

Special Topics: Symbiosis, BIOL 4970, 7970, Spring 2008

The goal of this Special Topics course will be to gain an appreciation of the importance of symbiosis in extant organisms, ecological systems, and evolutionary processes. Topics from the molecular aspects of these relationships up to the community level will be considered. Class will meet once a week at a time agreeable to everyone. Students will choose from a list of topics dealing with symbiosis (or develop their own topic) and present a review seminar as well as lead a discussion on the topic during the class meetings. Each student will prepare an in depth literature search and review paper on the major topic chosen for class discussion that will be turned in at the end of the term. The first three class meetings will be lectures by the course instructors. Three other class meetings will be devoted to presentations and/or demonstrations of lab techniques used to study symbiosis.

Format of class seminars and discussion:

1. All students will do a seminar presentation on a symbiosis topic using Powerpoint or Keynote. This seminar will be at least 50 minutes in length and will be followed by a question and discussion session. The speaker will review the literature on the topic, both historical and current, and will discuss research on the symbiosis(es) being considered. Information for this seminar should come from both library research and the web. Demonstrable evidence of library research (i.e. primary literature) must be apparent in the seminar.
2. Question and discussion session – each student will prepare at least 10 questions or ideas concerning each topic discussed and will be ready to add their thoughts to other participants questions and ideas.
3. The student with responsibility for the next seminar will hand out 2 copied review papers to all participants in the class. These must be read before the next class meeting. A list of 4 questions or ideas that students may be asked about at the next meeting will also be handed out. The papers and four questions/ideas will help form the basis for discussion at the following class meeting.
4. Graduate students in the course will select 2 topics for short presentations (20 - 30 minutes). One of these will be presented at each student seminar meeting following the question and discussion period for the main topic seminar.

Grades will be based on:

1. (40%) Quality of presentations on chosen topics. Students will do anonymous peer reviews of each others presentations. Grade will be based both on peer reviews and the instructor's evaluation.
2. (20%) Participation in class discussions – this is an important component, students should come to class having read the introductory papers passed out at the preceding class and should be ready to ask questions and discuss ideas.
3. (40%) The review paper

An abbreviated list of possible topics (other topics are welcome):

Lichen symbioses
Symbiosis and natural selection
Gut symbioses
Cleaner fish
Dinoflagellate (zooxanthella) symbiosis in the sea
Other protistan symbioses
Commensalisms and neutralisms: do they exist?
Mutualisms: are they always beneficial?
Coral bleaching: symbiotic breakdown?
Evolution, symbiosis and the eukaryotic cell
Bacterial symbioses
E. coli – what would we do without them?
Mites – a constant human companion
Pollination symbioses
Aphid farming: mutualism or parasitism?
Light organ symbioses in the marine environment
Morels and oak trees
Modeling mutualisms as biological markets
Evolutionary stages of symbioses
Nutrient cycling in marine symbioses
The role of genetic variation in symbioses
What organismal properties are conducive to symbioses?

You are not limited to these topics, in fact we welcome additional topic ideas from the participants in this course. If there is some other topic that interests you, just discuss it with and get it OKed by one of the course instructors.

Course schedule:

- Week 1 – Organizational meeting to finalize meeting time, topics and course format
- Week 2 – Lecture: History of the concept of symbiosis in biological systems
- Week 3 – Lecture: Symbiosis in ecological systems
- Week 4 – Lecture: Molecular approaches to symbiosis
- Week 5 – First topic presentation, first short topic
- Week 6 – Second topic presentation, second short topic
- Week 7 – Third topic presentation, third short topic
- Week 8 – Lab Techniques 1
- Week 9 – Fourth topic presentation, fourth short topic
- Week 10 – Fifth topic presentation, fifth short topic
- Week 11 – Lab techniques 2
- Week 12 – Spring break
- Week 13 – Sixth Topic presentation, sixth short topic
- Week 14 – Seventh Topic presentation, seventh and eighth short topic
- Week 15 – Lab Techniques 3 (Review papers must be turned in at this meeting)
- Week 16 – Class pot-luck dinner
- Week 17 – Final exams (no final in this course)