

## Course Information

BioSc 172L – Introduction to Biotechnology Laboratory - 2 units  
Contra Costa College

Fall 2014  
Katherine Krolkowski

**Lecture:** Monday (Room B-18, 12:40PM-1:30PM).

**Lab:** Wednesday (Room B-18. B-22. 12:40PM-3:30PM)

**Contact:** Katie Krolkowski Office: B-4, Phone: (510) 215-3990 , Email: krolkowskiccc@gmail.com

**Webpage:** Some course materials will also be made available at the course web page:

**Office Hours:** M (**At The HUB**, PS107 11:00AM-12PM *and* Biotech lab B-18 *1:30PM-2:00PM*), Tu (**At The HUB**, PS107 10:00 AM-11:00AM), W (Biotech lab, B-18 3:30-4:30PM), Th (My Office, B4 12:30-2PM)

**Required Materials:** *Lab Manual for BioSc172L* (2<sup>nd</sup> ed) Katherine Krolkowski; Recommended: *Essentials of Biology* Mader and Windelspecht *Email account and web access-* be able to check this often.

### Evaluations:

Quizzes occur at the very beginning of class as listed in the Course Schedule.

15 quizzes at 10 points each = 150 points

Laboratory work is assessed according to a rubric for each lab in the Course Schedule. **You must be present to receive credit**

15 lab days at 20 points each = 300 points

Pre-labs are due at the beginning of each lab meeting.

15 pre-labs at 10 points each = 150 points

Lab notebook entries and reports are due as listed in the course schedule.

10 entries and/or reports at 20 points each = 200 points

Exams and/or projects occur during class time or are due as listed in the Course Schedule.

2 at 100 points = 200 points

Total for course = 1000 points

**A:** 90-100%, **B:** 79-89%, **C:** 63-78%, **D:** 50-62%, **F:** below 50%

Extra credit opportunities may be offered for a total of not more than 60 points.

**Attendance:** Attendance at lectures is very important, as material for the lab will be covered, and this is the time for quizzes and preparing pre-labs. I strongly suggest that students read and take notes on relevant materials in the texts and lab book BEFORE the lecture for maximum impact. Attendance at labs is mandatory. Labs cannot be made up. If your grade is less than 70% at the 6<sup>th</sup> week of class, it is mandatory that you participate fully in an office hour assessment before the 8<sup>th</sup> week. If your grade is below 70% and you do not show satisfactory participation in the office hour assessment by the deadline, *you will be dropped from the class.*

**Course Description and Objective:** This is an introductory laboratory course in which scientific and biotechnology methodology is taught and used to explore and experiment with topics found in the Introduction to Biotechnology course (BioSc172). It is a brief introduction to the skills and concepts necessary to work in the biotechnology industry, allied health, or related fields. Topics will include: the biology, business, and legal/ethical issues surrounding biotechnology; cells, genes, DNA, proteins, genetic engineering, drug development, biofuels, agriculture, bioremediation, biotechnology company structure, and the regulations affecting the field, and a survey of general methodologies utilized in biotechnology research and manufacturing. Field trips may be included. Not repeatable.

At the completion of the course the student will be able to: Formulate and write out appropriate research questions and hypothesis when presented with observation phenomena; List the major steps in the scientific method of investigation; Prepare appropriate data tables and graphs from data collected; Demonstrate the use of general math skills in the application of the scientific method (i.e.

computations, ratios, calculations, conversions, logarithms; Describe, explain and apply the metric system of measurement; Collect and evaluate experimental data to accept or reject hypotheses; Explain the theory of spectrophotometry and demonstrate the proper care and use of the spectrophotometer; Demonstrate appropriate teamwork skills in the laboratory; Describe the characteristics of the cell differentiating between the prokaryotic and eukaryotic cell; Demonstrate the proper technique in using microscopes; Sketch the atomic structure for elements with atomic numbers from 1 to 20; Define pH, acids, bases, and buffers and describe their role in living systems; Differentiate between ionic, covalent, and hydrogen bonds; Compare and contrast the properties of the four major groups of macromolecules associated with living systems; Demonstrate the proper use of pH meters and computer-based pH probes to collect and analyze data collected under varying conditions; Describe the structure and function of enzymes; Evaluate the effect of different environmental factors on the rate of enzyme catalysis; Prepare agarose gels and successfully separate a mixture into constituent molecules using gel electrophoresis and column chromatography; Demonstrate the proper use of micropipettes to measure small quantities of fluids; Compare and contrast anaerobic fermentation and cellular respiration; Differentiate between the light dependent and independent reactions in photosynthesis; Describe antigen-antibody reactions and give examples of how immunology techniques are used in scientific research, medicine, and the biotechnology industry; Demonstrate appropriate skills in the aseptic culturing of cells; Explain the structure of DNA and its role in cellular respiration and protein synthesis; Describe some of the major studies that elaborated the structure and role of DNA in cells; Demonstrate the appropriate laboratory skills when separating and identifying DNA fragments using agarose gel electrophoresis methods; Calculate Mendelian probabilities when given the appropriate pedigree information; List potential chemical and biological hazards in the laboratory and take proper precautions against them.

**Student Learning Outcomes:** Students will demonstrate understanding of regulation in biology. Students will make lab notebook entries correctly according to an SOP. Students will improve their understanding and knowledge of basic biological concepts, including: 1) Basic chemistry for biology 2) Cell theory 3) Energy flow through photosynthesis and cellular respiration 4) Cellular reproduction 5) Genetics 6) Natural Selection 7) Ecology/ecosystems. Students will make lab notebook entries correctly according to an SOP

**General Notes:** Lab write-ups and homework assignments are to be your own work. Discussion of the material in groups is encouraged, but it is absolutely required that the work turned in is entirely your own. Violation of this policy is grounds for loss of credit on assignments, and severe or repeated violations are cause for disciplinary action as described in the CCC Student Code of Conduct/Academic Honesty Policy/Student Handbook. Spelling, grammar, writing style and attention to the format of the exercise are important. It is expected that you adhere to the classroom rules, described on a separate handout

**DSPS Statement :** Students who would like to receive accommodations for their learning, physical, or psychological disabilities should contact the Disabled Students Programs & Services (DSPS) office (H-19) and schedule an appointment. (510) 215-3969."

## A Covenant between the student and the professor for BioSc172L:

I, \_\_\_\_\_, the student, acknowledge the following:

- **The process of science is not “hard”, but it does take preparation and attention.**  
*I realize that when I miss class, I miss a valuable experience. It is up to me to reach out and communicate with others to do my best to gather missed information. I will do everything I can to NOT miss any class time.*
- **Life moves on, with or without me.**  
*The time in the biology lab is limited and a unique opportunity. When I am prepared before lab, I will gain the most from my lab experience. If I arrive at lab un-prepared, I will be using this special time and space and to do something I could have done in any number of places. I will spend time before lab each week to get prepared for this incredible experience.*
- **My teammates depend on me.**  
*Teamwork is very important in this class. When I am missing, or not focused on the present moment, I not only detract from my own experience, but from that of my lab-mates. I will make every effort to be a good teammate. I will acknowledge the times I am distracted or disruptive, and try my best to communicate clearly with my colleagues.*
- **The instructor has valuable information to share with me**  
*My professor is a trained professional, and her job is to create an effective learning environment for me and for my classmates. I realize that every person has different ways of communicating and different strengths, and that my professor tries hard to help every student in the class grow as much as possible. I will use my time in this course to work with my professor and wholeheartedly participate in this particular learning environment.*

I, \_\_\_\_\_, the professor, acknowledge the following:

- **Science may be a new experience for students**  
*While my life has been filled with a love of science, I understand that this is not true of many students. I will make every effort to listen to and address the ideas and perspectives that students share in class.*
- **The best way to prepare for a scientific experience is not obvious to many students**  
*I have had a lot of experience in being prepared for a scientific experience, and it feels second-nature to me. I realize that I sometimes become frustrated when I feel students are un-prepared for class. I will do my best to assist students with tools, examples, and patience to make it as clear as possible what “being prepared” looks like.*
- **Teamwork takes time to develop**  
*I realize that students are not only learning a new discipline, science – but that they are also negotiating a complex interaction with their team-mates. I will make every effort to provide constructive observations and assistance with negotiations, when I notice “dysfunction” in a team, rather than scold or criticize students.*
- **I have a duty to provide clear and complete information**  
*I fully accept my responsibility as an instructor to create an effective learning environment. I commit to arriving to class prepared with lectures, handouts, and graded assignments/feedback for students. I will do my best to address each student’s individual learning style. Students’ time is valuable, and I will make every effort to be sure that each moment in our classroom is as rich as possible.*

I have read and acknowledge the covenant “**A Covenant between the student and the professor for BioSc172L:**”, which is attached to my copy of the BioSc172L syllabus. I agree to follow this covenant throughout the semester.

Signed:

\_\_\_\_\_, Instructor Date: \_\_\_\_\_

\_\_\_\_\_, Student Date: \_\_\_\_\_