BIOL 5376 Evolutionary Ecology Spring 2023

Dr. Jon Seal, Office BEP 259
Email: jseal@uttyler.edu
Phone: 566-7126

Course Meeting Time: MW 11:30-12:50pm.

OFFICE HOURS: MWF, 2-3 pm

COURSE DESCRIPTION: Evolutionary ecology is a field that integrates ecology and evolutionary biology. This course will examine the history, techniques, topics and approaches of evolutionary ecology. The goal of the course is to provide a synthetic overview of the subject, unifying conceptual advances in evolutionary ecology.

STUDENT LEARNING OBJECTIVES: Upon completion of BIOL 3338, the student should be able to

- Understand how ecology is critical to the development of evolutionary biology and vice versa
- Define evolutionary biology
- Understand how genetics is applied to evolutionary ecology
- apply genetics to evolutionary biology
- understand that evolution is an optimizing process
- understand mechanism of evolutionary change
- define adaptation, how they evolve, and understand at what level selection is operating
- understand phylogenies
- understand the relationships between evolution and biodiversity

Comments about emails. Emails sent during normal business hours (e.g., 9am to 5pm) can expect a reply that day. Emails sent in the evening or early morning (e.g., 1am) most likely will not receive a reply until the following day. Emails sent over the weekend (Friday evening until Sunday evening) or on holidays also most likely will not be answered until the next business day. Nevertheless, I periodically check my email outside of business hours and will reply, when possible, to emergencies. So, if you have an emergency, send the email so that I have record of it and I will respond when I can.

Textbook:

1. Futuyma D & Kirkpatrick M (2022) *Evolution* (Oxford). While we will cover many of the topics in this book, we will not focus on the entire book. It is more of a reference that you should have on hand.

2. Dawkins R (1976) *The Selfish Gene* (Oxford University Press). (any edition will work) This book is highly influential and meant for a popular audience.

Additional Readings. There will be more assigned readings throughout this semester. All are meant as a guide to help you through the topics presented in lectures and with your term papers. They will be made available on Canvas.

If you haven't figured it out by now, most of graduate school involves reading, reading and even more reading. Start building a library. Plan on writing, too.

Evaluation:

1. Exams (Two, 100 points each)
2. *The Selfish Gene* Quiz (100 points)
3. Two paper synopses (50 points each, 100 points total)
4. Presentation (100 points)
5. Attendance/Participation (100 points)

1. Exams. There will be two exams in the course, one that will take place approximately midterm and then one at the end of the semester. Although the second exam will cover material since the first exam, realize that all of biology is cumulative, so you may expect material from the first exam on the second exam. There will be no final exam.

2. *The Selfish Gene* quiz. You will read the *The Selfish Gene* by Richard Dawkins and answer questions about it. This exam will be a take-home, written essay exam that will take place during the end of the semester.

3. Paper synopses. You must read and provide a 1-2 page synopsis of two primary, peer-reviewed articles in Evolution journals. You must use main evolution journals such as: *Evolution, Evolutionary Ecology, Journal of Evolutionary Biology, Molecular Phylogenetics and Evolution, Nature Ecology and Evolution, Ecology and Evolution, Systematic Biology,* and *The American Naturalist*. For reviews, *Trends in Ecology and Evolution* and the *Annual Review of Ecology, Evolution and Systematics* are good journals. Behavioral, ecological or organismal journals are not allowed. Your synopses must provide an overview of the main evolutionary topic addressed, the methods used and the results found. The two must address different evolutionary topics and cannot be the same papers you present in class (see below). One of these will be due before midterm and the second one after midterm.

4. Presentation. Each student will be required to lead the discussion related to some of the concepts presented in that week's lecture. Each student will present an older paper that I will provide and a newer paper (two papers in total) that you or I will provide. These papers will not be the same ones provided as your paper synopses. Again, use a paper in an evolutionary journal (see above) or general science journal that addresses evolutionary biology (such as *Science, Nature, Current Biology, Proceedings of the National Academy of Sciences* or the

Proceedings of the Royal Society, among others). In this presentation you will discuss these papers and lead the discussion. You will make links between this paper and the concepts presented in lecture. You may also highlight strengths and weaknesses in these papers.

5. Participation: I will keep actual notes on who answers my questions and volunteers information during class discussions (I will also note who falls asleep☺). The only way a graduate course works is if everyone comes to class engaged, prepared to listen, learn, discuss, focus and think about the material. This class is not the time to come and grade your Gen Bio quizzes or do other work. It is also not only about you. You need to come prepared to discuss papers and topics even if you are not presenting that day. I will use this information when assigning final grades in borderline cases. **Do not miss class!** Missing your presentation will affect others, please try to schedule your seminar accordingly. If you do not attend or miss class without explanation, your participation grade will suffer. Usually, if you miss class, it is part of a deeper problem and the rest of your grade suffers as well. Therefore, I strongly recommend that you treat this class seriously and attend every day. If life (family, illness, etc.) is interfering with your ability to attend and perform in class, by all means do come to talk to me about it. I won't need all details if you do not feel comfortable sharing, but I should be aware that you aren't being lazy, for example.

Remember to attribute findings of others - papers must be cited and in a standard format. I prefer the Wiley-Blackwell or Springer formats (publishers of the main journals above). It might be a good idea for you to learn these because most scientific journals follow one of these formats.

Grading. Final grades in the course will be determined by a standard grading system

90 – 100% = A 80 – 89% = B 70 – 79% = C 60 – 69% = D < 59% = F

Rounding: Grades will be rounded to the nearest whole number. Therefore, a 79.1 would be rounded down to a 79 (a 'C') and a 79.6 would be rounded up to an 80 (a 'B') and so on. This also means that grades in the middle of a bin, e.g., a 77 or an 87 will not be rounded to an 80 or 90, respectively.

My view of a graduate course is that nobody should earn less than a C. Even C's should be rare. C's are usually awarded when students have issues with facts but might have the right idea. This does not mean that a student cannot earn a D or F! 'B' students have their facts and ideas straight but fail in some degree to organize the facts in a way that results in a new view of the topic or demonstrate an understanding. 'A' students generally are able to organize the facts in a way that demonstrates clear understanding and not rote memorization. Most students should either receive a B or an A, unless they really screw something up.

You must write your assignments clearly using complete sentences. This is not meant to torture you, but the ability to communicate effectively and remember content across courses

are very important skills. Thus the clarity of your written answer will be a factor in grading. **I do not give extra credit.**

Grading Issues. In grading, I strive for fairness and consistency. If you feel like a grading error was made on an exam or assignment, you may submit a typed appeal within a week (7 days) of when the exam was returned to you. Your written appeal should be based on course materials and should stress the scientific validity of your original response.

Regrading issues. While I am happy to discuss exams and course content during office hours or other meetings, I will not verbally discuss grades or points on exams to students. Exams will be returned and keys will be posted online. If you are concerned about an exam grade, the best approach will be to go over the exam questions and try to understand why you scored incorrectly on each exam question. If you believe you unfairly lost points, consider filing an appeal. If you would like further clarification why you did not receive full points, please put the request in writing. **You will have one week from the return of the exam to file an appeal or make an inquiry or make any other dispute.** Your request must be justified with content from the lecture, textbook or other scientific peer-reviewed source, i.e., not random websites. Please come to office hours or schedule an appointment, and come with questions. The single exception to this policy would be errors in addition, for example, if I incorrectly tally up your points. If there is a math issue, you may contact me personally or send me an email. **In summary, I am happy to discuss topics or exam questions and answers, I will not discuss grades or points or address disputes in person. Grade and point issues must be addressed in written format.**

Do not cheat or plagiarize. **If you cheat or plagiarize, you will at a minimum receive a 0 on that assignment and be reported to the university authorities.** Realize that any issue with academic misconduct can severely impact, if not inhibit, your chances of obtaining a career associated with public trust (police officer, lawyer, doctor, dentist, nurse, etc.). Don't cheat or plagiarize. Just don't do it. Don't be tempted to look up/copying and pasting sources while taking an exam. Just don't. For definition and explanation of cheating or plagiarism see section on "**Student Standards of Academic Conduct"** toward the end of this document.

No Grade Grubbing. Grade grubbing is asking for points you did not earn. It's unethical to ask and would be unethical for me to award points. Also, within the category of grade grubbing is asking for exams or quizzes to be regraded outside the window where you are allowed to do so. Grade grubbing is not asking about your grades or trying to understand where you went wrong. Also, as a graduate student, grades generally mean very little. Few will care about your graduate student GPA or if you received an A or B.

Do not cheat or plagiarize, even on extra credit assignments. **If you cheat or plagiarize, you will at a minimum receive a 0 on that assignment and be reported to the university authorities.** Realize that any issue with academic misconduct can severely impact, if not inhibit, your

chances of obtaining a career associated with public trust (police officer, lawyer, doctor, dentist, nurse, etc.). Don't cheat or plagiarize. Just don't do it. For definition and explanation of cheating or plagiarism see section on "**Student Standards of Academic Conduct"** toward the end of this document.

Comment about plagiarism and definitions: Reciting definitions as you might see them defined in a textbook is not necessarily plagiarism. This is how we learn should learn words – we should learn the words and then a technical definition, which may be close if not nearly identical to what you might find in a dictionary, glossary or textbook. This is especially true in a closed book exam. For example, if evolution is defined as 'genetic changes over time' there are only so many ways this could be rewritten in an original manner and still retain its technical meaning. Therefore, I would not consider it to be plagiarism if you remember definitions of words as they are presented in the textbook or lecture, but if you stray from these definitions you may lose meaning. Much of scientific writing is not meant to entertain or be creative rather it is meant to convey understanding and meaning.

Attendance. Attendance is mandatory and will be taken in class. If you sign in for a friend (or friends), all of you will be counted as absent.

Missed Exam and Assignment policy: It is your responsibility to take the exam on time. Failing to take a scheduled examination will result in a score of 0 unless replaced by a make-up exam in a timely fashion. 'Make-up' examinations are given only in cases where there is a documented excuse beyond your reasonable control:

- Illness – you must have a physician note indicating that you were not in a physical condition to take the exam at the scheduled time. A note from a family member is insufficient.
- Death or grave illness in your immediate family.
- Significant scheduling conflicts (e.g., med-school interviews, or other university sponsored events). You must notify the instructor at least 2 weeks in advance of this absence.

The nature of the make-up exam will be decided by the instructor and may consist of a written and/or oral examination.

Legal Stuff

Do not plagiarize. Plagiarizing at the graduate level is a very, very stupid thing to do. I will be required to report you to the university.

Recording of Class Sessions

Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of

students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

Artificial Intelligence Statement

For this course, **AI is not permitted in this course at all**. I expect all work students submit for this course to be their own. I have carefully designed all assignments and class activities to support your learning. Doing your own work, without human or artificial intelligence assistance, is best for your efforts in mastering course learning objectives. For this course, I expressly forbid using ChatGPT or any other artificial intelligence (AI) tools for any stages of the work process, including brainstorming. Deviations from these guidelines will be considered a violation of UT Tyler's Honor Code and academic honesty values.

Final Comment. I expect that you are here because you want to be here. If you don't want to be here, don't be here ☺. Evolution is a fascinating topic, so please don't spoil it for others if you think it's the most boring subject on earth.

Tentative Schedule:

Week	Topics	Futuyma Chapter	Discussion Leader
January 13	Organization/Introduction What is evolutionary ecology?		
January 20	**No Class MJK, Jr. Day (Mon)**		
January 22, 27	Natural Selection, adaptation and fitness, units of selection	8, 11	
Feb 3	Mutation/Genetic Drift/Biodiversity	10,7	
Feb 10	Phylogenetic Inference and Comparative methods	2, 11 (299-301)	1
Feb 17	Tradeoffs, constraints/ecophysiology	13	2
Feb 24	Life history evolution	14	3
March 3	Evolution of Sex	15	4
March 10	Exam 1		
March 17	**No- Class SPRING BREAK**		
March 24	Parent-offspring conflict	16	5
March 31	Conflict and Cooperation	16	6
April 7	Social Evolution	16	7
April 14	Coevolution	19	8
April 21	Human Evolution Exam 2	23	

Final Exam TBA (April 28-May 2)

Important Dates:

January 20: Martin Luther King, Jr Day (No Class)
January 27: Census Date
March 31: Withdrawal Date
March 17-21: Spring Break (No Class)
April 25: Last Day of Classes
April 28-May 2, Final Exam Week