COURSE SYLLABUS – MIMG 121A  
FALL 2007

I, Microbiologist:  
A Discovery-based Undergraduate Research Course 
in Microbial Ecology and Molecular Evolution

Instructor

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Teaching Assistant

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Course Description

Lecture, two hours per week; laboratory, six hours per week.  
Requisites: Designed for upper-division students interested in acquiring research experience in a 
range of disciplines including molecular biology, environmental microbiology, bacteriology, 
plant and microbial community ecology, molecular systematics, and bioinformatics. Course 
participants are required to have conceptual background and technical experience as could be 
provided in General Microbiology lecture and laboratory courses (MIMG 101 plus MIMG 101L 
or MIMG 102L).  
Units: 4.0  
Two lab sections. Each section limited to 12 students.

Class Time and Location

Lecture: All sections TR 11:00 AM – 11:50 AM, 120 La Kretz

Lab:  
Section 1A TR 1 – 4 PM, 3336 Young Hall South

Section 1B WF 1 – 4 PM, 3336 Young Hall South

Textbooks

Phylogenetic Trees Made Easy: A How-To Manual for Molecular Biologists (3rd Ed.)  
by Barry G. Hall, Sinauer Associates, Inc., 2004

Brock – Biology of Microorganisms (11th Ed.) by M.T. Madigan and J.M. Martinko, Prentice 
Hall, 2006
Lab Materials

1. Lab Manual
2. Permanently bound lab notebook.
3. Sharpie marker(s).
4. Ball-point pen.
5. USB flashdrive (for saving and transporting computer-generated data).

Requirements

Attendance at lecture (2 hrs/week) and fulfillment of required lab research hours (6 hr/week) is mandatory.

Grading

<table>
<thead>
<tr>
<th>Points (Percentage)</th>
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<tbody>
<tr>
<td>Attendance at lecture</td>
<td>0 (mandatory)</td>
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<tr>
<td>Fulfillment of lab research hours</td>
<td>0 (mandatory)</td>
</tr>
<tr>
<td>Lab effort &amp; conduct</td>
<td>100 (12.5%)</td>
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<tr>
<td>Lab Notebook</td>
<td>100 (12.5%)</td>
</tr>
<tr>
<td>Homework (7 total, 20-40 pts each)</td>
<td>170 (21.25%)</td>
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<tr>
<td>Discussion participation</td>
<td>80 (10%)</td>
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<tr>
<td>Research Project Proposal (Due week 6)</td>
<td>150 (18.75%)</td>
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<tr>
<td>Final Paper (Due finals week)</td>
<td>200 (25%)</td>
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<td><strong>800 (100%)</strong></td>
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Grades: Grades are assigned on a performance curve, without strict limits on the proportion of each. Note that there will be no grade inflation – A’s and B’s must be earned.

Collaborative Work: Students will be assigned into Project Teams and are expected to work together during lab, lecture, and outside the classroom according to their own arranged schedules. 50 of the 200 pts that may be earned from completion of the Final Paper will be based on a collaborative effort between students in each Project Team. The score for the “collaborative points” that each student receives on the Final Paper will be the average score for his/her entire team. In addition, students are encouraged to communicate and work together in lab throughout the quarter. Thus, 20 of the 100 pts that each student may earn for Lab Effort & Conduct will be based on an evaluation of collaborative efforts among students in each Project Team during the laboratory period. Again, the score for the “collaborative points” that each student receives on for Lab Effort & Conduct will be the average score for his/her entire team. Note that most teams are comprised of 4 students.

Lab Effort & Conduct (100 pts total – 20 ‘collaborative’) 

The instructor and TA will evaluate your overall performance in lab based on a number of criteria including preparation for lab, demonstrated mastery of lab techniques, organization, adherence to lab policies (which includes following lab safety procedures), professional
behavior during lab (which includes being respectful of Instructors, TAs, and fellow students), and collaborative efforts between Project Team members. Points will be deducted for poor laboratory conduct at the discretion of the instructor and TA for any of the following: breaking or abusing equipment, not cleaning up properly, failure to use equipment log sheets, consistently arriving to or leaving lab late, unexcused lab absences, unwillingness to work with Project Team members on a consistent basis, etc.

**Lab Notebook (100 pts)**

Students are required to maintain a lab notebook, where you will write down detailed observations, procedures, results, data analysis, or other interesting insights. Labeled pictures of plates and gels should also be included in the notebook. Be certain to include any errors you make – just draw a single line through your mistake to cross it out then write the correction nearby (NO erasers or white out). Also, please incorporate notes about any gains in understanding and technical skill you obtain throughout the course. Your lab notebook will be checked periodically throughout quarter, so bring your notebook to every lab. Notebooks should be legible; however, they do not need to be tidy or neat so long as all the important information is there. Do not re-copy information from another sheet of paper into your lab notebook.

**Homework (170 pts total – 20 to 40 pts each)**

Seven homework assignments will be issued during the quarter. Assignments are due during the first 15 minutes of the lecture period. Any assignment received after that time on the due date will receive a maximum of 75% credit. A maximum of only 50% credit will be given for assignments that are one day late. No credit will be given for assignments that are more than one day late. NO exceptions! Unforeseen problems sometimes do occur, so PLAN AHEAD and complete the assignments early.

**Participation in Lecture Discussion (80 pts)**

Participation during lecture discussions is a critical component to this class. The opportunity to participate is what you make of it – the instructor and TA will determine your level of participation throughout the quarter and award up to 40 of the 80 points as deemed appropriate. All student start at zero and must EARN these points during the lectures. Note that the remaining 40 points that each student may earn for Discussion Participation will be based on an evaluation of the team data presentation during Lab Meeting (Week 8).

**Research Project Proposal (150 pts)**

Each student is required to submit a proposal describing the hypothesis(es) that will be tested during the course of conducting the project. Students should relate how the methodologies used in the project overview address particular question(s), predicting results that could be obtained that are either in support of or refuting the stated hypothesis(es). Students should use material presented in lecture, any assigned readings associated with that lecture, or any information acquired from efforts outside of class as a knowledge framework upon which to
build each proposal, which is due in class at 11:00 AM on Tuesday of WEEK 6 (November 6th, 2007). Each proposal should be ~ 4 pages (excluding figures and tables), double-spaced, and include the following: Project Summary (50 pts), Project Description (75 pts) and a Budget with Justification (25 pts).

Final Paper (200 pts total – 50 ‘collaborative’)

The final paper, which is due by 5:00 PM on Friday of Finals Week (December 14th, 2007), will summarize the work you and your Project Team members have performed and completed in the course. Although each individual team member is ultimately required to write his/her own paper and present his/her own analysis of the results, Project Team members may assist each other with the phylogenetic analysis, and should discuss and debate the interpretation of the phylogeny when analyzing and comparing the cultivation-dependent and environmental trees. BOTH trees must be included and discussed in the individual papers of all team members; therefore, the construction and analysis of the trees should be a ‘collaborative’ effort. Each paper should be 7-8 pages (excluding figures, tables, and trees), double-spaced, and include the following: Title Page (5 pts), Summary (15 pts), Introduction (25 pts), Methods/Procedures (15 pts), Data/ Figures/Results (40 pts), Discussion (20 pts), Bibliography (10 pts), DNA sequence submission (20 pts), and Project Team Collaborative Points (50 pts).