CEDAR CREST COLLEGE
Biology 243/353 Syllabus
Walther Research Information
Spring 2010

RESEARCH ADVISOR INFORMATION

Advisor: Dr. Andre P Walther
Office: Miller 25
Phone: 610-606-4666, x3513
Email: awalther@cedarcrest.edu
Office hours: By drop-in or appointment.

GENERAL INFORMATION

Thesis option: http://www2.cedarcrest.edu/academic/bio/thesisoption.htm
This site also describes non-thesis research options.

Course Prerequisites:

Successful completion of Principles of Biology I (BIO 121) and II (BIO 122), successful completion of Junior Colloquium (BIO 350), and permission of the research advisor. Four credits total must be eventually taken for the research thesis option.

Course Description:

These courses involve student participation in a CCC faculty research program. They may contribute to the fulfillment of a research requirement for some science majors. Research projects are generally 350 proposals being carried out in the laboratory, adapted as needed and guided by the research advisor.

Textbooks and materials:

- A bound laboratory notebook that resides in the laboratory is required. This notebook will be provided by the lab and must stay in the lab.
- You may also choose to keep your own separate notebook that you will take with you later. Alternatively, at the end of the semester you may copy your lab notebook to retain a copy for yourself.
- A 3-ring binder for papers, handouts, chemical inserts, and protocols is suggested.

Course Objectives:

Goal:

The goal of the course is to prepare students to design, carry out, interpret, trouble-shoot, and communicate scientifically sound research experiments that are a part of an independent molecular genetics-based project in the Baker's yeast *Saccharomyces cerevisiae*. This approach is designed to prepare students for research in graduate school, technical, pharmaceutical, or other related science-based work.

Objectives: At the completion of the research work, the student should be able to:

1. Understand basic methods of culturing yeast.
2. Understand molecular biology and genetic techniques associated with yeast.
3. Build skills of reading and understanding scientific literature.
4. Design basic experiments to test aspects of DNA repair pathways in yeast.
5. Record data and samples in a methodological format that would allow others to reproduce experiments from the notes and to locate and identify samples in storage.
6. Present her research, including background and experimental methods, to fellow students and to professors in both written and oral formats.

Course Outcomes:

1. Students will develop critical thinking laboratory skills in the design and analysis of experiments. This ability will be assessed through the evaluation of progress reports, lab participation, presentations, and lab notebooks.
2. Students will learn to apply their general lab and research skills to new problems and concepts by reading and sharing learned material from current research literature and by discussing lab projects with their lab mates and advisor.
3. Students will learn to select, follow, and adapt basic protocols for the methods required by their research projects. They will consider appropriate controls and how to draw conclusions from their experiments.
4. Students will be exposed to the intrigue of science research and be a part of a research team.

STUDENT ASSESSMENT & EVALUATION

Assessment:

Lab Meeting attendance and participation

The purpose of lab meetings is to keep a flow of information between the student and the advisor and throughout the lab. Not everything works the first time, sometimes the best way to move forward is to bounce your work off of others! Each student is required to attend these lab meetings and to participate in them, either by presenting as scheduled, or by asking questions and contributing to the discussions of those presenting.

Written Progress reports

The purpose of the progress reports is to help the student monitor and follow her work, to establish lab accountability and tracking, and to incorporate feedback and ideas from lab meeting. Additional comments should be added to the form during lab meeting. The lab reports should address the following:

I. What were your lab accomplishments during the last few weeks? What experiments were you working on?
II. What methods did you use for these experiments? Where there appropriate controls?
III. What were your results and what did you interpret from them?
IV. Did you have to do any troubleshooting?
V. What are your plans for the next few weeks?
VI. How did you contribute to overall Walther lab citizenry

Oral Progress Reports

Throughout the semester, in accordance with the lab schedule, each student will have the chance to more informally present her research. These presentations should be 15-20 minutes in length and include 1) background information of the project, 2) details of experiments performed to date, 3) results for experiments completed, and 4) future directions of the project. After presentations (powerpoint), presenters should expect questions from the other lab students and me.

Journal Club Presentation

Students should focus on the primary literature that affects their research project. Papers read and summaries should be useful for the final paper required of all students (and then quite useful later for 354). Each student will be responsible for leading the discussion of a primary literature paper pertaining to her research project. She will need to receive approval of the article to be presented by the instructor prior to presenting the article. She will also be responsible for providing a copy of the article to the other lab members at lab meeting the <u>week before</u> her journal club. The journal club presentation will contain the following:

I. What questions were the researchers asking?
II. What method did they use to address the questions?
III. What type of data did they acquire?
IV. What conclusions did they make? Were they supported by the data?
V. What questions were you left with?
VI. How does the paper relate to your research project?

Laboratory notebooks

Each student is required to keep her own lab notebook, with separate entries for each day of lab work. As is research tradition, this is property of the lab. At any point during the semester, I might need to check notebooks for what students are doing and how. Points will be deducted if I need to check your notebook and cannot find, or follow it. Don't get behind in keeping notes! Short incubation periods are a great time to catch up on notes. It will help you get started each day if you leave a plan behind for when you arrive.

The more information you track, the more you'll be able to determine later. **You should be able to completely repeat an experiment from your notebook**. **In fact, I should be able to repeat an experiment from your notebook!** See chart below for grading. Each entry should be written in pen, dated, and should include the following:

1. the purpose of that day's experiment
2. a detailed protocol, or brief but informative protocol and reference to a reliable source written before the experiment
3. details of the procedure that might vary (amount of antibiotic used and at what concentration, number of cells/ml etc) from experiment to experiment
4. chemicals or instrument settings used that would be challenging to determine later
5. notes on things that happened during the experiment that were not planned and observations made during the experiment
6. information regarding storage of samples ("placed in –80 °C freezer in Walther box 2") and labeling information (pRCD69 miniprep DNA 10/13/04) so that others could follow
7. stopping point for the day and summary
8. plan for the next lab day

Lab citizenship

Part of being in a lab group is working with the rest of the group, learning from other students, helping teach other students, keeping the lab safe, and keeping the lab running efficiently. In addition to doing her own dishes whenever possible, each student is expected to contribute some task toward general lab maintenance. These tasks will likely rotate, and might include any of the following: lab organization and database work, keeping an eye on general lab supplies and replenishing as needed, dealing with issues of tip boxes, disposing of waste materials, or making of media. Contributions can be recorded in the lab progress reports.

Final report

All students are expected to complete a final report that incorporates information from the written progress reports (particularly as *Materials & Methods*, and *Results*) and has the style and components of a research paper. These pieces are usually:

- Abstract
- Introduction & Background
- Materials & Methods
- Results & Discussion (may be separate or together)
- References

Grading:

Responsibilities	**BIO 243 – maximum points**	**BIO 353 – maximum points**
Lab attendance (13 mtgs)	26, 2 points each	26, 2 points each
Oral Progress Reports	(2)12, 6 points each	(4) 24, 6 points each
Written Progress Reports	(2)12, 6 points each	(4) 24, 6 points each
Journal Club		10 points
Laboratory notebooks	50	50
Final report	10 Abstract	26
Lab citizenship	20	20
Participation	20	20
Total possible points	150	200

Final grade %	A	A-	B+	B	B-	C+	C	C-	D+	D	F
	93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	73-76.9	70-72.9	67-69.9	60-66.9	<60

SCHEDULE

Walther Research Weekly Meeting Schedule, Spring 2010 –
Fridays at 1:15PM pm, Miller 32 ***(subject to change if needed)***

Date	**Presenter**	**Due**
1 – Jan 29	Everyone	Lab Policies/Informal project descriptions
2 – Feb 5	Christina, Molly	Oral and written Progress reports
3 – Feb 12	Kayla, Sarah	Oral and written Progress reports
4 – Feb 19	Kirsten, Tabby	Oral and written Progress reports
5 – Feb 26	Bekki, CJ	Oral and written Progress reports
6 – Mar 12	Buffer/Paper	
7 – Mar 19	**Joint Lab Meeting (Christina)**	
8 – Mar 25	**Joint Lab Meeting (Sarah)**	
9 – Apr 1	NO LAB MEETING	PAS Posters/Talks Drafts due this week
10 – Apr 9	NO LAB MEETING/PAS	Oral and written Progress reports PAS Poster/Talk Drafts due
11 – Apr 16	**Joint Lab Meeting (Molly)**	Oral and written Progress reports
12 – Apr 23	Kirsten, Tabby	Oral and written Progress reports
13 – Apr 30	CJ, Sarah	Oral and written Progress reports
14 – May 5	Thesis Practice talks	Abstracts/Final Reports/Thesis/Notebooks due
TBA		Attendance of senior talks and presentations for students of other labs