Evolutionary Biology PCB 4683
Spring 2020

BY ENROLLING IN THIS CLASS YOU AGREE TO EVERY ITEM IN THIS SYLLABUS.

PCB 4683 Evolutionary Biology, Spring Semester 2020 (4 credits)

Understanding evolutionary biology is critical for biologists and important for all biological organisms, including humans. To quote two notable evolutionary theorists, "Nothing in biology makes sense except in the light of evolution" (*Theodosius Dobzhansky, 1973*) and "Man is descended from a hairy, tailed quadruped, probably arboreal in its habits" (*Charles Darwin, 1871*). In this class we take an analytical approach to explore the pattern and process of evolution in all life forms, from HIV to single celled organisms to *Homo sapiens*. Evolutionary genetics will be considered as the foundation underlying all aspects of evolutionary biology, and concepts in speciation, adaptation, classification, population genetics, and macroevolution will be covered in depth. The importance of evolutionary concepts to all facets of biology will be emphasized, particularly the interplay between evolution and ecology, genetics, development, and medicine.

Course Objectives

- To understand evolutionary patterns and how evolutionary relationships are estimated.
- To become a skilled reader and critic of scientific literature.
- To understand the principles of population genetics, including selection, genetic drift, mutation, linkage, and gene flow.
- To understand the mechanisms of speciation and diversification.
- To understand the relevance of evolutionary biology to human society, particularly human health.

Prerequisites:
A grade of C or better in undergraduate genetics or consent of the instructor. A good understanding of basic genetics and ecology are vitally important to success in this class.

Class Meetings:
Lecture: 1:30 –3:20 PM Monday and Wednesday in HPA1 O112.

Lab course:
PCB 4683L, 1 credit.
The Evolutionary Biology lab is a separate 1 credit course and is not required. However, the laboratory content is coordinated with the lecture course, and concepts from lecture are reinforced with laboratory activities. When possible, you are encouraged to enroll in the lab during the same semester you take the lecture.

Mondays in BIO 211
Section 0011: Monday 8:30 – 10:20 am
Section 0012: Monday 10:30 am – 12:20 pm
Section 0013: Monday 3:30 – 5:20 pm

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Lecture Instructor:

Dr. Anna E. Savage
Office: BL 424, phone: 407-823-4504
E-mail: Anna.Savage@ucf.edu
Office Hours: Tues 11:00 am –1:00 pm, Weds 10:00 am –12:00 pm, and by appointment
I will do my best to be available during those times, but things occasionally come up requiring me to be away from my office or computer. Please e-mail me to schedule a specific meeting time.

Laboratory Teaching Assistants:

Jacob LaFond (lab TA only, sections 011 and 013)
BL 425; E-mail: lafondj@knights.ucf.edu
Office hours: Tues 2-3:30 PM & Wed 3:30-5 PM
Katherine Martin (lecture TA and lab TA for section 012)
BL 425; E-mail: katie.martin@knights.ucf.edu
Office hours: Thurs 2-3:30 PM & Fri 2-3:30 PM

Webcourses Site:

I have a course web site set up on Webcourses (https://webcourses.ucf.edu) that I will use to post materials for the course, including the syllabus, calendar dates, PowerPoints, quizzes, and your grades. If you need to contact me, please do so using the Inbox Conversations function in Webcourses.

Required Text:

Herron, J. C., and S. Freeman. 2014. Evolutionary Analysis, 5th edition. Pearson Education, Boston, USA. ISBN 0-321-61667-7
Companion Website: www.pearsonhighered.com/herron

Class Policies:

1. Attendance is not strictly required but many studies have shown that students who do not attend class do poorly. In addition, discussion assignments will take place during class and anyone absent will receive a zero for the assignment.
2. Exam make ups will not be given without valid documentation that is presented prior to the absence or within 24 hours of the administration of the test. Quizzes and discussion assignments may not be made up.
3. Assigned readings should be completed before attending class. Quizzes will assess you reading knowledge prior to covering the material in class.
4. You are encouraged to discuss any and all portions of the class with me. Please feel free to come to my office hours or make an appointment to discuss the class, especially if you are having trouble in the class.
5. Respect should be given to fellow students and the instructor. Please do not arrive late to class, walk out in the middle of class, or leave early.
6. Hateful or offensive speech or writing will not be tolerated.
7. Cell phones, iPods, and other electronic devices should be turned off and put away before class starts. If one of these devices disrupts class the owner will be asked to leave and will not be allowed to participate in discussion assignments.

8. Academic dishonesty (cheating and plagiarism) is strictly prohibited and will be taken very seriously and will result at least in an "F" for that assignment (and may, depending on the severity of the case, lead to an "F" for the entire course) and may be subject to appropriate referral to the Office of Student Conduct for further action. See the UCF Golden Rule for further information.

Course Accessibility:
It is my goal that this class be an accessible and welcoming experience for all students, including those with disabilities that may impact learning in this class. If anyone believes the design of this course poses barriers to effectively participating and/or demonstrating learning in this course, please meet with me to discuss reasonable options or adjustments. You may also contact SAS (Ferrell Commons 185; 407-823-2371; sds@ucf.edu) to talk about academic accommodations.

Grading:
Grades will be assigned according to the following scale:

	92-100 = A	90-91 = A-
87-89 = B+	82-86 = B	80-81 = B-
77-79 = C+	72-76 = C	70-71 = C-
	60-69 = D	
	≤ 59 = F	

The grade for this course will be based on four aspects:

1. Exams: 72%
2. Online quizzes: 16%
3. Paper discussion assignments: 9%
4. Pre- and post-test: 3%

   Total: 100%

(1) Four **exams** will be given on the dates indicated on the schedule. They will consist of multiple choice, math problems, and/or short answer questions, in varying proportions depending on the material covered. The first three exams will take place during the semester and will not be cumulative, covering only those chapters assigned since the previous exam. The fourth exam will take place during the final exam period and will be 50% new material and 50% cumulative. **The lowest of your four exam grades will be dropped**. This means that if you are satisfied with your three semester exam grades, you will not be required to take the final exam. (24% each; 72% total)

(2) Textbook reading assignment **quizzes** will be administered online through Webcourses every 1-2 weeks. Quizzes will always be due on Wednesdays (by 11:59pm) and will be available by the previous Friday. You will be expected to read each assigned chapter (or in some cases, chapter sections) and take a short quiz to assess your knowledge of the chapter material. This will reinforce or prepare you for material covered in lecture, depending on whether you choose to complete the quiz before or after lecture based on your personal preference. You will have 15 minutes to complete each quiz. You may take each quiz twice and the *most recent* of the two scores will be your grade for that quiz. The lowest quiz grade for each student will be dropped.

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All quizzes are due by **11:59 pm** on their due dates. (2% each; 16% total)

(3) Four **paper discussion assignments** will take place during class throughout the semester. Dates will not be announced in advance, so regular attendance is necessary to complete all of these assignments. Groups of 2-4 students will discuss broad questions based on previously assigned primary literature and write consensus answers that will be turned in for participation credit (full points are given for participating, regardless of whether the provided answers are correct). The lowest discussion assignment will be dropped. (3% each; 9% total)

(4) **Pre- and post-tests** will assess your general knowledge of evolutionary biology and will be administered online through Webcourses during the first and last weeks of class, respectively. You will earn 100% on the pre-test and post-test for completing the online questions, regardless of your score. (1.5% each; 3% total)

Schedule:

The following schedule is approximate and dates may be changed at any time.

Date	**Topic**	**Assignments**
6 January M	Class intro ~ Why study evolution? ~ Begin A Case for Evolutionary Thinking	Chapter 1
8 January W	Finish A Case for Evolutionary Thinking ~ Begin The Pattern of Evolution	Chapter 2.1-2.2; **Pre-test**
13 January M	Finish The Pattern of Evolution ~ Scientific Method	Chapter 2.2-2.5; **Directed reading 1**
15 January W	Evolution by Natural Selection	Chapter 3; **Quiz 1: Ch 1**
20 January M	*MLK DAY – NO CLASS*	
22 January W	Natural Selection continued	**Quiz 2: Ch 2 & 3**
27 January M	Intro to Phylogenetics	Chapter 4
29 January W	Intro to Phylogenetics ~ Genetic & Environmental Variation	Chapter 5.1-5.2; **Quiz 3: Ch 4**
3 February M	Mutation	Chapter 5.3-5.5
5 February W	***EXAM 1***	**Ch 1-5 exam**
10 February M	Population Genetics: HWE & Selection	Chapter 6.1-6.2; **Directed reading 2**
12 February W	Population Genetics: Selection & Mutation	Chapter 6.3-6.5; **Quiz 4: Ch 6**
17 February M	Population Genetics: Migration & Drift	Chapter 7.1-7.2
19 February W	Population Genetics: Molecular Evolution & Nonrandom Mating	Chapter 7.3-7.5; **Quiz 5: population genetics**
24 February M	Linkage and Sex	Chapter 8
26 February W	Quantitative Genetics	Chapter 9
2 March M	***EXAM 2***	**Ch 6-8 exam**
4 March W	Methods for studying adaptation	Chapter 10
9 March M	*SPRING BREAK – NO CLASS*	
11 March W	*SPRING BREAK – NO CLASS*	
16 March M	Sexual Selection I: Dimorphism and Males	Chapter 11.1-11.2
18 March W	Sexual Selection II: Females, Plants and Humans	Chapter 11.3-11.6; **Quiz 6: Ch 10**
23 March M	Kin Selection	Chapter 12
25 March W	Finish Kin Selection ~ Start Life History Evolution	Chapter 13.1-13.3; **Quiz 7:**

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		Ch. 11 & 12
30 March M	Finish Life History Evolution	Chapter 13.4-end; **Directed reading 3**
1 April W	***EXAM 3***	**Ch. 9-13 exam**
6 April M	Evolution and Human Health	Chapter 14
8 April W	Mechanisms of Speciation I: Species Concepts and Isolation	Chapter 16.1-16.2; **Quiz 8: Ch. 14 & 16**
13 April M	Mechanisms of Speciation II: Drivers of Divergence	Chapter 16.3-16.5; **Directed reading 4**
15 April W	Human Evolution	Chapter 20; **Quiz 9: Ch. 20**
20 April M	Finish Human Evolution ~ Discussion	**Post-test (due Wed)**
27 April M	***FINAL EXAM* 1 PM – 3:50 PM**	**~50% Chapters 14, 16, 20, ~50% cumulative**