I. **Background Information**

Lecturer: Lee Taylor, office WRRB 224, phone 474-6982, email fltt@uaf.edu, office hours 4-6PM Mondays.

Lecture Time: Tues, Thurs 9:45-11:15

Materials: Book chapters and journal articles will be provided on Blackboard and/or in class.

II. **Access to class materials and additional information**

This course will use the “Blackboard” program to make additional information available. Access is restricted to students enrolled in the course. All information associated with the course will be available there, including slides or images used during class, proposal construction guides, example proposals, links to relevant websites, etc.

III. **Instructional Methods:** *Instructor Lectures and Group Discussions.*

IV. **Disabilities Services:** The Instructor will work with the UAF Office of Disabilities Services “to provide reasonable accommodation to students with disabilities” (UAF Faculty Senate Meeting #123, 2004).

V. **Assessment**

<table>
<thead>
<tr>
<th>Activity</th>
<th>% of total grade</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposal/Chapter Submission</td>
<td>25%</td>
<td>March 21</td>
</tr>
<tr>
<td>Proposal/Chapter Resubmission</td>
<td>20%</td>
<td>May 6</td>
</tr>
<tr>
<td>Effort as Reviewer</td>
<td>5%</td>
<td>April 4</td>
</tr>
<tr>
<td>Class Presentations</td>
<td>25%</td>
<td>various</td>
</tr>
<tr>
<td>Discussion Participation</td>
<td>25%</td>
<td>throughout</td>
</tr>
</tbody>
</table>

Grant Proposal or Thesis Introduction:

Given the small size of the class and divergent needs of the students, I am providing two options for the major assignment in the class.

**Option 1.**

Each student will write an NSF-style grant proposal. You will use the NSF Grant Proposal Guide (GPG) for formatting instructions. This will consist of a 1 page Summary and a 5 (rather than 15) page Research Description, exclusive of References Cited. You will “submit” your proposal on March 21st. The proposals will then undergo “review” by a panel composed of both anonymous classmates and “outside” reviewers. You will receive the reviews, which you will then use as a guide to revising your proposal for “resubmission” on May 6th.

In addition to the GPG, real example NSF grants will be provided on blackboard to illustrate various successful approaches to organizing and selling a research project. In some cases, the accompanying reviews will be provided.

There are at least three purposes to this assignment. First, the proposal will fall within the subject of this course – interactions between plants and other organisms – and should hence solidify your understanding of class material and provide an opportunity to explore a subtopic in much greater depth. Second, the assignment will provide an opportunity to hone your writing skills, which are of paramount importance in science. Third, the assignment will increase your understanding of the proposal and review processes, and may provide a springboard for subsequent real proposals.

**Option 2**

Write an introductory chapter for your thesis. This should include a thorough review of the literature, an analysis of the current state of the field, and a clear description of the objectives and rationale of the thesis research. Examples of Thesis Introductions will be provided on blackboard. This option will help you make tangible progress toward completing your
graduate degree! Please note that if your thesis does not involve “plant interactions,” you will need to write a pseudo-
chapter for this course that does deal with plant interactions (Option 1 might be more useful to you, in this case).

This chapter will also be “reviewed” by anonymous classmates and outside volunteers. As with the grant proposal
option, the Thesis Chapter should be revised based on the feedback from the reviews and resubmitted.

Discussion Participation:
Everyone should read the papers BEFORE class, and think about them critically. I provide some suggestions on
approaches to critical reading below. You may be asked any of the critical reading questions about the focal reading
during class.

Class Presentations:
For each class in which we discuss journal articles, TWO students will be in charge of leading the discussion. Here are
some suggestions relating to preparing for a presentation:

1. Split the following up between the two presenters.
2. Go through the major purposes, methods and results of the paper/s.
3. Explain methods, etc. that may not be understood by the whole class. E.g. use blackboard to explain molecular
   methods.
4. Facilitate discussion of strengths and weaknesses of the paper/s.
5. Briefly describe related work since the publication/s, especially papers that offer dramatic new insights.
6. Provide a list of related references for interested persons.

Plagiarism:
Plagiarism is the overt or covert use of other people’s work or ideas without acknowledgement of the source. This
includes using ideas or data from a classmate or colleague without permission and acknowledgement, including
sentences from journal articles (either in their entirety or with minor changes) in your writing without citing the author,
or copying parts of a website into your essay. You cannot use someone’s ideas without citing the originator; you
cannot use someone’s words without quoting the writer. Any deviation from this will be regarded as plagiarism.

Plagiarism and cheating are serious offenses that violate the student code of conduct may result in an “F” in the course
and / or referral to the university disciplinary committee.

A few simple rules to prevent plagiarism:
1. When in doubt about whether you should cite or acknowledge someone, do so.
2. If you are unsure of how to cite someone’s writings or ideas, ask one of the instructors for help. Reference
   librarians are also a good source of information for help with citations.
IV. Schedule of Topics

<table>
<thead>
<tr>
<th>Class</th>
<th>Topic</th>
<th>Readings*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree of Life</td>
<td>Prokaryotes</td>
<td>Brock Ch. 2, 11, 12; Woese; Stiller</td>
</tr>
<tr>
<td></td>
<td>Eukaryotes -&gt; Fungi</td>
<td>Taylor et al.; TBA</td>
</tr>
<tr>
<td>Intro to Symbioses</td>
<td>Mycorrhizae</td>
<td>Smith &amp; Read Chs.; Read</td>
</tr>
<tr>
<td></td>
<td>N-Fixing Symbioses</td>
<td>Brock Ch.; Sprent</td>
</tr>
<tr>
<td></td>
<td>Symbiosis Theory</td>
<td>Bronstein; Thompson; Schwartz</td>
</tr>
</tbody>
</table>

- The reading list is subject to revision through the semester.

History of Life on Earth
Lynn Margulis

Review of Evolutionary Theory and Genetics
Williams – levels of selection

Symbiosis, interaction terms
Jim Trappe
Judith Bronstein

Geographic mosaics
John Thompson

Red-queen hypothesis
Gene-for-gene theory

Cost-benefit/economic analyses
Hoeksema

Partner-choice theory

Cheater theory
Approvechados

Prisoner’s Dilemma and Evolutionary Stable Strategies

Pollination
Nectar robbers
Seed predators (Yucca moth)
Deceptive orchids

Ant plants
Davis lady

Legume nitrogen fixation
Matthew Parker
Simms
Dennison, Nature

Mycorrhizae
Nancy Johnson
Bidartondo

Bever – soil feedbacks

Plant Parasites
Burden, wheat rusts
Suggestions on How to Read the Primary Literature Critically:

Ask yourself these questions as you read and be prepared to answer them if asked in class.

Introduction:
1. How does the study place itself in the context of the overall research field?
2. What were the specific goals of the study?
3. Are the goals/questions addressed in the study important/interesting and, if so, why?

Methods:
1. How did the researchers set out to test their hypotheses or address their questions?
   a. What are the strengths and weaknesses of the specific methods used?
   b. What statistical methods, if any, were used to analyze the data?

Results:
1. What were the outcomes of the experiments/surveys/studies?
2. Were the analyses appropriate for both the questions posed in the introduction and the actual data the team was able to obtain?
3. How did the researchers interpret their data – both raw and post-statistical analysis?
4. Are the interpretations justified by the data?

Discussion:
1. What are the most important findings of the study?
2. Do the findings agree with or contradict related work?
3. What are the broader ramifications of the study?
4. How well do the researchers compare and contrast their results with related work by others?
   a. Do they neglect relevant literature?
   b. Do they correctly interpret or misinterpret previous studies?
   c. Do they over or under-exaggerate the novelty of their study/results?

General:
1. What would you have done differently in carrying out such a study?
2. How does this study change our understandings of this area of biology?
3. What studies do you think should be carried out next, and why?