

## BIOLOGY 109-110Y: INTRODUCTION TO EXPERIMENTAL BIOLOGY

Biology 109 is the first semester of a year-long lab course designed to accompany Biology 115 and 116. It does not directly parallel the lecture courses and is meant to offer a different kind of experience. Biology 109 provides an opportunity for students to become involved in the process of scientific inquiry in a laboratory setting. The year-long sequence culminates in the design, implementation and presentation of a research project. Background in the form of web tutorials and readings are listed in the laboratory manual for each week's experiment. Using these resources, you should be able to understand each laboratory experience regardless of whether or not the topic has been discussed previously in your lecture courses.

**COURSE WEB SITE-** access **Introductory Laboratory** from the Biology Department site at: <http://biology.kenyon.edu/> or from the class moodle site.

### TEXTS AND SUPPLIES

**1. Laboratory manuals.**

**Biology 109** (Fall Semester)

*Introduction to Experimental Biology: Laboratory Manual*, 16<sup>th</sup> ed.

**Biology 110** (Spring Semester)

*Introduction to Experimental Biology: Biology 110*, 11<sup>th</sup> ed.

These lab manuals will be available in the bookstore at the beginning of each semester. **Bring it to the first class of each semester.**

- 2. Text & CD for background reading.** Freeman, Scott (2008) *Biological Science*, 3<sup>rd</sup> ed., Pearson, New York. This text is used in Biology 115 and 116. If you are not in one of these courses, consult with the instructor - you need not buy the text.
- 3. Notebook.** Three-ringed loose-leaf binder for instruction sheets, lab notes, and written assignments.
- 4. Tools.** Bring your calculator to class each week.

### LABORATORY PERFORMANCE

**Attendance is required.** You must come to your assigned section unless you have made provisions in advance for attending a different section. **Missed labs cannot be made up after the week of the lab.** Varsity athletes should pay careful attention to conflicts with athletic events and inform the instructor well in advance

**Preparation** for a laboratory exercise before coming to class is essential. Do the web tutorial, then read and study the appropriate exercise. Be familiar with what needs to be done during the lab, so you can organize your time efficiently. Try to anticipate any problems posed by the experiments. Make a note of anything you do not understand so you can clarify it with the instructor at the beginning of the class period. In some cases you will have to make decisions about experimental design - decisions you can make only if you understand the alternatives.

## WRITTEN ASSIGNMENTS

1. **Laboratory notebook.** A record of procedures used, data collected, and problems encountered in carrying out an experiment must be recorded during the laboratory period, kept in a 3-ring binder. **DO NOT COPY YOUR NOTES OVER AFTER CLASS.** Your laboratory notebook **MUST** be well organized and contain:

- This laboratory manual and any other materials passed out in class;
- Annotations on the laboratory handouts noting changes made to the protocols, and problems that influenced the experimental results;
- Well-labeled tables of the data taken in class that include captions, column headings, and units of measurement;
- Any other output generated in class, such as graphs, computer session windows, and photographs, with captions describing their contents.

2. **Assignments.** These will take a variety of forms and will be explained at the end of each laboratory. Assignments will depend on careful record-keeping in your lab notebook. They will give you practice in designing experiments, collecting data, using the computer for data analysis and graphics, and writing various parts of a scientific paper. Due dates are noted on the syllabus.

You will write four full scientific papers, two in the first semester and two in the second, including your independent project report at the end of second semester. Detailed instructions on scientific writing are provided in the reference section of this lab manual and on the class web site.

Grades will be based on the creativity and understanding you bring to each exercise. If you have questions about data interpretation or any aspect of the system under study, you are encouraged to consult with your instructor. Make sure you understand the material before you start writing. Questions posed at the end of each laboratory will help guide your thoughts but are not a substitute for you gaining an understanding of the issues. It is your responsibility to decide how to analyze and present the data. Ultimately, your goal in the papers is to convincingly describe your methods, results, and interpretations.

All papers will be written in the style of a scientific journal, so it is imperative that you use and understand the writing guide included in the laboratory manual and on the web site.

## ACADEMIC HONESTY

Acquaint yourself with Kenyon's policy on academic honesty, printed in the *Kenyon College Catalog*, 2009-10, pp. 24-27. Be sure you understand the concept of academic honesty as stated in the handbook. Problematic areas of academic honesty are discussed below with examples and suggestions.

**Reports and papers must be written independently.** In this class, you will work together in pairs or small groups to collect data. You may also work together to do some data analysis and you are encouraged to discuss results and your interpretations with classmates. However, you must write your paper independently. Independently means *by yourself*. Sharing text in any manner including by exchanging files is expressly forbidden. Sharing figures is only allowed if both partners actively contribute to constructing the figures. If figures are shared, the exact contribution of each partner must be stated in an Acknowledgments section (see below).

**All forms of collaboration and sharing of information must be explicitly acknowledged.** This means that you must state whom you worked with and you must state the nature of the interaction. For example: "Jane Doe and I worked together to produce Figure 1. We both contributed to creating Figure 1, and the same Figure is reproduced in each of our papers." or "John Doe and I discussed the interpretation of our results before I wrote this paper. The paragraph on possible sources of error was largely influenced by this discussion." or "Professor X provided the picture of the experimental setup." Collaborations should be acknowledged in the Acknowledgments section at the end of a paper.

**Citations of references must be done properly.** Direct quotations should not be used unless absolutely necessary. When direct quotations are used, the quoted text must be in quotation marks and cited properly. Close paraphrasing (simply rephrasing another's text without substantially altering the flow of ideas) is not allowed. Please be aware that scientific writing has a specific set of rules and conventions that may differ from those in other disciplines. If you are unsure about proper citation, refer to pp.13-14 of this manual or ask your instructor.

**Adherence to the above guidelines is the responsibility of the student.** You must understand and follow proper citation and acknowledgment formats.

*Use of information from student papers written in previous years is unacceptable!*

**If you have questions or are unsure, please ask your instructor.**

### GRADING

Your grade will be based on:

Assignments, tutorials, quizzes	45%
2 scientific papers	45%
Class performance, notebook	10%

**Penalties: 1/3 grade point for each day late; failure to acknowledge collaboration = 5% of total grade.**

**If you have a disability**, and therefore may have need for some type of accommodation(s) in order to participate fully in this class, please feel free to discuss your concerns in private with your instructor and be sure to contact Ms. Erin Salva, the Coordinator for Disability Services at x5145 or via electronic mail at: [salvae@kenyon.edu](mailto:salvae@kenyon.edu)