

THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
Department of Biological Sciences

Course #: BIOL 1107 CRN#28509
Course Title: Evolutionary Genetics
Credit Hrs: 1
Term: Spring 2016
Course Meetings & Location: Biology B108, Mondays & Wednesdays 9–11:50 AM
Prerequisite Courses: Instructor Approval
Instructor: Eli Greenbaum, Ph.D.
Office Location: Biology 301 (between Classroom & Biosciences Buildings)
Contact Info: Phone # 747-5553; Fax # 747-5808
E-mail address: egreenbaum2@utep.edu
NOTE: **please do NOT email me on Blackboard**
Emergency Contact: (Cell) 785-393-3583 *emergencies only please*
Office Hrs: Tuesdays 1:00-3:00, Wednesdays 3-4:30 PM; email for other appointment times
Textbook(s), Materials: Required: Hall, B. G. 2011. *Phylogenetic Trees Made Easy: A How To Manual, Fourth Edition*. Sinauer Associates, Sunderland, MA, 255 pp. (Available from Amazon for \$60 new)

Student Lab Notebook, available from Amazon for \$16 at:
http://www.amazon.com/gp/product/1930882742?ref=cm_sw_r_of_her_awd_WzbNwbQS59RNV
Lab Coat: available online and the UTEP Bookstore

- Course Objectives
(Learning Outcomes):
- (1) basic concepts of genetics, including the molecular structure of DNA, the processes of transcription and translation, gene structure and function, polymerase chain reaction, and genomics
 - (2) basic concepts of evolution, including differential survival due to natural selection, heritable variation resulting from mutation, genetic changes in populations over time, modes of speciation
 - (3) phylogenetic trees, including basic models of molecular evolution, optimality criteria (i.e., parsimony, likelihood, Bayesian inference), and bootstrap/posterior probability support values
 - (4) systematics, including cryptic species, taxonomic priority and nomenclature rules, and examples of taxonomic revisions based on phylogenetic trees from the primary literature
 - (5) conservation biology, including the biodiversity crisis, global amphibian declines, deforestation, human population growth, global climate change, and threat assessment criteria from IUCN
 - (6) laboratory techniques for DNA isolation, cold-vac concentration of samples with low DNA yields, PCR, DNA purification, and observation of DNA sequencing in the BBRC Genomic Core facility
 - (7) analysis of Sanger DNA datasets with the online databases GenBank and BLAST, and computer programs Seqman, MEGALIGN, RAXML, and MrBayes

Course Activities/Assignments: Students will be expected to give two 15 minute Powerpoint presentations related to: (1) the genus of amphibian or reptile they are working on for their semester-long project (midway through semester); and (2) an analysis of a phylogenetic tree, which will be based on their cumulative laboratory work over the course of the semester (at end of semester). Students will be expected to keep an organized laboratory notebook during laboratory activities to ensure that their methods and data are documented well. Contamination of samples must be avoided. Time constraints might not allow for all scheduled topics to be covered during classtime, and in these cases, students are still responsible for material that is posted in Powerpoints on Blackboard. Some topics may not be covered at all.

Assessment of Course Objectives: Students will be assessed on the course objectives from three exams, two Powerpoint presentations (a rubric for grading will be provided), organization and clarity of the lab notebook, effectiveness of laboratory procedures (i.e., valid results with no contamination), and attendance/punctuality.

Grading Policy: Each exam is worth 15% of the final grade and will include multiple choice questions. Exams will: (1) include two or three bonus questions such that it will be possible to receive a grade of 103%; (2) not be cumulative; and (3) not be curved. Failure to bring an undamaged, unfolded green SCANTRON to class on the day of exams will result in a penalty of 5 points to the exam grade. The two Powerpoint presentations will be worth 15% of the final grade each. Ten percent of the final grade will be determined from laboratory notebook organization and clarity. The final fifteen percent will be determined from validity of laboratory results (i.e., lack of contamination) and class attendance/punctuality. Final grades for the course will be as follows: 90–103: A; 80–89: B; 70–79: C; 60–69: D; < 60: F. **Please note that I do not provide grades of any kind via email OR phone; students must come to office hours to receive grades if they are not present to get them in class.**

Make-up Policy: Makeup exams will be offered to students who miss a scheduled exam because of illness, death in the family or university-sponsored activity, **but written documentation must be provided within 2 weeks of the missed exam.** Makeup exams will not conform to the scheduled exam format, and often consist of several essays worth 10–25 points each.

Extra Credit: Note that with the exception of bonus questions on exams, no extra credit will be given for any assignment at any time during the entire duration of this course. Requests for extra credit assignments will be denied—no exceptions.

Attendance Policy: **Attendance and punctuality are a significant portion of your grade in this course.** Valid excuses for tardiness/missing class include illness, vehicle breakdown, death in the family, or university-sponsored activity, but **all valid excuses must be accompanied by written documentation** to receive credit. Students who miss group problems or exams without written documentation will receive a grade of zero. I will monitor attendance/punctuality on a regular basis throughout the semester. Depending on the laboratory assignment, some classes may end early.

Assigned Videos: Occasionally I might assign videos for you to watch from websites including CBS News, BBC News, Youtube, New York Times and other sites with stories relevant to class. If videos don't load for you on the first attempt, it is the student's responsibility to try different web browsers to view the videos. I will monitor these websites prior to class, but if for any reason the website is not working, it is the student's responsibility to bring this to my attention at least 2 days before a given exam so that I can omit any questions that are related to these videos.

Honors Credit: Honors Credit is not available for this course.

Academic Integrity Policy: Because of the opportunity for cheating, bathroom visits during exams are not permitted; students who must leave during the exam for any reason will have their exams graded whether completed or not. **Sharing of calculators or use of calculator features of cell phones during exams/group problems will not be permitted.** The UTEP policy on academic honesty can be found at: <http://academics.utep.edu/Default.aspx?tabid=23785>. All students will be expected to adhere to this policy.

Civility Statement: I expect all students to be actively engaged in taking notes and class activities during the brief time we meet each week. This means that students should not: (1) converse with classmates during lectures; (2) use cell phones during class (including texting); (3) use laptop computers for any purpose other than note taking; or (4) otherwise disrupt your fellow students from learning and active participation.

- Disability Statement:** If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass. Requested accommodations must be made 5 working days before an examination. All students requesting disability accommodations must request a meeting with me in the first 2 weeks of classes.
- Military Statement:** If you are a military student with the potential of being called to military service and/or training during the course of the semester, please contact me within the first two weeks of class to arrange in advance for makeup exams, etc.
- Dropping the Course:** Students are cautioned to consider dropping the course if they are performing poorly **BEFORE** the drop deadline (see below for date). You must drop this class yourself – I will not automatically drop you if you just stop attending. However, I reserve the right to drop you if you register for the course and never show up to class. Also remember that courses may only be repeated a total of 3 times, and a “W” counts as one. The College of Science will remain aligned with the University and not approve any drop requests after the drop date. Note that if a student has an advisor submit a drop request after the drop deadline without permission from the dean, I will be asked to assign a grade by the registrar, and that grade will be F.
- Incomplete Grades:** All grades of Incomplete must be accompanied by an Incomplete Contract that has been signed by the instructor of record, student, departmental chair, and the dean. Although UTEP will allow a maximum of one year to complete this contract, the College of Science requests it be limited to one month based upon completion data. A grade of Incomplete is only used in extraordinary circumstances confined to a limited event such as a missed exam, project, or lab. If the student has missed a significant amount of work (e.g. multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.

Course Schedule:

Lecture Schedule	Topic/Exam
W Jan 20	Objectives & Congo Lecture (will not be posted)
M Jan 25	DNA: basic genetic material/Lab: DNA Extraction Part 1
W Jan 27	DNA Replication/Lab: DNA Extraction Part 2
M Feb 1	Polymerase Chain Reaction/Lab: PCR
W Feb 3	Gene Function & Structure/Lab: Check Gels & DNA Purification
M Feb 8	Genomics & DNA Sequencing/Lab: tour of DNA Core Facility
W Feb 10	Transcription/Lab: ab1 files, MacClade and Nexus files
M Feb 15	Translation/Running a phylogenetic tree in RAxML
W Feb 17	***** NO CLASSES POPE VISIT TO JUAREZ *****
M Feb 22	Mutation & Repair/Lab: DNA extraction from more samples
W Feb 24	EXAM 1
M Feb 29	Natural selection/Lab: PCR for more samples
W Mar 2	Student Powerpoint Presentations/Lab: Check Gels, Purification
***** SPRING BREAK MARCH 7-11 *****	
M Mar 14	Population Genetics/Lab: ab1 files, Nexus and analyses
W Mar 16	Evolutionary Genetics/Lab: DNA extraction from more samples
M Mar 21	Molecular Evolution/Lab: PCR for more samples
W Mar 23	Phylogenetic Trees/Lab: Check Gels, Purification
M Mar 28	Systematics and Taxonomy/Lab: ab1 files, Nexus and analyses
W Mar 30	EXAM 2
F Apr 1	***** DROP DEADLINE *****
M Apr 4	Trees & Cryptic Species/Lab: DNA extraction from more samples
W Apr 6	Conservation Biology/Lab: PCR for more samples
M Apr 11	Biodiversity Crisis/Lab: Check Gels, Purification
W Apr 13	Global Amphibian Declines/Lab: ab1 files, Nexus and analyses
M Apr 18	Deforestation /Lab: DNA extraction from more samples
W Apr 20	Human Population Growth/Lab: PCR for more samples
M Apr 25	Global Climate Change/Lab: Check Gels, Purification
W Apr 27	Endangered Species & IUCN/Lab: ab1 files, Nexus and analyses
M May 2	Laboratory Only: Wrap up final analyses
W May 4	Student Final Powerpoint Presentations
FINAL EXAM:	TBD