Principles of Ecology and Evolution
Biology 125
Spring 2016

Class meeting time and place: TR 12:30-1:45 PM, Math 210
Instructor: Dr. Jennifer Gumm
Department: Biology
Phone: 468-2322
E-mail: gummj@sfasu.edu
Office: Miller Science Rm. 123
Office hours: Tues/Thurs 10:30-12:30, Wed 1-2 and by appointment
Text: Biological Science, Volume 2 Freeman

Lab Subscription to SimBio is required. Information will be available on D2L

Course online resources: see D2L

Course Description:
4 semester hours, 3 hours lecture, 2 hours lab per week. Fundamental principles of biological inquiry, scientific analysis, and concepts in ecological and evolutionary biology.

Student Learning Outcomes:
After successful completion of this course student will be able to:
SLO 1. Demonstrate understanding of the process of science by distinguishing between science and non-science and designing experiments that address testable hypotheses.
SLO 2. Use quantitative reasoning to interpret evolutionary and ecological data (tables, figures and graphs) from primary research, theoretical models and computer based-simulation experiments.
SLO 3. Demonstrate understanding of the skills and attitudes necessary for effective teamwork in collaborative learning activities and a semester long project.
SLO 4. Critically assess the interrelationship of human dimensions and ecology/evolution and communicate resulting conclusions in oral, visual and written formats.
SLO 5. Understand evolution as the unifying concept in biology.
SLO 6. Understand the factors that govern interactions between organisms and their environments.

Program Learning Outcomes: Departmental PLOs and associated Student Learning Outcomes.
PLO 1. The student will demonstrate a good knowledge base in biological concepts (Knowledge). (SLO 1,5-6)
PLO 2. Clearly articulate scientific information in oral form. (SLO 3-6)
PLO 3. Clearly articulate scientific information in written form. (SLO 3-6)
PLO 4. Be able to design, carry out, and analyze experiments to answer biological questions. (SLO 1-2)
PLO 5. Demonstrate teamwork skills needed to coordinate diverse multidisciplinary teams to solve challenges in the biological world. (SLO 2-4)

General Education Core Curriculum Objectives/Outcomes: Texas State Exemplary Educational Objectives and associated Student Learning Outcome.
CO 1. Critical Thinking: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information. (SLO 1-6)
CO 2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication. (SLO 3-6)
CO 3. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions. (SLO 1-2)
CO 4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal. (SLO 2-4)
Course Requirements:

Your final grade in this course is determined by grades from lab based inquiry activities, lecture exams, daily lecture quizzes, Literature reviews and online discussion, and participation in the course evaluation.

Laboratory Activities: Students will conduct a variety of inquiry activities in the lab section of the course. Each lab meeting will include written and oral instruction on the critical thinking skills developed in that activity and will include written and oral instruction in the empirical and quantitative skills used in that activity. Laboratory activities will include structured/guided inquiries in which students work through examples, questions, problems and case studies. Students will evaluate of primary literature and participate in group discussions. Additionally students will conduct experiments to test hypotheses in which they collect data using online databases and field based methods, analyze data using computer software, synthesize data and present conclusions using visual (graphical), written (lab reports), and oral (presentation) communication.

Grading Policy:

Your final grade in this course is determined by grades from the laboratory, lecture exams, daily lecture quizzes and participation.

- 3 Mid-term exams: 45%
- 1 Final Exam (1/2 cumulative): 25%
- Pre-class Quizzes: 10%
- In-class work/participation: 10%
- Literature reviews: 10%

To calculate your grade, use this formula to sum the four parts of your grade:

\[
\frac{(\text{% average on three midterms} \times 0.45) + (\text{% on final} \times 0.20) + (\text{% of total pre-class quizzes} \times 0.10) + (\text{% of total in-class work/participation} \times 0.15) + (\text{% of group project} \times 0.15)}{\text{Total}}
\]

The lecture portion of your grade is determined by earning 90%, 80%, 70% and 60% of the available points for the associated traditional letter grade. The lecture portion makes up 3/4 of your course grade with the lab portion making up the remaining 1/4th.

Example:

Lecture Average: 92
Lab Average: 75
Final grade = \(92 + 92 + 75 = 351\), \(\frac{351}{400} = 87.8\% = \text{B}\)

Exams: There will be 3 midterm exams. All exams may consist of short answer, short essay, multiple-choice, matching, true/false, diagraming, concept maps, or calculation based questions. Any student who misses an exam will not have the opportunity for a makeup exam. If an exam is missed a score of 0 will be given and that will be the exam grade that is dropped.

THE FINAL EXAM WILL CONSIST OF TWO PARTS:
- Part 1 consists of questions from the final section on of the course on ecology.
- Part 2 consists of questions that are cumulative, covering the material from the entire course.

Starting Exams On Time: all students must be there to start the exam at the start of the normal time whether in the lecture hall or Disability Services. Excessively late students may not be allowed to take the exam and thus will drop that exam. No students will be allowed to leave exam until 30+ minutes of the exam period have passed. (Also, all Disability Services students must email the professor at least 24 hours in advance before the exam to confirm arrangements.)

Other Exam Info: Any student who misses the final due to travel plans will be given a 0. Missing a final for other reasons is likely to result in an incomplete at a minimum. Students who fail to bubble in their student ID or exam version # (or who do it incorrectly) will be
**Quizzes:** Pre-class quizzes are designed to encourage you to keep up with the material and be ready for in-class activities. You will need a to take the quizzes online in D2L before the class period starts. There will be no make-up for missed quizzes.

**Evaluations and surveys:** It is now departmental policy to require students to fill out online class evaluations at the semester’s end (instructions will be provided at a later date). Additional surveys about your experiences in the course are required.

**Lecture participation:** Class attendance is mandatory, and prompt arrival is crucial. Students will participate in prepared group activities and will be graded on participation and the correctness of this work. Participation questions could be given at any time of any class, including right at the beginning of lectures, so it is crucial to arrive on time. Lecture participation grading will not be based on the number of questions answered correctly, but on the number of questions in which you participated. Participation and in class work counts for 15% of the total course grade.

**Literature Review:** Students will gain experience with primary literature through critical evaluation of scientific papers. Each student will write a series of 5 reviews of various topics from the class in one system. In addition to this evaluation, students will be required to engage with other students about their review topics. More details will be available on D2L.

**Studying:** The exams will emphasize material that we have covered in lecture. The main objective of the reading assignments is to help you understand the topics covered during the lecture. A good strategy for success in the course includes the following.

- **Careful Notes:** Take notes during the lecture, emphasizing material that is written or presented in figures, but also jotting down material presented verbally.

- **Study Groups:** Students that form and participate in serious study groups will do best in this course. Check your notes each night for concepts you did not fully understand. Later, compare notes with a few other students in a study group and discuss problem areas.

- **Understand and Memorize:** Make sure that you UNDERSTAND each of the topics discussed. Memorizing everything in the notes is not sufficient to do well in this course. Some exam questions will just test your conceptual understanding. But you must also memorize the notes as well (e.g., lists, definitions). Both are necessary to do well.

- **Keep Up Each Week:** Each weekend learn the material presented in lecture well. Really study the notes thoroughly. Understand and memorize lists, definitions, key concepts. See professor during office hours if you have questions.

- **Studying for Exams:** First study and memorize your notes alone, then work with your study group. Prior to exams one helpful strategy is to recopy your notes, or at least make a detailed outline emphasizing sections that you had trouble with. Use the practice exams posted on D2L. However, these do not cover all material, so your primary goal should be to study your notes. Learn your lecture notes well. Test yourself by trying to write out lists from memory and drawing figures from memory. Do practice problems in the ecology section. Don't just look your notes over. Make sure what you are learning makes sense to you.

**IF YOU DO POORLY ON AN EXAM:** First of all, for each question determine why you got that question wrong.

1) **UNDERSTANDING** – you failed to understand the concept well. Interpreting a graph, inferring ancestral characteristics on a tree, applying a formula etc. may only require understanding.

2) **MEMORIZING** – you failed to memorize an important piece of information. You forgot a definition, could not remember the association taught, or the difference between A and B.

3) **QUESTIONS** – you really feel that you understood and memorized the material, but you were thrown off by the question. You need to practice our multiple-choice exams more. Also, make sure you are well rested for exams so able to read difficult
questions carefully, and that you are able to think well on your feet. Cramming generally does not work very well in any course, and perhaps this course especially. Each of the above problems requires a different solution. Reread the study advice above to address the problem that you had. Often, you may need to put in more time studying. If you do the work, this can be a straightforward, fun and interesting class.

Acceptable Student Behavior: Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1, http://www.sfasu.edu/policies/student_conduct_code.asp). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

***Class etiquette***
Do not be late for class.
Do not leave before the class period is over.
Do not anticipate the end of class and start putting your things away.
Do not talk during class.
No cell phones/smartphones are ever allowed on during class.
Use of computers is forbidden unless instructed for particular activities, or documented need (i.e. disability. Please see instructor)

Academic Integrity (A-9.1): Abiding by university policy on academic integrity is a responsibility of all university faculty and students. Faculty members must promote the components of academic integrity in their instruction, and course syllabi are required to provide information about penalties for cheating and plagiarism as well as the appeal process.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:
- using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class;
- falsification or invention of any information, including citations, on an assignment; and/or,
- helping or attempting to help another in an act of cheating or plagiarism.

Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism include, but are not limited to:
- submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source; and,
- incorporating the words or ideas of an author into one’s paper or presentation without giving the author due credit.

Procedure for Addressing Student Academic Dishonesty
A faculty member who has evidence and/or suspects that academic dishonesty has occurred shall gather all pertinent information, approach the student(s) involved, and initiate the following procedure:
- The faculty member shall review all evidence of cheating or plagiarism and discuss it directly with the student(s) involved. The faculty member shall inform the student(s) of the procedure for addressing academic dishonesty, as well as the appeals process.
• After hearing the student(s)’ explanation or defense, the faculty member will determine whether or not academic dishonesty has occurred and will inform the student(s) what action will be taken. Penalties may include reprimand, no credit for the assignment or exam, re-submission of the work, make-up exam, or failure of the course. The faculty member may consult with the academic unit chair/director and dean in making these decisions.

• After a determination of academic dishonesty, the faculty member shall notify the office of the dean of the student’s major by submitting a Report of Academic Dishonesty, along with supporting documentation as noted on the form. This report shall be made part of the student’s record and shall remain on file with the dean’s office for at least four years.

• Upon second or subsequent offenses, the dean of the student’s major will determine a course of action, which may include dismissal from the university. The dean may refer the case to the college council for review and recommendations before making this determination.

A student’s record of academic dishonesty will not be available to faculty members. The purpose of the record is for the dean to track a pattern of academic dishonesty during a student’s academic career at Stephen F. Austin State University. Students who are found to have demonstrated academic dishonesty and have withdrawn prior to the award of a grade will continue to have the determination of the infraction within their student records.

Student Appeals
A student who wishes to appeal decisions related to academic integrity should follow procedures outlined in Academic Appeals of Students (A-2).

Source: http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades Semester Grades Policy (A-54): At the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

Source: http://www.sfasu.edu/policies/semester_grds.asp

Students with Disabilities: To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Course Calendar: **Timing of Topics May Vary!**

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<th>#</th>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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<td>1</td>
<td>T Jan 19</td>
<td>Scientific Inquiry</td>
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<td>2</td>
<td>R Jan 21</td>
<td>Scientific Method</td>
<td>p. 1-15</td>
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<td>Lab: No lab</td>
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<tr>
<td>3</td>
<td>T Jan 26</td>
<td>Reading Scientific Literature</td>
<td>TBA</td>
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<tr>
<td>4</td>
<td>R Jan 28</td>
<td>Intro to Evolution &amp; Evidence</td>
<td>p. 444-453, 459-462</td>
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Lab: Experimental Design & Data Analysis

5  T Feb 2  Heredity & Mendelian genetics  Posted Reading
6  R Feb 4  Hardy Weinberg equilibrium  p. 465-472
Lab: Mendelian Genetics

7  T Feb 9  HWE continued  p. 465-472
Lab: HWE: Breeding Bunnies

8  T Feb 16  Microevolution: Natural Selection  p. 453-459, 472-475
9  R Feb 18  Microevolution: Sexual Selection  p. 475-478
Lab: EvoBeaker: Guppy Lab

10 T Feb 23  Microevolution: Genetic drift  p. 478-482
11 R Feb 25  Microevolution: Migration & Mutation  p. 482-486
Lab: EvoBeaker: Sickle Cell Alleles

12 T March 1  Macroevolution: Species concepts  p. 489-494
13 R March 3  Macroevolution: Speciation  p. 494-502
Lab: Species Concepts

14 T March 8  Macroev: Phylogenies & Phylogeography  p. 505-509, 516-523
15 R March 10  Exam
Lab: Building Phylogenies

T March 15  Spring Break
R March 17  Spring Break
Lab: Spring Break

18 T March 22  Climate  p. 1059-1068
19 R March 24  Spring Break 2
Lab: Anthromes

19 T March 29  Biomes  p. 1068-1080
20 R March 31  Pop Eco: Distribution & Life History  p. 1101-1107
Lab: Population distribution

22 R April 7  Population Growth Continued  p. 1112-1120
Lab: Life History Tables
Homework: EcoBeaker: Population Growth Models

T April 12  Exam  p. 1123-1135
23 R April 14  Community Ecology: Species interactions
Lab: TBA

24 T April 19  Community Ecology: Competition  p. 1125-1128
25 R April 21  Community Ecology: Biodiversity  p. 1135-1138, 1142-1145
Lab: EcoBeaker: Keystone Predator

26 T April 26  Succession  p. 1138-1142
27 R April 28  Ecosystem Ecology: Energy Flow  p. 1148-1156
Lab: Food Webs
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<th>Date</th>
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<tr>
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<td>T</td>
<td>Ecosystem Ecology: Nutrient cycling</td>
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<td>29</td>
<td>R</td>
<td>Ecosystem Ecology: Climate Change</td>
<td>p. 1163-1169</td>
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Lab: Climate Change

**Final Exam**  TBA