BI 101L General Biology I Lab
Spring 2002 Monday 2-4:50 PM
Henry Hall 8

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Office Hours: MWF **11-12 or by *appointment***

Course Description:
Biology 101 laboratory course is a one credit course that is distinct from, but accompanies, the Biology 101 general biology lecture course for non-science majors. This course is designed to apply the principles and concepts presented in lecture, to introduce students to the scientific method and writing style and to give students hands-on experience in a laboratory setting. The experiments will come from the biochemical, cellular and molecular fields of biology as well as genetics and biotechnology.

Course Objectives: Students will be able to demonstrate the following at the end of the semester:

1. **Knowledge of the scientific method and writing through lab reports and one short research report;**
2. **Familiarity with how organic molecules are chemically assayed;**
3. **How to assess cell structure and various aspects of function including enzymes, membrane processes and photosynthesis;**
4. **Familiarity with molecular biological aspects including isolation of DNA and its analysis and manipulation with polymerase chain reaction;**
5. **Knowledge of Mendelian genetics and mechanisms of heredity as surveyed in humans and flies;**
6. **Understand biodiversity.**

Text: **There is no text for this course. Handouts describing activities, lab notebook and lab reports will be provided for each laboratory.**

Grade Determination: The grade the student earns in this course will be based on:

1. **Lab notebooks. [2 checks @ 25 points each] Lab notebooks are an essential element to practicing science. The purpose of the lab notebook is to keep a complete record of your laboratory experiments including expectations (hypotheses), observations and data. A bond composition notebook or a three ring binder can be used. Notebooks will be collected at each midterm exam and graded.**

2. **Lab reports. [2@ 50 points each]. Laboratory reports are to be written in the format of a scientific publication which will be discussed early in the semester. More specific information on the content and format of the reports will be given in the handout for that laboratory exercise.**

3. **Assignments. [4@ 10 points each]. These are short 1-2 page assignments that involve research on the internet or analysis of experimental data.**

4. **Writing/research assignment. [1 @ 50 points], This assignment is intended to give the student experience in research on a scientific topic. Two references, one of which may be a text book, must be included. The other may be a journal, periodical or a web site that specializes in the topic area. Suggested topics are listed on the last page of this syllabus. Only one student from the lab section can write on the topic and you must indicate to me which topic you will be doing. If you would like to do your paper on another topic, please see me personally with your suggestion.**

   The paper must be three pages or less. Papers must be typed on a computer within a word processing program. Please make sure to run a spell check on your paper! Use single line spacing and 12 point sized font. Any paper turned in after the due date and time will be penalized one letter grade. No papers will be accepted after 24 hours beyond the due date and time.

5. **Lab Exams. [2 @ 75 points each]. There will be two lab exams. The second lab exam is not cumulative, e.g., it covers material only from the first lab exam.**

6. **Quizzes. Quizzes will be given at the beginning of many laboratory sessions. Important safety and technical aspects of experimentation are accomplished by being familiar with WHY you are doing an experiment and HOW you will conduct the experiment. Familiarity with the steps in the laboratory will minimize accidents and increase the likelihood of success in conducting the experiments.**

Grades will be assigned on the following scale: A > or = 90%, B > or = 80%, C > or = 70%, D > or = 60% and F as receiving < 60% of the total possible points.
Class standing: I will try to keep the class informed of the class curve particularly after the first midterm exam. Students with D or F grades will receive deficiency notices prior to the April 8 drop date deadline. Students who receive one of these notices are strongly encouraged to make an appointment to see the instructor to discuss their further progress in the course.

Writing Assignment Suggested Topics:

1. **Acid rain and its effect on pond organisms.**
2. **Lactose intolerance: what's the basis for this problem and how is it treated?**
3. **Diabetes---Insulin dependent or non-insulin dependent. Describe each form and investigate hopes for treatment.**
4. **Kidney dialysis---when is dialysis required, how does it work and what happens if it fails to work?**
5. **Effects of global warming on the *biotic* elements of the environment.**
6. **Select a genetically engineered food (rice, corn, tomatoes, strawberries) and discuss why it has been genetically altered, the success and controversy with the technology and how they were modified. Are there any benefits to these foods?**
7. **How do hormones get into the food chain or environment [example: BGH?]**
8. **What is chromosomal nondisjunction? Discuss a human condition that results from chromosome nondisjunction. What types of gametes can be produced by these individuals?**
9. **What is Rh compatibility? When is it important to be Rh compatible? What are the consequences of Rh incompatibility? Are there any treatments?**
10. **What is mad cow disease? What is Jacob-Creutzfeldt Syndrome? How are these two related?**
11. **What is the basis for the warning on diet drinks containing aspartame? What is PKU and what is its frequency of carriers in the United States?**
12. **Select a human genetic disease and discuss how it is inherited, if there are any cures, the frequency of carriers (individuals that carry one copy of the mutation) in the population.**
13. **Temperature sex determination---which organisms have it? How does it work?**

Tentative course schedule for BI 101L General Biology Lab I (Spring 2002):

Date	Topic
Jan 14	*Setup/Scientific Literature/Scientific Writing* [Assignment 1—due Jan. 28]
Jan 21	Fr. Chaminade and Martin Luther King Remembrance (no lab)
Jan 28	*Microscopy & Cell Structure*
Feb 04	*Chemical Analysis of Food* [Lab Report I---due Feb. 11]
Feb 11	*Enzymes and Assaying Enzyme Activity* [Lab Report II---due Feb. 25]
Feb 18	President's Day (no lab)
Feb 25	*Membrane Structure and Function---Diffusion and Osmosis*
Mar 04	Lab Exam I [Notebooks due]
Mar 11	*Photosynthesis and Isolation of Photosynthetic Pigments* [Assignment 2 due 3/18] [Lab Writing Assignment-due April 22-see syllabus]
Mar 18	Isolation, Characterization and Manipulation of DNA
Mar 25	Spring Break
Apr 01	*Cell Replication---Mitosis, Meiosis and Karyotypes* [Assignment 3 due Apr 08]
Apr 08	*Genetics of Humans and Flies* [Assignment 4 due Apr 15]
Apr 15	*Polymerase Chain Reaction & DNA Fingerprinting*
Apr 22	*Evolution and Biodiversity* [Writing Assignments due]
Apr 29	Lab Exam 11 [Notebooks due; covers material from Lab #6 through Lab #11]