

LECTURE SCHEDULE: (T-Th 11:00 - 12:20 live, recorded for asynchronous viewing)

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| Thur. Oct. 1 | Course intro. On being a plant. I. |
| Week 1 | Sections Begin |
| Tue. Oct. 6 | On being a plant. II. Clonal plants |
| Thur. Oct. 8 | Physiological ecology I and II. |
| Week 2 | |
| Tue. Oct. 13 | Plant demography |
| Thur. Oct. 15 | Plant life-histories I. Theory |
| Week 3 | |
| Tue. Oct. 20 | Plant life-histories II. Data |
| Thur. Oct. 22 | Ecological genetics. I and II |
| Week 4 | |
| Tues. Oct. 27 | Floral biology |
| Thur. Oct. 29 | Mating systems I. Sex or no sex. |
| Week 5 | |
| Tue. Nov. 3 | Mating systems II. Self-fertilization vs. outcrossing |
| Thur. Nov. 5 | Mating systems III. Combined vs. separate sexes |
| Week 6 | |
| Tues. Nov. 10 | Mate choice and sexual selection in plants |
| Thur. Nov. 12 | Seed biology, dispersal, and seedling establishment |
| Week 7 | |
| Tues. Nov. 17 | Plant-herbivore interactions I and II |
| Thur. Nov. 19 | Interspecific Competition |
| Week 8 | Sections do not meet |
| Tues. Nov. 24 | Diversity, stability and ecosystem function |
| Thur. Nov. 26 | Thanksgiving Holiday |
| Week 9 | |
| Tues. Dec. 1 | Historical reconstruction in plant evolutionary ecology |
| Thur. Dec. 3 | Plant-fungus interactions |
| Week 10 | |
| Tue. Dec. 8 | Evolution and ecology of agroecosystems |
| Thur. Dec. 10 | Plant conservation/review |
| Wed. Dec. 16 | EXAM |

WEEKLY ASSIGNMENTS AND READINGS

Journal articles in bold (found on the course website) are required reading BEFORE section and may be the subject of (simple) quiz questions. Readings from texts reinforce and extend lecture material and can be used to aid study.

Week 1: On being a plant/ Clonal Plants:

Suggested Text Reading: Silvertown and Charlesworth, Chapter 1 and pp. 290-294 on clonal plants.

You may want to review plant growth and nutrient transport in any introductory biology text.

Journal Article: Karban and Shijori 2009. Self-recognition affects plant communication and defense. Ecology Letters 12: 502-506.

Week 2: Physiological Ecology/Demography:

Assignment: Quiz on lecture material through week one and article by Karban and Shijori. Due by Midnight Tues. Oct. 13

If needed, review plant photosynthetic adaptations (C_3 , C_4 and CAM) in any introductory biology text.

Suggested Text Reading: Silvertown and Charlesworth Chapters 5-5.3 and 6-6.4 for demography.

Journal Article: Franks et al. 2007. Rapid evolution of flowering time by an annual plant in response to climate fluctuation. Proceeding of the National Academy of Sciences USA 104: 1278-1282.

Week 3. Life history/Ecological genetics

Assignment: Quiz on lecture material from week two and journal article by Franks et al. Due Midnight Tues. Oct. 20

Suggested Text Reading: Silvertown and Charlesworth, Chapters 2, 3, and 10.

Review for first mid-term.

Week 4. Floral Biology/Mating systems

Assignment: EXAM on lecture material through week three. Due Midnight Tues. Oct. 27

Suggested Text Reading Howe and Westley. Chapters 6 and 7 (parts of each chapter on pollination)

Journal Article: Anderson, B. and SD Johnson. 2007. The geographical mosaic of coevolution in a plant-pollinator mutualism. Evolution 62: 220-225.

Week 5. Mating Systems.

Assignment: Quiz on lecture material from week four and journal article by Anderson and Johnson. Due Midnight Tues. Nov. 3.

Suggested Text Reading: Silvertown and Charlesworth Chapter 9

Journal Article: Quellar, DC. 1983. Sexual selection in an hermaphroditic plant. Nature 305: 706-707.

Week 6. Mate Choice and Sexual Selection, Seed biology and dispersal.

Assignment: Quiz on lecture material from week five and journal article by Quellar. Due Midnight Tues. Nov. 10.

Suggested Text Reading: Howe and Westley, Chapters 6 and 7 (parts of each chapter on seed dispersal) Chapter 9 pp. 191-198.

Journal Article: Midgley JJ, White JDM, Johnson SD, Bronner GN. 2015. Faecal mimicry by seeds ensures dispersal by dung beetles. Nature Plants 1: DOI: 10.1038/NPLANTS.2015.141

Review for second exam.

Week 7. Plant-herbivore interactions/Competition.

Assignment: EXAM on lecture material weeks 4-6. Due Midnight Tues. Nov. 17

Suggested Text Reading: Howe and Westley, Chapters 3-5. Silvertown and Charlesworth, Chapter 8. (Note: Section 8.2 (pages 117-120) covers standard Lotka-Volterra two-species competition equations. This is covered in detail in Introductory Ecology and you will not be responsible for it here (read: not on exam).

Week 8. Community ecology. **Sections do not meet due to THANKSGIVING!**

Assignment: Plant lists (using the SEEK app) due Midnight Tues. Nov. 24 (but can be turned in any time up to this date).

Week 9. Historical reconstruction.

Assignment: Quiz on lecture material from weeks 7 and 8. Due Midnight Tues. Dec. 3.

Assignment: Powerpoint on Journal Article Due Midnight Tues. Dec. 1 (but can be turned in any time up to this date).

Week10. Agroecology and evolution in agroecosystems.

Assignment: Quiz on lecture material from week 9. Due Midnight Tues. Dec. 10.

Journal Article: Gould, F. 1991. The evolutionary potential of crop pests. American Scientist 79: 496-507.

Finals Week:

Assignment: EXAM on lecture material weeks 7-10. Due 2:30 pm Wed. Dec. 16

COURSE GOALS

1. Student should become familiar with fundamental aspects of plant population biology and ecology from the whole plant to community levels.
2. Student should learn about major interactions between plants and other types of organisms (pollinators, dispersers, herbivores, pathogens).
3. Student should become familiar with reading and interpreting research papers in the field of plant evolutionary ecology
4. Student should gain working knowledge of some of the reasons behind, and tools used, in plant conservation biology.

COURSE ORGANIZATION

Professor: Dr. Joshua Kohn, 1258 Muir Biology, 534-8233, email: jkohn@ucsd.edu. Office hours: Mondays 2-3 or by appointment (just e-mail, **do not hesitate**). **E-mail questions at any time. Dr. Kohn usually responds within 24 hours.**

Grad IA's: Amy Geffre (ageffre@ucsd.edu) and Daniella Fairbank (dfairban@ucsd.edu). Their office hours will be announced the 1st day of class.

1. **Lectures.** **Each student is expected view all lectures.** Lectures will be presented live T-Th 11:00-12:20 and also recorded for asynchronous viewing if needed. Recordings of lectures usually take less than 24hrs to post onto the course website, but delays up to 72hrs can occur. I would greatly appreciate those of you who can view it live and ask questions (through chat). Otherwise I will be talking to myself and the lectures will suffer. Because no text adequately covers all of the topics discussed in this course, viewing of lectures and careful note taking will be essential to your success. Even with pdfs of the powerpoint slides, do not expect to be able to consistently miss lectures and do well. There is no substitute for viewing full lectures to see what is emphasized and to ask questions in real time, if possible.

2. **Sections.** **SECTION MEETINGS START FIRST FULL WEEK (WEEK 1).** Each student is expected to view and participate (if possible) in one, one-hour, section per week. Section meetings have three goals: 1) To reinforce concepts and other material discussed in lecture. 2) To present additional material relevant to lecture topics. 3) To discuss assigned reading, primarily research papers. **Sections will help you prepare for 5pt. quizzes which will be due on Tuesday at midnight the week following your section meeting.** Quizzes will cover lecture material from the previous week as well as any assigned research papers. The purpose of these quizzes is to motivate you to stay abreast of the lecture material and to do the assigned reading of research papers. Quiz questions will be designed to be relatively easy if you have prepared. Questions about research papers will not require deep understanding of statistical or other details of the paper. Just be aware of the basic question being asked, how experiments were designed, and what the major findings were. **The five highest quiz grades will count toward your course score (see below).**

3. **Readings.** There are two texts for this course.

Silvertown, J.W. and D. Charlesworth. 1993. Introduction to Plant Population Biology, 4th edition. John Wiley and Sons Inc. NY.

Howe, H.F. and L.C. Westley. 1988. Ecological Relationships of Plants and Animals. Oxford University Press. NY.

Both of these texts are small and cover a limited number of the topics discussed in this course. Silvertown and Charlesworth will be most useful for lectures on demography, clonal plants, life-history evolution, and competition while Howe and Westley will be used for aspects of the course dealing with plant-pollinator, plant-disperser, and plant-herbivore interactions. Copies of

both texts will appear on reserve in the Geisel library. Readings from these texts are meant to reinforce and augment the lectures. Questions on exams will come from lecture material, so you will not be examined on any material in these two texts that are not covered in lectures.

In addition, research papers from the scientific literature will be assigned some weeks to augment text material. One goal of this course is to introduce students to primary scientific literature (research papers). Journal article readings will form the basis for discussion in section meetings on weeks when papers are assigned. You are expected to have done the week's reading **BEFORE** attending section. Scientific writing is dense and often difficult. I do not expect an in-depth understanding of every detail or statistical analysis. I do expect you to try and understand what the paper is about, how it relates to lecture, and, if experimental, basically what was done. In addition, questions may appear on exams that relate to assigned readings. **THE LIST OF WEEKLY ASSIGNMENTS AND READINGS ABOVE SHOULD BE CONSULTED EACH WEEK.**

4. **Course website.** There will be a course website for BIEB 126 at <https://canvas.ucsd.edu/> On it will appear this course syllabus, .pdf files of powerpoint presentations to assist note-taking, the journal articles for weekly discussion sections, and also lecture notes that briefly outline the lecture and list some of the major sources for them. .pdf files of lecture powerpoint presentations may be revised (adding or subtracting a slide or two) up to two hours before lecture, but are usually complete by the night before. The site will also disseminate practice exams, answer keys to exams, and information on your grades as the quarter progresses. There is a discussion forum on the site but Dr. Kohn does not monitor it. Use this at your own risk as students can occasionally disseminate incorrect information. If you want a question answered promptly, it is usually best to email Dr. Kohn jkohn@ucsd or your IA (see addresses above) directly. Please put BIEB 126 in the subject line. Recordings of lectures will be available on the course website so long as Dr. Kohn remembers to record them (remind him if he doesn't hit the record button).

5. **Grading.** There will three, equally weighted, **exams** each worth 50pts. There will be six short **quizzes** each worth ten points each. The five best quiz scores will count towards your grade. In addition, there are two 25pt assignments (described below). Please consult the list of WEEKLY ASSIGNMENTS AND READINGS for dates of all exams, quizzes and assignments). Students will be graded on the curve based upon their total score. It is expected that approximately 15% of the students will receive A's, 35% B's, 35% C's and the rest D's and F's. Exact grade cut-offs will be determined by Dr. Kohn at the end of the course.

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| To summarize: | Three 50pt exams | 150pts |
| | 5 highest quiz scores, 10pts each | 50pts |
| | 2 25pt assignments | 50pts |
| | TOTAL | 250pts |

REGRADES: If a grading error has been made on your exam, you may submit a **regrade petition** to Dr. Kohn within one week of the return of the exam. *A regrade petition must clearly and concisely state the reason(s) why you think your answer is deserving of additional credit. Regrade requests will not be processed without a written petition. No regrades will be given for exams written in pencil or non-permanent ink.* Students who submit exams for regrading do so with the knowledge that we may (1) regrade the entire exam and your score could go up or down and (2) compare the submitted regrade to photocopies of the original exams.

MISSED EXAMS: *There are no make-up exams and missed exams will normally be considered zeroes.* If you know in advance that you cannot take an exam, you must contact Dr. Kohn and make arrangements. If you do not inform the professor and miss an exam, then you

will be required to provide official documentation of an unavoidable emergency (e.g., serious illness, etc.) Without such documentation, you will receive a zero for that exam. For a missed exam with valid documentation, Dr. Kohn will determine the method of makeup.

Assignments:

There are two assignments for this class that are neither exams or quizzes.

1) **25 points.** Download the app named **SEEK** by iNaturalist. This app allows you to identify (many) plants by viewing them through your phone's camera. I have used it and found it to be pretty accurate at identifying both native and horticultural plants, often when they don't have flowers. At times it will not be able to make an identification all the way to species because closely related plant species may look quite similar. It can also identify many animals, though they are generally harder to get good pictures of. We will supply a spreadsheet template. You are to identify 20 plants to species and find out 1) Their genus, species and common name. 2) The plant family they belong to. 3) Whether they are native to California or not, 4) If not native to California, what continent they come from 5) Whether they are growing naturally or have been planted into landscaping. 6) Where the plant was observed (e.g. UCSD campus, elsewhere in San Diego, California, other US state, other country). These plant list spreadsheets must be returned to your TA by midnight Tues. Nov. 24 but you can compile and turn them in any time before this. If you do not own or have access to a smartphone (and so cannot use SEEK) please contact Dr. Kohn and he will suggest a workaround.

2) **25 points.** Maybe a certain topic or experimental result talked about in lecture appeals to you. Use the electronic library system to find, read, and digest a research paper that cites any paper used in lecture and/or pertains to a topic covered in this class. Then create a two or three slide powerpoint presentation that explains 1) The bibliographic information of the paper (authors, year, title, journal, the paper discussed in lecture that it cited, the topic, and 2) the major finding(s) and conclusions of the paper. You may then present this to your section (first send it to your TA) or your TA might use it in section. You should use one (usually) or two (max) figures from the paper to illustrate the main point. You can cut these out of any .pdf file using the select tool and paste them into your presentation. Papers cited in lecture can be found in the lecture notes downloadable from the course website. Papers assigned as reading for sections are also fair game. One method to find papers that cite a given paper is to go to the Web of Knowledge <http://apps.webofknowledge.com/> and search for the paper or topic cited in lecture or one assigned for reading in section. When you find it, click on the paper and the right hand column will list papers that have cited the paper you looked up. Then find a paper from this list that is interesting to you and report on it. You could also use Google scholar <https://scholar.google.com/> to search for papers on a given topic.

CHEATING: Students are expected to do their own work, as outlined in the UCSD Policy on Academic Integrity downloadable here: <http://senate.ucsd.edu/Operating-Procedures/Senate-Manual/Appendices/2>). Cheating will not be tolerated, and we will fail any student caught engaging in academic dishonesty. **All exams will be open book and open notes** and will be timed. Any student caught cheating on any exam, quiz, or assignment will receive a failing grade for the course. He or she may also be suspended from UCSD.