

Syllabus for Evolutionary Biology (PCB 4683) -- Fall 2017

Enrollment in this course constitutes an agreement to fully comply with the contents of this syllabus.

PCB 4683 Evolutionary Biology, Fall Semester 2017 (4 credits)

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 or consent of the instructor. A good understanding of basic genetics and ecology are vitally important to success in this class.

Class Meetings:

Lecture: 12:00 pm –1:50 pm Tuesday and Thursday in BA1, room 119.

Labs (PCB 4683L, 1 credit): Mondays in BIO 211

Lab 11: 8:30–10:20 am; Lab 12: 10:30 am–12:20 pm; Lab 13: 12:30–2:20 pm

Lecture Instructor:

Dr. Chase M. Mason

Office: BIO 401E

E-mail: chase.mason@ucf.edu

Office Hours: Tuesday 2:00–4:00 pm, or by email appointment.

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

Miles Zhang; BIO 442; E-mail: miles.zhang@knights.ucf.edu

Max Aleman, BIO409; E-mail: max.aleman@knights.ucf.edu

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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, slides, 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 will not be formally enforced, but many studies have shown that students who do not attend class do worse than their attending peers. Also, discussion assignments will take place during class and anyone absent will receive a zero for the assignment.
2. Make-up exams will not be given without valid documentation that is presented prior to the absence or within 24 hours of the administration of the exam. Quizzes and discussion assignments may not be made up.
3. Assigned readings should be completed before attending lecture. Online 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.
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 discriminatory 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 a device disrupts class the owner will be asked to leave and will not be allowed to participate in any discussion assignments.
7. Academic dishonesty (cheating and plagiarism) is an extremely serious offense, one that undermines the perceived value of a UCF degree. Academic dishonesty will result in a grade of 'F' for the assignment in question, and depending on severity, a grade of 'F' for the entire course and referral to the Office of Student Conduct for further action. See the UCF Golden Rule for definitions of academic dishonesty and further information on policy.

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 participation and/or demonstration of learning in this course, please meet with me to discuss reasonable modifications to course requirements. You may also contact SDS (Ferrell Commons 185; 407-823-2371; sds@ucf.edu) to talk about academic accommodations.

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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 four 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. (20% each, 60% total)

(2) One cumulative **final exam** will have the same format as the semester exams and will take place on Thursday Dec 7th from 10:00am – 12:50pm. (20%)

(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. 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. The lowest quiz grade will be dropped. All quizzes are due by **11:59 pm** on the day before their due dates. (1% each, 8% total)

(4) **Discussion assignments** will take place during class throughout the semester. Dates will often not always adhere to the schedule, 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. (3% each, 9% total)

(5) A **pre-test** and **post-test** for the course will be given via webcourses to gauge course efficacy. (1.5% each, 3% total)

Please note that the Withdrawal Deadline for Fall 2017 is October 30th

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Schedule:

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
Aug 22 (T)	Class Introduction ~ Why study evolution? A Case for Evolutionary Thinking	Chapter 1	Pre-test
Aug 24 (TH)	The Pattern of Evolution/ Scientific Method	Chapter 2	Quiz 1: Ch 1
Aug 29 (T)	Evolution by Natural Selection I	Chapter 3	
Aug 31 (TH)	Evolution by Natural Selection II		Quiz 2: Ch 2 + 3
Sept 5 (T)	Intro to Phylogenetics I	Chapter 4	
Sept 7 (TH)	Hurricane Irma: Class Cancelled		
Sept 12 (T)	Hurricane Irma: Class Cancelled		
Sept 14 (TH)	Hurricane Irma: Class Cancelled		
Sept 19 (T)	Intro to Phylogenetics II		Discussion 1
Sept 21 (TH)	Genetic & Environ. Variation/Exam 1 Review	Chapter 5	Quiz 3: Ch 4 + 5
Sept 26 (T)	*EXAM 1* (Ch 1-5)		
Sept 28 (TH)	Population Genetics I: Selection & Mutation	Chapter 6	Quiz 4: Ch 6
Oct 3 (T)	Population Genetics II: Migration & Drift	Chapter 7	
Oct 5 (TH)	Linkage and Sex	Chapter 8	Quiz 5: Ch 7 + 8
Oct 10 (T)	Quantitative Genetics	Chapter 9	
Oct 12 (TH)	Discussion/Exam 2 Review		Discussion 2
Oct 17 (T)	*EXAM 2* (Ch 6-9)		
Oct 19 (TH)	Methods for Studying Adaptation	Chapter 10	Quiz 6: Ch 9 + 10
Oct 14 (T)	Sexual Selection I: Dimorphism and Males	Chapter 11	
Oct 26 (TH)	Sexual Selection II: Females, Plants and Humans		Discussion 3
Oct 31 (T)	Kin Selection/Life History Evolution	Chapter 12	Quiz 7: Ch 11 + 12
Nov 2 (TH)	Life History Evolution/Exam 3 Review	Chapter 13	
Nov 7 (T)	*EXAM 3* (Ch 10-13)		
Nov 9 (TH)	Evolution and Human Health	Chapter 14	Quiz 8: Ch 13 + 14
Nov 14 (T)	Mechanisms of Speciation I	Chapter 16	
Nov 16 (TH)	Mechanisms of Speciation II/Human Evolution		Discussion 4
Nov 21 (T)	Human Evolution/Exam 4 Review	Chapter 20	Quiz 9: Ch 16 + 20
Nov 28 (T)	*EXAM 4* (Ch 14, 16, 20)		
Nov 30 (TH)	Final Exam Review Day		Post-test
Dec 7 (TH)	*FINAL EXAM* 10am-12:50pm		