts are clear and well organized.  
2. Some of the labs and sessions are missing; not separated or labeled. |
1. More than one lab is missing.
2. Some major sessions are not included.
3. Few questions are answered.
4. No references

1. More than one lab is not presented.
2. Only a few contents are addressed accurately.
3. Limited number of the graphs, tables, and photographs are labeled; most are not accurate or not easy to understand.
4. Interpretation and discussion of results indicate almost no understanding of the experiments.
5. Only a few of the answers to the questions are correct.

1. Not clear or organized.
2. More than one lab is missing and sessions are not presented.
3. The level of writing is seriously below what would be expected of a college student.

- **Student Presentation**: A day is set aside at the end of the semester for presentation by the students of the work done during the course. Students will form their own teams and prepare a PowerPoint presentation in the lab on Dec. 8. Any combination of labs can be covered during the presentation. A fifteen-minute presentation should be given, plus five-minute question time. Required contents of the presentation are similar to the lab report of that experiment.

- **Instructors Evaluation**
This grade is determined by attendance, class participation and experimental skills.

**Course Policies:**

- **Late Work, Make-ups Policy**
  
  Late lab reports will be subjected to a penalty of 10% for each day they are late.
  
  There are no make-ups for classes, quizzes, presentations.

- **Lab Safety Policy**

  **COURSE SAFETY AND SOCIAL RESPONSIBILITY**

  To avoid injury to yourself and fellow students and to provide a climate that is conducive for all students to learn, you are required to adhere to the following rules. Failure to comply with these rules while performing laboratory experiments may result in suspension or expulsion from this laboratory course.
○ If you have a problem or condition that may affect your performance or safety in the laboratory you should discuss it in private with your Laboratory Instructor. This information will be held in strict confidence.

○ **YOU MUST WEAR APPROVED SAFETY GOGGLES or SAFETY GLASSES AT ALL TIMES** during the specified labs. It is a legal requirement of the Commonwealth of Pennsylvania that eye protection be worn in university teaching and research laboratories. **YOU MAY NOT WEAR CONTACT LENSES** in the laboratory.

○ **YOU MUST WEAR CLOSED-TOE, FULL SHOES AT ALL TIMES IN THE LABORATORY.** Sandals, of any type, are not allowed in lab.

○ You **MAY NOT PIPET** any solution **BY MOUTH.** If you get any chemicals on your hands **WASH YOUR HANDS IMMEDIATELY.** Plenty of running water is the best first aid for all chemical accidents. Rapid and immediate treatment is essential. Clothing soaked with strong acid or alkali must immediately be removed. This is no time for modesty. The safety showers are mainly intended to be used in cases where corrosive chemicals are spilled or splashed over a large body area.

○ You must put on gloves before helping anyone who is bleeding.

Note the location of eye fountains and safety showers so that you can use them if needed. Eye injuries, whether chemical or mechanical, must always be considered to be serious. The best procedure, **IN CASE OF CHEMICAL INJURY TO THE EYE IS IMMEDIATE, PROLONGED, CONTINUOUS FLUSHING WITH WATER** (15-20 minutes) at an eye fountain. Eyes must be forced open to be washed well.

○ **NEVER EAT, DRINK, OR SMOKE IN THE LABORATORY.** Long hair must be confined securely to minimize hazards.

○ Never force glass rods, pipettes, or tubing into rubber stoppers. Always use a lubricant (grease or glycerin) and protect hands with a towel. Use proper technique and care when inserting a pipette into a pipette bulb.

○ **DO NOT RUN** or "horse around" in the laboratory. Do not engage in any activities or behavior which might confuse, startle, or distract another student.

○ **DO NOT PUT BACK ANY CHEMICAL, SOLID OR LIQUID, INTO THE STOCK BOTTLES** from which they were obtained. The excess chemical may now be contaminated. Ask your Instructor what to do with the excess chemicals. **REPLACE STOPPERS,** lids, covers, etc. on the proper containers immediately after using the containers. **NEVER REMOVE** chemicals from the laboratory. Clean up chemical spills immediately. Check with your Instructor for the proper procedure.

○ **IF A FIRE ALARM SOUNDS** while you are working in the laboratory turn off any Bunsen burner, hot-plate stirrer or other electrical appliance; remove any reaction from any heat source; and leave the building by the nearest exit.

○ An Instructor must always be present while students are working in the laboratory. **YOU ARE NOT PERMITTED TO DO UNAUTHORIZED EXPERIMENTS.**

○ Always leave your work area clean at the end of each lab. **WASH YOUR HANDS BEFORE YOU LEAVE LAB.** It is a good idea to wash your hands
whenever they have been in contact with any chemical, not just at the end of
the lab period.

○ **NOTIFY YOUR INSTRUCTOR IMMEDIATELY** in case of any accident or
spill. Give cracked or chipped glassware to your Instructor and obtain
replacements from the supply bench. Broken glassware **MUST BE PLACED
IN THE "BROKEN GLASS" BOX ONLY.** For treatment of any accident you
must go to Presbyterian University Hospital. Transportation will be provided if
needed - speak with your Instructor. You and your Lab Instructor together
must file an Accident Report within 24 hours. Except in very unusual
circumstances, all medical claims are the responsibility of the student.
**INSURANCE COVERAGE** by either a student plan or family plan is strongly
recommended

- **Other Academic Issues**

○ **Academic Integrity:** Students are expected to comply with University of
Pittsburgh’s Policy on Academic Integrity. For more information:
  http://www.pitt.edu/~provost/ai1.html

○ Students agree that by taking this course all required papers may be subject
to submission for textual similarity review to Turnitin.com for the detection of
plagiarism. All submitted papers will be included as source documents in the
Turnitin.com reference database solely for the purpose of detecting
plagiarism of such papers. Use of Turnitin.com page service is subject to the
Usage Policy and Privacy Pledge posted on the Turnitin.com site.

○ Each student is issued a University e-mail address (username@pitt.edu)
upon admittance. This e-mail address may be used by the University for
official communication with students. Students are expected to read e-mail
sent to this account on a regular basis. Failure to read and react to University
communications in a timely manner does not absolve the student from
knowing and complying with the content of the communications. The
University provides an e-mail forwarding service that allows students to read
their e-mail via other service providers (e.g., Hotmail, AOL, Yahoo). Students
that choose to forward their e-mail from their pitt.edu address to another
address do so at their own risk. If e-mail is lost as a result of forwarding, it
does not absolve the student from responding to official communications sent
to their University e-mail address. To forward e-mail sent to your University
account, go to [http://accounts.pitt.edu](http://accounts.pitt.edu), log into your account, click on **Edit
Forwarding Addresses**, and follow the instructions on the page. Be sure to
log out of your account when you have finished.

○ If you have a disability for which you are or may be requesting an
accommodation, you are encouraged to contact both your instructor and the
Office of Disability Resources and Services, 216 William Pitt Union, 412-648-
7890/412-383-7355 (TTY), as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.