

# **BIO 345 – Advanced Recombinant Techniques**

## **Fall, 2008 Syllabus**

- Instructor:** Dr. André Walther  
Miller Building 25, x3513  
awalther@cedarcrest.edu
- Office hours:** Monday, Wednesday 10 AM - 11 PM, or by appointment
- Class time & place:** Monday, Wednesday, Friday 11:00 - 11:50 am (3 credits),  
SCI138
- Required Text:** The Course will be based on primary literature and review articles that will be supplied by Dr. Walther via eCollege.
- Prerequisites:** BIO335/BIO336

### **Course Description:**

This course will cover advanced techniques in molecular biology with a special focus on molecular genetic and recombinant techniques. We will discuss the mechanisms of manipulating the genomes of scientifically important model organisms. We will also cover the multiple “omics” including genomics and proteomics.

### **Objectives**

The objectives for students in this course are to:

- Achieve a detailed understanding of advanced molecular biology techniques.
- Understand how genomes can be genetically modified.
- Gain experience in reading primary scientific literature.
- Develop expertise in logical problem solving.

### **Course Outcomes**

Upon successful completion of the course, students will:

- Demonstrate the ability to engage in scientific reasoning by interpreting and discussing primary scientific literature.
- Demonstrate the ability to communicate these concepts orally and in writing.

### **Assessment**

The outcomes described above will be assessed through:

- Written exams: scientific / quantitative reasoning, written communication ability
- Oral presentations: scientific reasoning, oral communication ability
- Class participation: oral communication ability

## **Student Responsibilities**

### **Readings:**

The reading materials are integral to this course. Readings must be completed prior to class in order to facilitate student discussion. Failure to come prepared to class will impact participation grades. You are responsible for all material in the assigned reading, whether or not it is discussed in lecture. Anything in the assigned reading or lecture notes is fair game for exams.

### **Attendance:**

It is strongly recommended that you attend class. A significant portion of your grade involves your class participation. Repeated absences will negatively affect your participation grade.

### **Scholarship and Integrity:**

I fully support the Cedar Crest College Honor Code and the Classroom Protocol code as stated in the Customs Book. 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. Material that is quoted from another source must be clearly indicated as a quotation and must be followed immediately by a citation to the original source. Paraphrasing is not acceptable as original work; editing someone else's writing does not make it your own work. Cheating or plagiarism will result in a grade of F for the assignment or the entire course, at the instructor's discretion. If you have any questions about these issues, please discuss them with an 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 the Advising Center.

## Assignments and Evaluation

### Exams (400 pts)

Each of the two 200 pt, in-class exams during the semester will cover reading and lecture material since the previous exam.

**Exam #1: Wednesday, October 10**

**Exam #2: Monday, November 19**

### Comprehensive Final Exam (200 pts)

The comprehensive final exam will include course material from throughout the semester and final presentations.

**Date: TBA**

### Informal Paper Discussion Leader (100 pts)

Students will choose a paper from a list provided by Dr. Walther. They will be responsible for a brief informal description of the main technique described in the paper. Choice of paper and Dates of presentations TBA.

### Final Presentation (200 pts)

Students will choose a topic of interest and give a formal 20 min PowerPoint presentation on the topic. Late delivery of assignments will result in a loss of points.

- Topic due (topic can not be changed later): Friday, Sept. 14
- Hard copies of 5 primary research articles due: Friday, Oct. 19
- Draft of PowerPoint (electronic copy): Friday, Nov. 16 (11:59 PM)
- 20-minute MS PowerPoint presentation: Monday, Nov 26 - Friday, Dec. 10

### Class Participation (100 pts)

Class participation and adherence to the classroom protocol may affect your participation grade. The participation grade will be determined solely at the discretion of the instructor.

**There will be NO extra credit assignments, so make your points count.**

### Make-up policy for exams:

If you miss an exam due to illness or emergency that has been documented through the Dean of Student Affairs' office, you must contact the instructor as soon as possible to arrange a make-up exam. Make-up exams will not be given for any other reason. Please note that make-up exams may be of a different format than the main exam given in class.

Your obligations for this course include attendance at the final exam, on the day and time scheduled by the Registrar's Office. You should not make travel arrangements until the final exam schedule is published; if

you must make plans early, you should schedule your travel after the last final exam day.

**Course Grading:**

The course grade will be calculated to the nearest 0.1%, and the letter grade determined by the table below. Late assignments will be deducted 10% per calendar day, including weekend days.

**Grading Scale:**

A	93.0 - 100%	C	73.0 - 76.9%
A-	90.0 - 92.9%	C-	70.0 - 72.9%
B+	87.0 - 89.9%	D+	67.0 - 69.9%
B	83.0 - 86.9%	D	60.0 - 66.9%
B-	80.0 - 82.9%	F	< 60.0%
C+	77.0 - 79.9%		

**Grading Disputes:**

*What the instructor giveth, he may also taketh away.* If a student has an issue about the grading of specific questions, I will be more than willing to hear them out, however by asking the instructor to modify the grading on a specific question, he reserves the right to regrade the entire exam.

**Your Keys to Success:**

There is a large body of material to learn in this course. To learn successfully, you will need to attend the lectures, read the text and other assigned readings, and study effectively. You need to put in the effort, but help is available. Always feel free to ask questions!

**Schedule: Subject to change**

Lecture	Date	Topic
1	Mon 8-25	Syllabus/DNA structure
2	Wed 8-27	How to Read a Paper
3	Fri 8-29	DNA/RNA Isolation
NO CLASS	Mon 9-1	
4	Wed 9-3	DNA recombination <i>in vivo/in vitro</i>
5	Fri 9-5	RE/Polymerases/Ligases
6	Mon 9-8	PCR/ <b>Choose Papers</b>
7	Wed 9-10	RT-PCR/cDNA libraries
	Fri 9-12	Hybridization/Northern/Southern
8	Mon 9-15	<b>qPCR paper/</b> qPCR/ qRT-PCR
9	Wed 9-17	Recombinant Protein Expression
10	Fri 9-19	<b>Protein Expression paper/</b> Recombinant Protein Expression
	Mon 9-22	Bacteria/Yeast
11	Wed 9-24	Yeast/ <i>C. elegans</i>
12	Fri 9-26	<b>DM Memory paper/</b> <i>D.melanogaster</i>
13	Mon 9-29	<i>D.melanogaster</i> /Mouse
14	Wed 10-1	<b>Mouse Model Paper/</b> Mouse
15	Fri 10-3	Human
16	Mon 10-5	Left overs
17	Wed 10-7	<b>EXAM I</b>
18	Fri 10-9	Sequencing/Genomics
NO CLASS	Mon 10-13	
19	Wed 10-15	<b>Genomics Paper/</b> Genomics
	Fri 10-17	<b>CE RNAi paper/</b> miRNA/RNAi
20	Mon 10-20	miRNA/RNAi
21	Wed 10-22	GFP/Protein Localization/ <b>Protein Localization Paper</b>
22	Fri 10-24	<b>Microarray paper/</b> Microarrays/SNP arrays
23	Mon 10-27	Transposable elements
24	Wed 10-29	<b>Mouse deletion paper</b>
	Fri 10-31	Epistasis and such
25	Mon 11-3	<b>SGA paper/</b> Epistasis and such
26	Wed 11-5	<b>stem cell paper/</b> Stem Cells
27	Fri 11-7	<b>iPS paper/</b> Stem Cell techniques
	Mon 11-10	<b>Gene therapy paper/</b> Gene therapy
28	Wed 11-12	Gene therapy
29	Fri 11-14	Ethics of GE
30	Mon 11-17	<b>Human interactome paper/</b> Proteomics
31	Wed 11-19	<b>ChIP paper/</b> ChIP
32	Fri 11-21	Left Overs/ Draft of Final Presentation due
33	Mon 11-24	<b>EXAM II</b>
NO CLASS	11-26/11-28	<b>Gobble Gobble</b>
34	Mon 12-1 to 12-8	Final Presentations
	TBA	<b>Comprehensive Final Exam</b>

