

**Advanced Plant Biology (Biol 369) Fall 2009**  
Monday/Wednesday 2:00 - 4:15 (lecture & lab), Holt 261

Dr. Chris Ivey, 898-5812  
Office Hours: Tues 1:30-4:30, Friday 10:00-12:00, 306 Holt Hall

Text: Raven et al. 2005. *Biology of Plants*, 7th edition. Freeman.

**Policies and procedures**

All assignments will only be accepted via WebCT unless otherwise noted. Late assignments will be penalized 10% per day, and will not be accepted later than 5 days (including weekends) beyond the due date. There will be no make-up exams or assignments without prior arrangements. Academic dishonesty in any form will be immediately referred to Student Judicial Affairs and students will receive a zero for the assignment. This includes plagiarism, failing to provide proper credit for an idea, copying or borrowing coursework from another student, paraphrasing someone else's idea without acknowledging the source, copying answers from your text, copying phrases or sentences and then changing a word or two etc. Additional information on academic integrity is available in the Code of Students Rights and Responsibilities, which is available from [www.csuchico.edu/sjd](http://www.csuchico.edu/sjd).

CSU, Chico acknowledges each student's unique set of abilities and limitations, and works to provide all students with an enriching educational experience. Accommodations will be made, as possible, in cooperation with Disability Support Services ([www.csuchico.edu/dss](http://www.csuchico.edu/dss), Student Services Center 170, 898-5959), but it is the responsibility of the student to communicate his/her needs.

**Course activities**

**1. Journal.** Students are expected to keep a neatly hand-written journal for the course, which will hold two types of records, paper summaries and research progress. At least one entry per week in each category is required, for which you can receive up to five points for a total possible of 75 (5 points x 15 weeks = 75 points or 15% of the course total). You are responsible for seeing that the instructor checks your notebook each week. If you fail to have your notebook checked at some point during each week you will not receive credit for that week. Deadline for check off is 5 pm Friday, except week 1, which will be 5 pm Monday 31 Aug.

Paper summaries: Each week you are expected to identify and read a peer-reviewed paper covering one of the two main themes from this course: reproductive isolation or thigmonasty. These papers ultimately should be of use in developing your research papers, and may be used in its bibliography. These may NOT include papers assigned for discussions. Summaries will start with a complete citation (no DOIs, urls, etc), and will consist of at least two paragraphs followed by three questions. The first section should summarize the paper **in your own words**. Phrases copied from the abstract or elsewhere in the paper will be considered plagiarism and will be dealt with accordingly (see Policies and Procedures). The second section should identify weaknesses or limitations from the interpretation of the data, important areas where the research could be extended, or ways in which the material is conceptually linked to other ideas from class or ideas in other papers. In this section, I'm looking for some evidence of sincere intellectual engagement with the material presented in the paper – thus, this will require some reflection on your part. Finally, summaries should end with three questions about the paper – these can be on any aspect of the paper, but the best questions are those that extend the scope of the paper or study, were they answered. An example of a paper summary will be provided online.

Research progress: Each week you are expected to record some evidence of progress in your research projects. This may involve reflections, data collected, summaries of conversations, observations, ideas for experiments from papers or books read, etc. You need to have a minimum of a couple paragraphs of thoughtful material each week providing evidence of what you have accomplished. As you begin to develop and execute your projects, this will serve as your lab notebook and repository of data. This also will provide evidence of your perseverance throughout the semester in learning and thinking about reproductive isolation and thigmonasty.

**2. Discussions.** To improve familiarity with the structure and style of scientific writing, we will read and scholarly papers during the course. Before each discussion, you will receive some questions about the content of the paper, the answers to which are due online before class, and they will not be accepted after that time. In addition, students must submit two content-related questions about the papers that are intended to spark discussion.

**3. Term papers.** The class will undertake two intensive mid-semester investigations, to be carried out concurrently, into (a) potential mechanisms of gametic isolation between two closely related species of *Mimulus* and (b) environmental influences on thigmonastic stigma behavior of *Mimulus*. Investigations will be conceived and designed by two-person research teams. Results of experiments will form the basis for two formal scientific manuscripts, which must conform to the style required for submission to the American Journal of Botany. For style requirements, see [www.amjbot.org/misc/ifora.shtml](http://www.amjbot.org/misc/ifora.shtml).

**4. Presentations.** Research teams will present the results of both of their investigations in a formal symposium, scheduled tentatively for 9 November. Presentations should adhere to standard scientific format and be supported by a Powerpoint (or similar) slide show. Teams should remember to document their efforts with photographs throughout the semester!

**5. Group poster.** Each team will choose one of their two investigations to develop into a poster describing the results of their experiment, which will be included in the departmental poster session at the end of spring semester 2010. Poster formatting requirements will be discussed in class.

**6. Exams & quizzes.** Exams will be a combination of short answer, multiple choice, and short essay questions. They will cover material from all class activities, including readings, lectures, and lab. Half of the final exam will be cumulative. Quizzes will be available online Friday afternoons and run through the following Monday. There will be no makeup quizzes or exams without prior arrangements.

**7. Participation and attendance.** Each week students will be evaluated based on punctuality, preparation, enthusiasm, attendance, and participation. Students can earn either 5 or 0 points for the week, all or nothing. To earn 5 points, a student must be present, prepared, and engaged during the entire period for all class meetings.

### Course Objectives

By the end of the course, students should be able to:

- Explain Mayr's Biological Species concept
- Name 3 prezygotic reproductive isolating mechanisms
- Name 3 postzygotic reproductive isolating mechanisms
- Diagram the cellular processes behind thigmonastic or other plant movement (e.g., pulvini)
- Draw a plant root and label five tissues
- Draw a plant stem and label five tissues
- Draw a flower and label ten structures
- Diagram cellular processes involved in pollen tube growth
- Diagram the process of angiosperm fertilization
- Name one advantage and one disadvantage of inbreeding
- Identify five mechanisms that decrease the likelihood of inbreeding in plants
- Conceive and conduct original research as a part of a team
- Compose a formal scientific manuscript, based on original data
- Present research results orally and in a poster suitable for professional scrutiny
- Organize a presentation on a botanical subject of interest to human culture and lead class in instructional exercise

### Grading:

Participation and attendance		75
Journal		75
Discussion questions	5 @ 5 points each	25
Quizzes	6 @ 10 points each	60
Exams	Midterm	25
	Final	50
Research	10 questions	10
	Proposal presentations 2 @ 10	20
	Proposals 2 @ 10	20
	Research presentations 2 @ 25	50
	Papers 2 @ 25	50
	Poster	Draft
	Final	50
<b>Total</b>		<b>535</b>

A	(92%)	C	(72%)
A-	(90%)	C-	(70%)
B+	(87%)	D+	(67%)
B	(82%)	D	(63%)
B-	(80%)	F	(<63%)
C+	(77%)		

**Schedule (subject to change):**

<b>Week</b>	<b>Monday</b>	<b>Wednesday</b>	<b>Readings</b>	<b>Assignments</b>
1 (24 Aug)	-Introduction to course -Greenhouse	Flowers Reproduction Sex expression & mating	p. 235-237 Chap. 19 Paper 1	10 Research Questions Quiz 1
2 (31 Aug)	Experimental design Transplant seedlings Discussion 1	<b>FURLOUGH DAY</b>		Paper 1 questions
3 (7 Sept)	<b>Labor Day, no class</b>	Pollen: pollination	Chap. 20 Paper 2	Quiz 2
4 (14 Sept)	Pollen: post-pollination	Speciation Reproductive isolation Discussion 2	Chap. 11	Paper 2 questions
5 (21 Sept)	<b>FURLOUGH DAY</b>	Reproductive isolation Experiments		Quiz 3
6 (28 Sept)	Nastic movements	EXAM	Chap. 28	
7 (5 Oct)	Introduction to Mimulus Methods workshop Proposal development	Proposal symposium Research plan	Paper 3	Research proposals due
8 (12 Oct)	Research	Research Discussion 3		Quiz 4 Paper 3 questions
9 (19 Oct)	<b>FURLOUGH DAY</b>	Research	Paper 4	
10 (26 Oct)	Research	Research Discussion 4		Quiz 5 Paper 4 questions
11 (2 Nov)	<b>FURLOUGH DAY</b>	Research		Presentation titles due
12 (9 Nov)	Research symposium	<b>Veteran's Day, no class</b>		
13 (16 Nov)	Tissues – roots	Tissues – stems Wood anatomy	Chap 24 & 25 Paper 5	Quiz 6
14 (30 Nov)	Anatomy lab Discussion 5	<b>FURLOUGH DAY</b>	Chap 26	Papers due Poster draft due Paper 5 questions
15 (7 Dec)	Economic botany	Economic botany		Final poster due

**4 September – last day to drop without a COP**

**18 September – last day to drop without a serious & compelling reason, documented**

**9 October – Sean Carroll, Laxson Auditorium, 7:30 pm**

**24 November – 150<sup>th</sup> anniversary of publication of “Origin of Species”**

**18 December (Friday) – Final exam, 12:00-1:50 pm, Holt 261**