

BIEB 150

Evolution

Winter Quarter 2021

COVID-19. The following changes have been made for BIEB150 Winter 2021 because of covid-19, and they supersede and replace instructions that are listed below. All activities for Bieb150 Winter 2021 will be taught and conducted remotely through Canvas/Zoom. Lectures, Sections, exams (two midterms and one final) will be synchronous. Extra time at the end of lectures will be used for chat. Lectures will be recorded and made available afterwards. Sections will not be recorded. The number of midterms for 2021 was increased to two. If you cannot take a test because of time zone conflicts, you need to notify Prof. Chao during the first two weeks of winter quarter and an alternative will be considered. Students will be able to drop their lowest exam score and the final grade is the average of the two best scores from the two midterms and final exam. The midterms and exam are comprehensive but with emphasis on the more recent lecture materials. Allotted time for the first exam will be more to allow students to become familiar with the testing format. If someone misses one test (a midterm or the final exam), the single missed test will be counted as their lowest grade and dropped from the final grade. Regrading policy will be changed if short answers (T or F; multiple choice, etc.) become the testing format.

Instructor: Lin Chao

Office Hrs: The instructor will always be available after lectures to answer questions with ZOOM Chat. However, if students require additional help on lecture materials, the instructor requests that students first try to address their questions to the Instructional Assistants's during section meetings. Because of the size of the class, the instructor cannot meet on a regular basis with individual students. If problems and questions cannot be satisfactorily addressed during section meetings, students are of course welcome to approach the instructor for clarification. If students have general questions or issues (topics not covered by present lectures, suggestions of possible lecture topics, ways to improve the course, career choices in biology, etc.) they are also welcome to approach the instructor. Phone: 858 822 2740; Email: LChao@ucsd.edu; office: Muir 2213.

Instructional Assistants (IA's):

To be announced.

Lectures: Tuesday/Thursday 8:00 AM – 9:20 AM Remote Class (RCLAS)

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.

Exams: Two midterms and one final remotely via Canvas. Format (short answer, True or False, or multiple choice to be determined).

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 the Zoom recorded lectures, and studying the handouts with lecture figures.

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 AND FINAL GRADE

The final grade for the course is based on your score on the two midterms and the final exam. You will be able to drop the lowest grade of the three exams. Your final letter grade is based on the average of your two higher exam scores. The grades are curved and the average grade in my past classes has been somewhere between B- and C+.

CHEATING

All students will be asked to abide by an honor system to NOT seek unauthorized help in completing the exams. The exclusion of cheating is requested not so much as to impose fairness, but more to encourage studying and learning, two activities which will be of much higher value in life than a GPA.

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.
- 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. If you wish to see your final exam, appointment times will be made available the following instruction Quarter.

Lecture Schedule
Winter 2021

BIEB 150 - Evolution

Date	Handout Lecture Figures Code	Topic	Suggested Reading: Chapters in Freeman and Herron
5-Jan	A	A case for evolution: The Meaning of Life	17
7-Jan	B	Genetic Variation and Mutations	5
12-Jan	C	Modeling a population without evolution: Hardy-Weinberg	6
14-Jan	D	Selection as an agent of evolution: Directional Selection	6
19-Jan	E	Selection for Heterozygote	6
21-Jan	F	Selection against Heterozygote	6
26-Jan		Midterm 1	
28-Jan	G	Mutations as agent of evolution	6
2-Feb	H	Genetic Drift.	7
4-Feb	I	Migration and Meiotic Drive.	7
9-Feb	J	Frequency Dependent Selection	6
11-Feb	K	Evolution of Sex and its Consequences	8
16-Feb	L	Evolution of Genomic Imprinting and Sexual Conflicts	
18-Feb		Midterm 2	
23-Feb	M	Evolution of Mating Systems	11
25-Feb	N	Evolution of Polyandry in Acorn woodpeckers: A case study of local interest.	11
2-Mar	O	Game Theory	12
4-Mar	P	Evolution of Senescence: a case study of life history tradeoffs	13
9-Mar	Q	Competition and Diversification	16,18
11-Mar	R	Predators and Virulence	14
18-Mar		Final Exam – 8:00AM – 10:59AM	NOTE TIME CHANGE