

BIEB 150

Evolution

Winter Quarter 2022

Course changes due to Covid (Winter 2022)

- 1) All Lectures will be remote and lecture video recordings will be provided through Canvas. Lectures are labeled alphabetically A-R.
- 2) Synchronous Introduction to Lectures will be presented and recorded. Announcements concerning the class, exams, reviews, and pertinent information will be made during these Introductions. Please check for video recordings of such introductions through Canvas if you missed the synchronous events.
- 3) All tests and the final exam will be remote and synchronous.
- 4) Please read below parts of the syllabus for answers to other questions not affected by Covid (such as how to study for this class). A recommended study approach is to treat each lecture as a story. Focus on understanding the storyline, and how the facts relate to or support the story, as opposed to just memorizing the facts.
- 5) All Sections will be remote. Please use your assigned IA and section for discussions and review of lecture materials.
- 6) Text book is recommended for extra reading but it is not mandatory.
- 7) Tests and final exam are based solely on lecture materials (see below for format).
- 8) Professor Lin Chao's synchronous office hours will change from week to week to allow attendance and participation of students with conflicts to one time. Please check BIEB150 Canvas for links to Zoom links.
- 9) Please use Professor/Lecturer email (LChao@ucsd.edu) directly instead of Canvas email whenever possible. Please keep short and make clear your question.
- 10) We recognize that Covid has made the times very trying for students wanting to attend classes acquire an education. We are willing to listen and take into consideration your thoughts and requests, but please also recognize that our response and accommodations are limited by the regulations of the university and the requirements of delivering instruction to many individual students.

Examination format for 2022:

There will be 4 tests (denoted Test 1, 2, 3, 4) and a Final Exam, for a total of 5 units. All 5 units are each worth 10 points, will be conducted synchronously at different dates, and have a time limit of 18 minutes. A copy of a previous midterm and answer key will be provided on Canvas as a guide to the examination questions to be used. Note that the previous midterm was a 5 page exam with a time limit of 80 minutes. Tests 1-4 and the final exam will be designed to correspond to a single page of the previous midterm.

Given the scores from your 5 examination units, you will be able to drop the unit for which you have the lowest score and your final grade is based on a total of 40 points. Tests 1-4 are based

on different blocks of lectures (see Lecture Schedule 2022 below). For example, Test 1 is based on lectures A-F. Test 2 is based on lectures G-J. The Final Exam is cumulative and covers all of the lectures (A-R). If you miss a test or the final exam, that one missed unit will be treated as your unit with the lowest score and not used for your final grade.

Extra Credit for signing into the Honor System for remote examinations in 2022.

Cheating (the use of notes, books, cell phones, other individuals and sources of information when not authorized) during the completion of remote examinations in classes erodes the value of grades and education. Professor Lin Chao prefers a system with no grades (learning is the reward) but realizes the impracticality of the approach. UCSD has requested that instructors curb cheating. Professor Lin Chao considered using video monitoring, or other means, to prevent cheating, but he wishes to work with trust and asks that, by taking the exams in this class, you agree to abide by an Honor Code and not use unauthorized materials. **The only material deemed authorized in BIEB150 is the information and knowledge that is in the mind of the individual taking the examination over the duration of the examination.** All students will be asked to officially agree and sign in as to not use unauthorized materials during remote BIEB150 examinations. If you agree to sign in, you will be provided a 5% extra credit towards your final grade. Information will follow.

Final Lecture, test, and final exam schedule for 2022.

Lecture Schedule		Winter	2022	BIEB 150 - Evolution		Suggested Reading: Chapters in Freeman and Herron
Date	Week	Lecture	Topic			
4-Jan	1	A	A case for evolution: The Meaning of Life			17
6-Jan	1	B	Genetic Variation and Mutations			5
11-Jan	2	C	Modeling a population without evolution: Hardy-Weinberg			6
13-Jan	2	D	Selection as an agent of evolution: Directional Selection			6
18-Jan	3	E	Selection for Heterozygote			6
20-Jan	3	F	Selection against Heterozygote			6
25-Jan	4		Review for Test 1 (Lectures A-F)			
27-Jan	4	G	No lecture TEST 1 (Synchronous; 3:30PM; Canvas; Lectures A-F; 18 minutes)			
1-Feb	5	H	Lecture: Mutation as an agent of evolution Genetic Drift			6 7
3-Feb	5	I	Migration and Meiotic Drive			7
8-Feb	6	J	Frequency Dependent Selection			6
10-Feb	6	K	Evolution of Sex and its Consequences			8
15-Feb	7	L	TEST 2 (Synchronous; 3:30PM; Canvas; Lectures G-J; 18 minutes)			
17-Feb	7	M	Lecture: Evolution of Genomic Imprinting and Sexual Conflicts Evolution of Mating Systems			11
22-Feb	8	N	Lecture: Evolution of Polyandry in Acorn woodpeckers: A case study of local interest.			11
24-Feb	8	O	Game Theory			12
1-Mar	9	P	TEST 3 (Synchronous; 3:30PM; Canvas; Lectures K-N; 18 minutes)			
3-Mar	9	Q	Lecture: Evolution of Senescence: a case study of life history tradeoffs Competition and Diversification			13
8-Mar	10	R	Predators and Virulence			14
10-Mar	10		TEST 4 (Synchronous; 3:30PM; Canvas; Lectures O-R; 18 minutes)			
			No lecture after test.			
15-Mar			Final Exam (Synchronous; 3:00PM; Canvas; All Lectures A-R; 18 minutes)			

Lecturer/Professor: Lin Chao

Professor Office Hrs: To be announced and may change from week to week to allow attendance and participation by students having scheduling conflicts with particular times. Please follow planned office hours on BIEB150 Canvas site. Office hours are synchronous and will not be recorded to encourage participation of individual students. If students require more help on lecture materials, IA's and sections can provide additional assistance.

Instructional Assistants (IA's):

To be announced.

NOTE: The below text assumes in person instruction and has not been modified. See above for changes due to COVID for remote instruction.

Lectures: Tuesday/Thursday 3:30PM – 4:50PM, CENTR 101

Sections: No Sections the first week of lecture. Sections start the second week. Check the Schedule of Classes for section times and meetings rooms. Please follow additional announcements in lecture. Sections are supervised by the Instructional Assistants. Attendance of sections is highly recommended, but not mandatory. You can attend any scheduled section. The goal of the sections is to provide a chance for students to discuss, review and clarify material covered during the lectures. The attendance of sections is not a replacement for attending lectures.

Midterm: To be administered in the same room as lectures, unless otherwise announced. See attached Lecture Schedule below for date and time.

Final Exam: NOTE: Final exam is only 1 ½ hours (90 minutes), although the Schedule of Classes reserved a much longer time slot. To be administered in the same room as lectures, unless otherwise announced. See attached Lecture Schedule below for date and time.

Recommended Text: *Evolutionary Analysis*, 4th Edition, by Scott Freeman and Jon C. Herron. Purves, Pearson Education, Inc., 2007. Recommended for additional reading, but not required.

COURSE GOALS

BIEB 150 offers an introduction to evolution. In this class, the process of evolution is taken from the perspective of a population. In biology, we can study how molecules are assembled to produce cells. Although some organisms are single-celled, we can also study how cells are in turn assembled to create more complex organisms. If we go one level higher, we find that organisms exist in populations. The goal of this course is to understand how interactions at the population level can help us understand the evolution of organisms.

This course is more theoretical and mathematical than most courses in the biological sciences. The objective is to develop a framework to understand and think about the process of evolution, instead of providing a large body of facts to substantiate evolution. Algebra and genetics are used extensively, so you will be expected to be comfortable with both.

PREREQUISITES AND REQUIREMENTS

BILD 1 and 3 are prerequisites for this course. Although I try to review background material whenever necessary, materials familiar to most students cannot be reviewed in detail. If you have difficulties recalling some of the basic information, I suggest that you review it by going over an appropriate introductory text book. If you need a refresher or review, please take it as early as possible and not after you have fallen behind.

Although math classes are not a prerequisite for BIEB 150, math and algebra are used extensively in the course. As stated earlier, you will be expected to be comfortable with math, especially algebra.

ADVICE

Because the lectures in this course build on material from previous lectures, you will be seriously hurt by missing lectures. Reading the text book helps, but the text is meant to supplement and not replace the lectures. Nothing really replaces attending lectures and taking your own lecture notes. Learning to listen to a lecture and then recording your own notes, by your own hands, is an invaluable skill. Take extensive and complete notes. Recording only an outline of the lecture is not sufficient. Record everything that is stated or presented on the chalk board. You will find that you will retain much more information if you force yourself to listen and then translate the information into your own notes. Learning by listening and taking notes is possibly the single most important skill that you can acquire from four years of college education. Most information you learn from your classes will become outdated. Listening and taking notes will never become outdated, despite whatever new communication technologies might arise, and they will allow you to continue to learn.

An additional and important reason to attend lectures is that all materials presented and discussed during lecture times will be covered by the midterm and final exam. This includes answers and discussions generated by questions asked by students in the class.

If you attend lectures and take notes, the next secret to succeeding in this course is to go over your notes the same day as the lecture. Rereading your notes the same day takes advantage of the fact that the material is still fresh in your mind. You will find that you can recall much more information (that same day) than you actually recorded in your notes during class. If you recall additional information, write it down and add it to your notes. If you have questions, have them clarified immediately with your IA or instructor.

If you miss some lectures, you can find out what happened in class and catch up by talking with your IA or instructor, listening to PodCasts of the lectures, or obtaining lecture notes from the UCSD Bookstore. Please note that the UCSD Bookstore lecture notes are printed before the lectures are given. Although the lectures are not changed by much from year to year, new topics and unforeseen discussions, which can be used for testing in the midterm and final (see above), will be introduced by student questions and requests, new scientific developments, or current public events. Such additions will not be in the lecture notes. Thus, the best way to make up for a missed lecture is to use the lecture notes, your IA, and the PodCast (which will contain the additions) to reconstruct the missed lectures.

This is not a very difficult course. The amount of material presented is not overwhelming. I will make an effort to adjust the lectures to your pace. However, because the lectures build on each other, you must put a constant and steady amount of effort into the lectures. If you fall behind, the interaction between the different lectures will make it difficult for you to recover and obtain a good grade. If you keep pace, this course should become a rewarding learning experience for all of us.

EXAMS, GRADING, AND SAMPLE EXAMS

The final grade for the course is based on your score on the midterm exam and the final exam. The two exams are weighed equally, i.e., they count each for 50% of the final grade. The average grade in my past classes has been somewhere between B and C. Before your midterm, a copy of last's years midterm and answer key will be provided to help you study and prepare for the test.

CHEATING

Because of problems in previous years, two mechanisms will be implemented to control cheating. First, all exams returned to students will be photocopied (see Regrades). Second, attendance, presence, and identify of students in class during mid-term and final exams will be recorded photographically. If any students object to being photographed, they must present their objections to the instructor during the first week of classes so that a resolution may be achieved. If students fail to raise objections during the first week, no accommodations will be made and photographs will be taken. Documented cheating will result a failing grade for the course and report to the UCSD Office of Academic Integrity.

MAKE-UPS AND REGRADES

- 1) A valid excuse for missing an exam is a medical or family reason. Appropriate documentation (for example, letter from doctor) is required. Extraordinary circumstances will be considered on a case by case basis by the instructor. Make-ups for exams will be given only with a valid excuse.

- 2) A make-up exam will be given at a later time to be arranged between the student and instructor. The format of the make-up exam (written, oral, essay, multiple choice, etc.) will be decided by the instructor. If you miss an exam without a valid reason, you will receive no points for that exam.
- 3) Regrades can be requested only if there are errors in either the addition of points or the reading of your answers. If a regrade request is made, the entire exam will be regraded. If regrade changes are in your favor your score will be increased. If regrade changes are against you, your score will be lowered. **WARNING:** Because of previous problems, all exams will be photocopied before being returned to students. Do not modify your exam after it is graded when asking for a regrade. Regrade exams found to be modified will be sent to the UCSD's Office of Academic Integrity.
- 4) An answer key will be provided to you after your midterm is graded and returned. Please use the answer key to evaluate if you have been graded incorrectly. However, bear in mind that what matters in grading is what you knew and recorded at the time you took the exam and not what you know later or after the answer key is provided. Graders can only give you credit for what was stated on the proper areas of the exam sheets.
- 5) Requests for regrading of exams must be made in writing within one week after exam is returned and/or answer key is posted. Please explain concisely what errors were done. All additional communications on regrade between the instructor and student will be conducted by email. The instructor will not meet one on one with students to discuss grades and regrades.
- 6) An answer key will not be provided for the final exam. Additionally your final exam will not be returned and it will be kept on file as a record.