CEDAR CREST COLLEGE
BIO 236 - Cell and Molecular Biology Lab

Spring, 2010 Syllabus

Instructors:	Dr. Andre Walther (Section 1,3 and lab coordinator) MIL 25, x3513, awalther@cedarcrest.edu Dr. Audrey Ettinger (Section 2,4), SC 108, x3512, ajetting@cedarcrest.edu Dr. Kent Fitzgerald (Sections 5) MIL 27, x3609, kkfitzge@cedarcrest.edu	
Time, place:	**Section 01, Monday 1-4 PM** **Section 02, Tuesday 1-4 PM** Section 03, Thursday 8-11 AM Section 04, Thursday 1-4 PM **Section 05, Tuesday 8-11 AM**	All labs meet in Miller 31
Prerequisites:	Required: successful completion of BIO 121 and BIO122 and Strongly Recommended: CHE 111 and 112	
Textbook	A scientific notebook of your choosing	

Objectives

The objectives for students in this course are to:

- Learn and gain experience with a range of important experimental techniques in molecular and cellular biology, including microscopy and photomicroscopy, protein analysis, primary cell culture, and common molecular biology techniques such as DNA isolation, Restriction digestion, and DNA sequencing
- Learn to prepare publication quality photographs and to analyze data
- Learn how to write formal scientific reports
- Prepare for advanced lab work and research at Cedar Crest and beyond

Course Outcomes

Upon successful completion of this lab, students will be able to:

- Demonstrate proficiency in laboratory techniques taught in the course
- Demonstrate quantitative reasoning through laboratory-based problem solving and analysis
- Demonstrate written and graphical communication ability through preparation of the photo assignment and lab reports

Assessment

The outcomes described above will be assessed through:

- Quizzes: scientific / quantitative reasoning
- Assignments: scientific / quantitative reasoning, written communication ability
- Class participation: oral communication ability

Student Responsibilities

SAFETY is the highest priority in the lab. You are responsible for understanding and complying with safe lab practices. Read and follow the safety procedures distributed in the first meeting. If anything unexpected happens or you are ever unsure what to do, ASK!

Attendance in lab is required except in case of absence for medical or personal reasons that have been documented through the Office of the Dean of Students. Unexcused absence will result in a 50 pt deduction from the lab grade. Prior permission from your lab section instructor is required to change lab sections. You will occasionally need to work in lab at times outside of scheduled class hours. Travel plans must be made to conform to the Cedar Crest College schedule. IT IS YOUR RESPONSIBILITY TO ARRIVE TO LAB ON TIME. If you are late or do not complete tasks that are assigned outside of class, your instructor may deduct points from that lab's assignment at their discretion.

Readings are assigned to prepare you for lab. Therefore, lab readings must be completed before class. Quizzes based on the reading will encourage this practice.

Scholarship and Integrity: We fully support the Cedar Crest College Honor Code and the Community Standards for Academic Conduct as stated in the Student Guide. You are required to abide by the Honor Code and by accepted practices of scholarship and integrity. All writing and other material that you submit must be your own, original work, unless otherwise acknowledged. Cheating or plagiarism will result in a grade deduction or a zero grade for the entire assignment, at the instructor's discretion. Incidents of academic dishonesty will be reported to the Provost and Dean of Student Affairs. If you have any questions about these issues, please discuss them with the instructor.

Classroom protocol: The Honor Code states, "Appropriate classroom behavior is implicit in the Cedar Crest Honor Code. Such behavior is defined and guided by complete protection for the rights of all students and faculty to a courteous, respectful classroom environment. That environment is free from distractions such as late arrivals, early departures, inappropriate conversations and any other behaviors that might disrupt instruction and/or compromise students' access to their Cedar Crest College education."

Students with Disabilities: Students with documented disabilities who may need academic accommodations should discuss these needs with their professors during the first two weeks of class. Students with disabilities who wish to request accommodations should contact Academic Services.

Assignments and Evaluation

Quizzes

There will be 10 online quizzes offered on the ecollege website worth 10 points each. Quizzes will be based on the information in the lab handouts and assigned readings from the textbook for that week. On weeks with assigned quizzes, they will be made available online at least 48 hours before the start of your lab section and will need to be COMPLETED at least 1 hour before the beginning of your assigned lab period. There will be NO make-ups for quizzes without an excuse from the Dean of Student Affairs.

Photo Assignment

The photo assignment will be the culmination of Part I of cell biology lab. The assignment will consist of two photos: one phase contrast photograph and one fluorescent photograph. Each photo will have a legend that will include: a description of the specimen, the technique used (not detailed methods), and an accurate calibration bar. The assignment will also include a title and authors. Keep in mind that your photo assignment should be presentation quality.

Lab Reports

Lab reports are an essential aspect of science and allow researchers to record methods and observations and to critically analyze their data. Reports also allow other scientists to repeat experiments and to further discovery by going beyond the data presented in the report. In this lab, you will add to the information gained in freshman lab and continue to learn how to write a formal lab report.
The semester is divided into multiple parts, each covering a different aspect of cell and molecular biology. For Parts II-III, you will be required to write a section of a lab report (i.e., Introduction, materials and methods, results, and discussion). This will allow you to learn how to write a report a little at a time. The lab write-ups will culminate with the Part IV of the lab, for which you will combine everything that you have learned about writing a lab report into one complete report, which will be worth 250 points.

Lab Notebooks

You will be required to have an up to date notebook for the lab course that will be graded as part of the final exam.

Final Exam

There will be a final comprehensive exam in the final week of lab. This will include an open notebook component, a practical component, and a closed notebook component. You will not be allowed to bring class handouts to the final exam.

Points Breakdown

10 Online Pre-lab Quizzes (10 points each)		100 points
Part I: Microscopy	Photo assignment	100 points
Part II: Cell Culture	Materials and Methods	150 points
Part III: Molecular Biology	Results and Discussion	150 points
Part IV: Protein Techniques	Complete Lab Report	250 points
Comprehensive Exam		200 points
Participation		50 points
	Lab total:	**1000 points**

If you have any questions on the assignments or grading policies, please don't hesitate to ask your instructor. The lab grade will be determined from the total lab points according the table below. Late assignments will be deducted 10% per calendar day.

Points:	744-800	720-743	696-719	664-695	640-663	616-639	584-615	560-583	536-559	480-535	479 or less
Grade:	A	A-	B+	B	B-	C+	C	C-	D+	D	F

Lab Schedule

Week	Date	Topic	Reading
Part I: Microscopy Objectives: Develop expertise in microscope set-up and use, learn applications and use of fluorescent dyes and phase contrast, learn to prepare presentation-quality photomicrographs.			
1	Jan 25-26	Introduction, lab safety, microscopy and measurement	
2	Feb 1-2	**Online Quiz 1** Phase microscopy, photomicroscopy	Book pp728-731
3	Feb 8-9	**Online Quiz 2** Fluorescent microscopy Fluorescence handout	Book pp731-734 Microscopy handout
Part II: Cell Culture Objectives: Learn the art and science of preparing and maintaining primary cell cultures. Measure proliferation, using cell counting techniques.			
4	Feb 15-16	**Online Quiz 3** Cell culture preparation and rehearsal	Cell culture handout/Paper Intro+MM
5	Feb 22-23	Primary cell culture	Cell culture handout
6	Mar 1-2	**Online Quiz 4** Cell counts	Cell culture handout
	Mar 8-10	*Spring break - no labs*	
Part III: Molecular Biology Objectives: Learn the theory and practice isolating and characterizing DNA isolated from cows in order to examine the evolutionary diversity amongst different populations.			
7	Mar 15-16	**Online Quiz 5** Genomic DNA Isolation and Digestion of Lambda DNA	MolGen Handout
8	Mar 22-23	**Online Quiz 6** Genomic DNA gel and PCR of ND3 and D-Loop	MolGen Handout
9	Mar 29-30	**Online Quiz 7** PCR product purification, quantitation, prep of sequencing	MolGen Handout
	Apr 5-6	*Easter break-no labs*	
10	Apr 12-13	**Online Quiz 8** Editing of raw DNA sequence and sequence analysis	MolGen Handout/Paper R+D
Part IV: Protein Techniques Objectives: Learn the theory and practice of protein gels and Western blots. Apply these approaches to a phylogenetic comparison of serum proteins from several species			
11	Apr 19-20	**Online Quiz 9** Protein electrophoresis	Protein handout
12	Apr 26-27	**Online Quiz 10** Western blot	Protein handout
13	May 3-4	**Final Exam**	