PCB 4683 Evolutionary Biology, Spring 2019

Evolution is the unifying theory of biology, applicable to all biological organisms including humans. As such, understanding evolutionary biology is critical for biologists and anyone who seeks an understanding of the natural world. To quote a notable evolutionary theorist, "Nothing in biology makes sense except in the light of evolution" (*Theodosius Dobzhansky, 1973*). In this class we take an analytical approach to explore the pattern and process of evolution in all life forms, from viruses to single celled organisms to plants 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 and ecology courses or consent of the instructor. A good understanding of basic genetics and ecology is vitally important to your success in this class.

TIME AND PLACE:

Lecture: 9:30 – 11:20 Tuesday/Thursday in HPA1 Rm 112.

CREDIT:

Lecture (PCB 4683): 4 semester hrs.

LECTURE INSTRUCTORS
Dr. Michelle R. Gaither
Department of Biology
Office BMS132
Web Site: https://webcourses.ucf.edu/
Office Hours: Mon 9:30-10:30; Thurs 11:30-12:30

OFFICE HOURS:

Generally, I will be available during my office hours, however, things occasionally come up requiring me to be away from my office or computer. Therefore, you are requested to please email and schedule an appointment with me. I will be available online in Webcourses in the chat room on evenings before exams.

Laboratory Teaching Assistants (office hours by e-mail appointment):

Jacob Lafond; BIO425; E-mail: lafondj@knights.ucf.edu
Office hours: Wednesdays 10:00 am – 11:30 am & Thursdays 2:00 pm – 3:30 pm.

Ryan Ridenbaugh; BIO442; E-mail: r.ridenbaugh@knights.ucf.edu
Office hours: Tues 1:00-2:30pm, Friday 10:30-12:00

Note: all reviewing of graded exams is administered by the lecture TA during weekly office hours. Instructor office hours are for lecture content-related questions, follow-up questions about exams after reviews with the lecture TA, and other inquiries

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, PowerPoints, quizzes, and your grades. If you need to contact me, please do so using the Inbox Conversations function in Webcourses. If you don't get a response within 24 hours send me an email.

REQUIRED TEXT:

Evolutionary Analysis, 5th edition 2014. *By Herron and Freeman. Prentice Hall, Inc., Upper Saddle River, NJ 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, unannounced discussion assignments will take place regularly 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 your 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.Hateful or offensive speech or writing will not be tolerated.
6. 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.
7. 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 SDES (Ferrell Commons 185; 407-823-2371; sas@ucf.edu) to talk about academic accommodations.

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

Percentage	Letter Grade
90.0 – 100	A
85.0 – 89.9	B+
80.0 – 84.9	B
75.0 – 79.9	C+
70.0 – 74.9	C
60.0 – 64.9	D
< 60.0	F

The grade for this course will be based on five components:

(1) Four semester **exams** will be given on the dates indicated on the schedule. They will consist of multiple choice, math problems, and short answer questions. The lowest exam grade will be dropped. (18% each, 54% total).

(2) One cumulative **final exam** will have the same format as the semester exams (18%)

(3) Pre-class reading **quizzes** will be administered online through Webcourses approximately once per week. These quizzes are matched to the pace of assigned readings, and you will be expected to read each chapter and take a short quiz to assess your knowledge of the chapter *prior to* going over that chapter during lecture. ***Quizzes are due at midnight the day prior to the lecture date on which they are listed*** **(therefore most are due before midnight on Wed prior to the lecture on which they are listed!!!!!!).** This will ensure you will be ready to cover the material during lecture and anything you didn't understand in the reading can be addressed in detail during class. You may take each quiz up to twice and the *most recent* of the two scores will be your grade for that quiz. Pay careful attention to due dates on Webcourses as these will be strictly enforced. The lowest quiz grade of the semester will be dropped. (2% each, 16% total)

(4) **Discussion assignments** will take place during class throughout the semester. Dates will often not always adhere to the schedule and many will be unannounced, so regular attendance is necessary to complete all of these assignments. Students will form groups to discuss broad questions based on textbook material and primary literature and write a consensus answer that will be turned in for credit. The lowest discussion assignment will be dropped. (TBD% each, 9% total)

(5) A **pre-test** and **post-test** for the course will be given via webcourses to gauge course efficacy. These are not actually graded but instead full credit is given for completed tests. (1.5% each, 3% total)

The following schedule is approximate and dates may be changed at any time. ***Quizzes are due at midnight the day prior to the lecture date on which they are listed,*** as these go hand in hand with the required pre-class reading. Quizzes will typically be available for several days in advance of the due date.

Date	Topic	Pre-class Read:	Assignments
Jan 8 (T)	Class intro ~ Begin A Case for Evolutionary Thinking	Chapter 1	**Pre-test**
Jan 10 (TH)	Finish A Case for Evolutionary Thinking ~ Begin The Pattern of Evolution	Chapter 2	**Quiz 1: Ch 1**
Jan 15 (T)	Finish The Pattern of Evolution ~ Scientific Method	Chapter 3	
Jan 17 (TH)	Evolution by Natural Selection		**Quiz 2: Ch 2 + 3**
Jan 22 (T)	Evolution by Natural Selection		
Jan 24 (TH)	Intro to Phylogenetics	Chapter 4	**Quiz 3: Ch 4 + 5**
Jan 29 (T)	Intro to Phylogenetics ~ Genetic & Environmental Variation	Chapter 5	**Directed Reading 1**
Jan 31 (TH)	Mutation/Exam 1 Review		
Feb 5 (T)	***EXAM 1* (Ch 1-5)**		
Feb 7 (TH)	Population Genetics: HWE & Selection	Chapter 6	**Quiz 4: Ch 6**
Feb 12 (T)	Population Genetics: Selection & Mutation		
Feb 14 (TH)	Population Genetics: Migration & Drift	Chapter 7	**Quiz 5: Ch 7 + 8**
Feb 19 (T)	Linkage and Sex	Chapter 8	**Directed Reading 2**
Feb 21 (TH)	Quantitative Genetics/ Exam 2 Review	Chapter 9	
Feb 26 (T)	***EXAM 2* (Ch 6-9)**		
Feb 28 (TH)	Methods for Studying Adaptation	Chapter 10	**Quiz 6: Ch 9 + 10**
Mar 5 (T)	Sexual Selection I: Dimorphism and Males	Chapter 11	
Mar 7 (TH)	Sexual Selection II: Females, Plants and Humans		**Directed Reading 3**
Mar 12 (T)	Spring Break		
Mar 14 (TH)	Spring Break		
Mar 19 (T)	Kin Selection	Chapter 12	
Mar 21 (TH)	Life History Evolution	Chapter 13	**Quiz 7: Ch 11 + 12**
Mar 26 (T)	Life History Evolution/Exam 3 Review		
Mar 28 (TH)	***EXAM 3* (Ch 10-13)**		
Apr 2 (T)	Evolution and Human Health	Chapter 14	
Apr 4 (TH)	Mechanisms of Speciation I	Chapter 16	**Quiz 8: Ch 13 + 14**
Apr 9 (T)	Mechanisms of Speciation II		**Directed Reading 4**
Apr 11 (TH)	Human Evolution	Chapter 20	**Quiz 9: Ch 16 + 20**
Apr 16 (T)	Human Evolution/Exam 4 Review		**Post-test**
Apr 18 (TH)	***EXAM 4* (Ch 14, 16, 20)**		
Apr 23 (T)	Study Day		
Apr 25 (TH)	***FINAL EXAM**		**Cumulative**