

BIOL 508 COEVOLUTION, Spring 2009

Instructor: Dr. Kathy S. Williams
TTH 9:30-11 am LS 134//AH1112 Schedule #00418

Introduction

By examining the concept of "coevolution," this course should help to improve your understanding of interspecific interactions, such as predation, parasitism, competition, pollination, and mimicry. This course will also demonstrate the essential link between ecology and evolution.

Goals of the course include the following.

Students will be able to ...

1. ... identify conceptual differences among interspecific interactions.
 2. ... define how coevolution differs from evolution.
 3. ... explain how commonly coevolutionary interactions may occur.
 4. ... predict situations in which we may find coevolving species.
- (more specific objectives are listed on page 3 of this syllabus)

Prerequisites: Prerequisites for the course are Biology 352 and Biology 354, courses in Genetics, Evolution, and Ecology. You are required to have completed those courses, or equivalents before enrolling in this course. If you have not completed those courses or spoken with me about your equivalent preparation, you should drop this course.

Communication

Contacting Me: I encourage you to meet with me during office hours, or by appointment. It's always best to leave a message or note if you want to meet outside office hours, since I may be doing lab or field work, in the library, or in other meetings.

Office Hours (tentatively set): Wed. 8:30 - 9:30 am PS 151A, inside my lab PS151.

If the lab door is closed, please knock loudly enough so I can hear it from inside my office. Many students work in my lab, so if you stop by when I'm not there, please don't rely on them to pass verbal messages on to me. Just send me an email note. I can meet with you at other times by appointment, just let me know when you want to meet.

E-mail: kwilliams@sunstroke.sdsu.edu

Telephone: 619-594-4358 (Messages may be left there.)

Mailbox: Biology Dept. office, inside glass door, right side. My box is **BELOW** my name.

Contacting you: Assignments will be delivered by Blackboard, and occasionally by email. You are required to have an active, working email account, preferably through the university server, @rohan.sdsu.edu. To get an account simply go to Love Library [LL-200 (SDSU Student Computing Center)] and complete the form for a new account. *You are responsible for making sure your inbox is not filled up and can accept mail and attachments from me. I recommend you use rohan for this class.* You must keep your university records up to date, with your current email address on file; that is the one I will use.

Text/Materials

Text required for course: D. Futuyma & M. Slatkin. *Coevolution*. Sinauer Press. 1983. Reprinted by Aztec Shops; Available at Bookstore (cheaper than the original!). Most chapters of this text are easy to read, and references cited in the chapters are a great addition to your professional library. The last time I looked on Amazon and found *one* used copy for \$147.07.

Additional Readings: The text will be supplemented with current articles from primary journals. You will get these additional readings as pdf files downloaded from the course Blackboard site.

Class Organization

This class will involve student-centered learning, or "active learning." In student-centered learning, students work in groups and individually to explore problems and become active knowledge workers rather than passive knowledge recipients (Harmon S.W. & Hirumi A., 1996). Educators recognize that groups successfully discover for themselves what new information they need to acquire in order to master some topic or solve some problem. I will assign groups of 4-5 students during the first 2 weeks and groups will be permanent for the semester.

The readings are critical to the course. The textbook is an excellent resource and you will be assigned readings for each class. I do not intend to lecture in a traditional format. You will not be expected to memorize what you read. Instead, you will learn to identify major scientific arguments, then come up with your own conclusions and support them. Thus, there will be several correct answers to most questions asked.

A typical class will be to start with a brief (10-15 min.) quiz or writing assignment over the assigned reading (short answers of less than 1/2 page, and sometimes multiple choice, worth about 15 points). You will take the quiz individually and turn it in. Then you might take the test as a group (10-15 min.) with all group members working together and sharing knowledge to answer all questions correctly. We will go over the responses together and discuss any confusing points. If there remain any points of confusion, or if you have questions, I will help you understand those points. Other individual and group activities will be used to help you understand the material also. Obviously, you must complete your reading assignments

prior to classtime and attend each meeting in this course to participate in active learning. These methods have been used for many years in colleges and graduate schools (especially medical and law schools) to enhance learning.

Course Goals

My goal, as an instructor, is to provide a learning environment in which all students participate in a variety of instructional strategies and assessment practices that challenge their higher order thinking and reasoning skills so they can successfully demonstrate the outcomes described below.

- become active and reflective learners
- learn to reason logically and critically to evaluate information
- communicate (orally and in writing) an understanding of and links among biological principles and concepts to peers and others
- gain confidence in your ability to write about and analyze concepts in biology
- develop positive attitudes about the relevance of biology to your life and the ability to apply this knowledge in the resolution of real-world problems
- develop positive interdependence and individual accountability by working cooperatively in class.

Dr. Kathy S. Williams

Tentative Schedule (subject to change with notice)

wk	Date	TH	TOPIC	READINGS
1	22-Jan	TH	Introduction to the course	---
2	27-Jan	TU	Coevolution, initial ideas: Darwin to Ehrlich & Raven	Chap. 1, pp. 1-7 & papers
	29-Jan	TH	Coevolution vs. evolution	Chap. 1, pp. 1-13 & papers
3	3-Feb	TU	Genetic Background - Slatkin	Chap. 2, pp. 14-32; Strickberger
	5-Feb	TH	Genetic Background (cont'd)	(above)
4	10-Feb	TU	Genetic Background (cont'd)	(above)
	12-Feb	TH	Herbivory: Plant defenses - Futuyma	Chap. 10, pp. 207-231
5	17-Feb	TU	Herbivory (cont'd)	papers & Chap. 10
	19-Feb	TH	Herbivory (cont'd)	papers & Chap. 10
6	24-Feb	TU	Herbivory (cont'd)	papers & Chap. 10
	26-Feb	TH	Mid-term exam (due Mar 5)	
7	3-Mar	TU	Phylogenetic Aspects of Coevolution - Mitter & Brooks	Chap. 4, pp. 65-98
	5-Mar	TH	Phylogenetic Aspects of Coevolution (cont'd)	papers
8	10-Mar	TU	Coevolution and Seed Dispersal - Janzen	Chap. 11, pp. 232-262
	12-Mar	TH	Team 1	papers
9	17-Mar	TU	Coevolution and Pollination - Feinsinger	Chap. 13, pp. 282-310
	19-Mar	TH	Team 2	papers
10	24-Mar	TU	Coevolution and Mimicry - Gilbert	Chap. 12, pp. 263-281
	26-Mar	TH	Coevolution and Mimicry - Gilbert	Chap. 12, pp. 263-281
	31-Mar	TU	Spring Break	
	2-Apr	TH	Spring Break	
11	7-Apr	TU	Team 3	papers
	9-Apr	TH	Mid-term exam (if needed)	
12	14-Apr	TU	Coevolution and Competition - Roughgarden	Chap. 17, pp. 383-403
	16-Apr	TH	Team 4	papers
13	21-Apr	TU	Predator-Prey Coevolution - Bakker	Chap. 16, pp. 350-382
	23-Apr	TH	Team 5	papers
14	28-Apr	TU	Parasitic Helminths and their Hosts - Holmes	Chap. 8, pp. 161-185
	30-Apr	TH	Team 6	papers
15	5-May	TU	Coevolution and the Sea	Chap. 14, pp. 311-327
	7-May	TH	Team 7	papers
16	12-May	TU	Putting it all together	Epilogue, pp. 459-464
	19-May	TU	Final (if needed) 1030-1230	

a	Coevolution in Bacteria ... - Levin & Lenski	Chap. 5, pp. 99-127
b	Coevolution and Endosymbiosis - Ehrman	Chap. 6, pp. 128-136
c	Coevolution in Plants & Fungi - Barrett	Chap. 7, pp. 137-159

Meeting Locations- AH 1112 Learning Research Studio

I have reserved the use of AH 1112, the ITS Learning Research Studio, for this course. We will meet there when appropriate. Meeting locations will be announced well in advance.

A central theme of the Learning Research Studio is the development of innovative and effective ways to use technology for instruction. This classroom provides the following resources:

- * an interactive, touch-sensitive whiteboard;
- * 16 tablet and 30 laptop computers, with wireless Internet-connectivity; and
- * tables and chairs that can be rearranged in various configurations to support collaborative work

Those resources are provided to:

- * promote use of educational multimedia;
- * encourage interactive, cooperative learning;
- * use wireless technologies for teaching; and
- * assist with new instructional approaches.

Grading (more details on "Grading" page on Bb)

The majority of your course grade will come from the assignments completed during regular classtimes. Based on your performance during the semester, a final exam may be given. I will inform you of the details of the final well before the assigned final time. All students will be required to prepare and deliver short oral presentations during the course (you will work as teams).

Two-thirds of your grade will come from performance on individual activities, and 1/3 will come from your group activities (tentatively set). At any point during the semester, you can total up the assignment points given and calculate the proportion you've answered correctly. Over the whole course you should have a total of 250-400 points, depending on the final.

What about the group score? All members of the group receive the same score from the group activities. As with the individual scores, at any time you can calculate the proportion your group has answered correctly. At the end of the semester, each individual's group score will be weighted, based on their average "contribution" score, based on peer reviews. Therefore if all group members contribute equally, each member would earn the same group score. However, some members might earn slightly more than the group score, while some might earn slightly less, based on exceptional or less than adequate contributions.

I assure you that if the sum of your individual and group scores total at least 90% of the possible points you'll get an A, at least 80% earns a B, at least 70% earns a C, and at least 60% earns a D. You must earn at least 50% of the highest score earned in the class to pass this course. I may curve the grades slightly more liberally than that grading scheme, but do not count on it. Using this grading method, you should know the points you've earned at any point in the semester and the associated letter grade range.

Academic honesty & academic fraud

[SDSU Center for Student Rights and Responsibilities is responsible for acting on behalf of the University president regarding all aspects of student discipline. <http://www.sa.sdsu.edu/srr/conduct1.html>]

Cheating has seldom been a problem in Biol. 508, and warning you about the consequences may seem unnecessary. Nevertheless, to avoid any possibility of you not recognizing what the consequences are, this is the course policy: If you employ any form of cheating, plagiarism, or other forms of academic dishonesty that are intended to gain unfair academic advantage, you will receive a zero on the exam or assignment. In addition, the event will be reported to campus judicial authorities and may lead additional actions from the University.

Remember, your responses must be your own words. Copying off the internet without citing it as you would a printed article is illegal and professionally inappropriate. I recommend that you look at the sites below to get a clear explanation of plagiarism, cheating, and similar inappropriate conduct. If you have any questions about what constitutes academic dishonesty, please ask.

<http://science.widener.edu/svb/essay/plagiar.html>

<http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>

Student work may be checked using plagiarism detection software, if circumstances indicate the necessity.

Services for SDSU students: These services are among the many that are available for all SDSU students.

SDSU Counseling & Psychological Services http://www.sa.sdsu.edu/cps/cps_home.html

Counseling & Psychological Services offer activities to support the well-being and psychological health of the university community. The CPS center is home to the Center for Well-Being, and offers many groups and workshops, as well as individual appointments with therapists. They offer many resources (some on-line) for issues like anger management, sexual assault, test anxiety, alcohol use, depression, anxiety, building self esteem, improving relaxation & concentration skills, and coping with trauma.

SDSU Student Disability Services <http://www.sa.sdsu.edu/sds/>

"Student Disability Services provides qualified students with disabilities equal access to higher education through academic support services, technology and advocacy in order to promote their retention and graduation."

Why collaborative learning, problem solving, and student centered learning rather than a traditional lecture course?

1. Educational advantages

In student centered learning, students work collaboratively in small groups, tutor one another, and learn to depend on one another rather than depending exclusively on the authority of the teacher. Students learn to construct knowledge as it is constructed in the academic disciplines, and they learn the craft of interdependence.

Many agree that at present there is too much passive learning experience (lectures) and few opportunities for active learning. In the traditional teacher-centered learning classroom the teacher is solely responsible for what the student is expected to learn. The teacher's usual role is to dispense information in lectures, assign readings, and provide demonstrations. The student is a passive recipient.

Active learning is not something that is done for students; it is something that learners do for themselves. In student-centered learning, the student learns to determine what s/he needs to know; the student 'learns to learn.' Groups discover for themselves what new information they need to acquire in order to master some topic or solve some problem. Problem solving is what must be done when the answer to a question or problem can not simply be retrieved from memory. This is the way knowledge is gained in "the real world."

In active learning, students take responsibility for their own learning. This fosters a cooperative rather than competitive learning environment and stimulates intellectual curiosity in students. Faculty in a classroom of active learners can be viewed as facilitators of learning rather than disseminators of knowledge.

2. **This process helps meet the stated goals of California State Univ. system (Spring 1997)**, which listed the following specific abilities expected of CSU graduates:
- Communicate effectively, through a variety of means
 - Read analytically and think critically at a high level
 - Write clearly
 - Acquire substantive in-depth command over one or more fields of study
 - Locate, analyze, evaluate, and synthesize information
 - Integrate knowledge across discipline boundaries
 - Make both qualitative and quantitative assessments
 - Participate effectively in a democratic society
 - Work effectively in group settings with people different from oneself.

The CSU statement also included the following remarks:

"We will assure that our graduates possess a certain breadth and depth of knowledge together with a certain level of skills. CSU will facilitate other techniques of active learning such as collaborative learning, problem solving, and use of interactive technology. We will require that each student be responsible for creating an academic plan, one which will encourage students to take a more active role in their own learning, including self-paced and self-directed study."

3. **These skills also meet the goals of SDSU College of Sciences (Spring 1997)**, which identified the main attributes that any Bachelor's Degree holder should possess:
- Mental maturity and critical thinking
 - Solid background in the fundamental principles of the discipline
 - Sense of self, community, and the environment
 - Ability to communicate
 - Ability to work on a team

The Dean of the College of Sciences stated that "as students progress into their junior year they should learn to accept more responsibility for their own education. Students must have basic technological skills (word processing, spreadsheets, web browsing, library searches, and e-mail). Almost without exception, corporations approach a problem with a team of people bringing different and appropriate skills to the solution. University graduates must have the skills necessary to work successfully on such project teams. Individual competence must be complemented by strong cooperative skills."

PEER REVIEW, Biol.508, Spring 2009

Name _____ Group _____

Please assign scores that reflect how you really feel about the extent to which the other members of your group contributed to your learning and/or your group's performance. This will be your only opportunity to reward the members of your group who actually worked hard on your behalf. If you give everyone pretty much the same score, you will be hurting those who did the most and helping those who did the least.

Instructions: In the space below, please rate each of the **other** members in your group. To complete the review you should:

1. List the name of each of the members of your group in alphabetical order of their last names.
2. Assign an average of 10 points to the other members of your group.
(If your group has 5 people, you will assign 40 points; if 4 people assign 30 points, etc.).
3. Differentiate some in your ratings. You may not assign more than 15 points to a person. You do not have to award all of your points.

Group member	Score
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

Additional Feedback:

In the space below, would you also briefly describe your reasons for your highest and lowest ratings. These comments, but not information about who provided them, will be used to provide feedback to students who would like to receive it.

1. Reasons for your highest rating:

2. Reasons for your lowest rating:

3. If you were to assign points to yourself based on this scale, what do you feel you would deserve? Why?