

BIEB 150

Evolution

Winter Quarter 2024

Changes and notes for Quarter 2024.

- 1) All lectures have been recorded (videos) and are available on Canvas. You are assigned the task of watching the entire recording before attending the two *in-person* meetings scheduled per week. Exams/tests/quizzes in the class will be based on all of the materials covered by the recorded lectures. All *in-person* class meetings are held in York 2622 (see below for time and date). All exams/tests/quizzes are remote and synchronous via Canvas.
- 2) It is requested that if you have COVID or FLU symptoms/condition do not attend the *in-person* meetings until you are clear. Transmission of either conditions to the class and instructor is a serious health problem. If students wish to talk with the instructor after the *in-person* meeting, they are asked to not crowd the area or consider emails.
- 3) The twice a week *in-person* meetings will not be video-recorded, but the audio will be recorded as Podcasts. A meeting will be divided into two halves. During the first half the instructor will provide a summary (about 40 min) of the video/lecture assigned for the meeting. The presentation of the summary assumes that students have watched the assigned video. The summary is abbreviated and is shorter than the video. However, all details in the videos will be covered by exams/tests/quizzes, even if the details were not discussed by the summary. Thus, attending a summary is not a replacement for watching the corresponding lecture video. Students are encouraged to interrupt and ask questions during the summary. During the second half of the class meeting, the instructor will take questions on any previously assigned video/lecture. The instructor will not provide summaries for previous videos.
- 4) Please see ADVICE (to do well in this class) below. It is highly encouraged that you take notes and draw out diagrams/figures when watching the videos and summaries. Because the videos and summaries are presented to you at different times/place, consider how you will integrate and keep the two together (an ink pen and a paper notebook?). 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) There is only one Section/Discussion per week for this class. The Section meets once a week starting the **second** week of classes. The Section provides additional discussion and review of class material, but there are no exams/tests/quizzes during the Section. Attendance of sections is highly recommended, but not mandatory. The attendance of sections is not a replacement for attending lectures. The Section will be remote (Zoom), synchronous and recorded. See the Canvas for this class for Zoom links, meeting times (also on Schedule of Classes), and recorded videos.
- 6) To obtain enrolled status in the class, you must take the Extra Credit Quiz (see below) before the end of the second week of class.
- 7) Text book is recommended for extra reading but it is not mandatory.

- 8) If you would like to contact the Professor/Instructor please use the email (LChao@ucsd.edu) directly instead of Canvas email. Please keep short and make clear your question.
- 9) All tests and the final exam will be remote, synchronous, and timed. See below for format and grading.

Examination format and grading for 2024:

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 remote and synchronously at different dates, and have a time limit of 18 minutes. Tests 1-4 are based on different blocks of lectures (see Lecture Schedule 2024 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).

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.

If you miss a test or the final exam, the missed unit will be treated as your unit with the lowest score and not used for your final grade.

A previous midterm and answer key will be provided on Canvas as a guide to the examination questions to be used. It may be more useful to try to take the midterm first without looking at the answer key. 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.

Extra Credit Quiz for signing into the Honor System for remote examinations in 2024.

Cheating (the use of unauthorized notes, books, other individuals and sources of information) during the completion of remote examinations in classes erodes the value of grades and education. Your instructor prefers a system with no grades (learning is the reward) but realizes the impracticality of the approach. UCSD has requested that instructors curb cheating. Your instructor considered using video monitoring, or other means, to prevent cheating, but he would rather teach than police. Thus, your instructor 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. You must take the Extra Credit Quiz before the end of the ~~Friday~~ **Wednesday** of the second week. The quiz is available on Canvas starting the first week. You must take this quiz if you wish to certify that you are attending this class.

Time Table for Quarter

Lecture Schedule	Winter	2024	BIEB 150 - Evolution	
Date	Week	Lecture Video	Topic	Suggested Reading: Chapters in Freeman and Herron
9-Jan	1	A	Assigned video: A case for evolution: The Meaning of Life <i>In-person</i> Course Introduction and Summary of Video A Extra Credit Quiz available to be taken. NO Sections this week.	17
11-Jan	1	B	Assigned video: Genetic Variation and Mutations <i>In-person</i> summary of Video B	5
16-Jan	2	C	Assigned video: Modeling a population without evolution: Hardy-Weinberg <i>In-person</i> summary of Video C Sections start this week. Extra Credit Quiz available to end of Friday Wednesday of this week (number 2).	6
18-Jan	2	D	Assigned video: Selection as an agent of evolution: Directional Selection <i>In-person</i> summary of Video D	6
23-Jan	3	E	Assigned video: Selection for Heterozygote <i>In-person</i> summary of Video E	6
25-Jan	3	F	Assigned video: Selection against Heterozygote <i>In-person</i> summary of Video F	6
30-Jan	4		TEST 1 (Remote and Synchronous; 3:30PM; Canvas; Lectures A-F; 18 minutes) No <i>In-person</i> summary or class meeting No assigned video	
1-Feb	4	G	Assigned video: Mutation as an agent of evolution <i>In-person</i> summary of Video G	6
6-Feb	5	H	Assigned video: Genetic Drift <i>In-person</i> summary of Video H	7
8-Feb	5	I	Assigned video: Migration and Meiotic Drive <i>In-person</i> summary of Video I	7
13-Feb	6	J	Assigned video: Frequency Dependent Selection <i>In-person</i> summary of Video J	6
15-Feb	6	K	Assigned video: Evolution of Sex and its Consequences <i>In-person</i> summary of Video K	8
20-Feb	7	L	TEST 2 (Remote and Synchronous; 3:30PM; Canvas; Lectures G-J; 18 minutes) No <i>In-person</i> class meeting.	

			Assigned video: Evolution of Genomic Imprinting and Sexual Conflicts Summary/discussion of Video L done at next <i>in-person</i> meeting.	
22-Feb	7	M	Assigned video: Evolution of Mating Systems <i>In-person</i> class meeting: Summaries for both videos L and M	11
27-Feb	8	N	Assigned video: Evolution of Polyandry in Acorn woodpeckers: A case study of local interest. <i>In-person</i> summary of Video N	11
29-Feb	8	O	Assigned video: Game Theory <i>In-person</i> summary of Video O	12
5-Mar	9	P	TEST 3 (Synchronous; 3:30PM; Canvas; Lectures K-N; 18 minutes) No <i>In-person</i> class meeting. Assigned video: Evolution of Senescence: a case study of life history tradeoffs Summary/discussion of Video P done at next <i>in-person</i> meeting.	13
7-Mar	9	Q	Assigned video: Competition and Diversification <i>In-person</i> class meeting: Summaries for both videos P and Q	16,18
12-Mar	10	R	Assigned video: Predators and Virulence <i>In-person</i> class meeting: Summaries for video R	14
14-Mar	10		TEST 4 (Remote and Synchronous; 3:30PM; Canvas; Lectures O-R; 18 minutes) No <i>In-person</i> summary or class meeting No assigned video	
19-Mar			Final Exam (Remote and Synchronous; 3:00PM; Canvas; All Lectures A-R; 18 minutes)	Final exam has same weight and length as previous Tests

Lecturer/Professor: Lin Chao. For quicker response, please use LChao@ucsd.edu instead of Canvas email and write a clear simple subject line.

Lectures: Tuesday/Thursday 3:30PM – 4:50PM, YORK 2622

Sections: Wednesday 5:00-5:50 PM. No Sections the first week of lecture. Sections start the second week. Remote, synchronous, and recorded. Please follow additional announcements in lecture and Canvas.

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.

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.

Answer Key and Regrades.

- 1) 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.
- 2) Requests for regrading of exams must be made in writing (email professor with clear subject line) 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.
- 3) 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.