

# Evolutionary Biology PCB 4683

## Fall 2015

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

### *PCB 4683 Evolutionary Biology Fall Semester, 2015 (4 credits)*

The study of evolution is an essential undertaking for any biologist. As the great Modern Synthesis thinker Theodosius Dobzhansky once said, "Nothing in biology makes sense except in the light of evolution." In this class we take an analytical approach to delve into the intricate facets of evolutionary biology. From *The Voyage of the Beagle* to current topics in HIV evolution, we will examine the theories and processes of how species evolve. This class aims to not only teach facts about the evolutionary process, but also to inspire critical thought in the subject by getting familiar with the current evolutionary research. This class is meant to challenge the student to comprehend the foundation of all biology, evolution.

#### **Course Objectives**

- To understand evolutionary patterns and how evolutionary relationships are estimated.
- 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 issues.

#### **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 are vitally important to your success in this class.

#### **Class Meetings:**

**Lecture: 11:30–1:20 pm Tuesday and Thursday in ENG2 102.**

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. Tiffany M. Doan

Office: BIO 401A, 407-823-5424

E-mail: [Tiffany.Doan@ucf.edu](mailto:Tiffany.Doan@ucf.edu)

Twitter: @DoanTiffany, Class Hashtag: #UCFEvoBio

Office Hours: Tuesday 2:30–4:00 pm, Wednesday 12:00–1:00 pm, Thursday 2:30–4:00 pm.

(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. You can always e-mail me for another meeting time.)

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

Mr. Jonathan Napier; BIO 436; E-mail: [jnapier2@knights.ucf.edu](mailto:jnapier2@knights.ucf.edu)

Mr. Matthew Lawrance; BIO 425, E-mail: [lawrancm@knights.ucf.edu](mailto:lawrancm@knights.ucf.edu)

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### Webcourses Site:

I have a course website 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.

### 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](http://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 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.
6. Hateful or offensive speech or writing will not be tolerated.
7. Cell phones 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](mailto:sds@ucf.edu)) to talk about academic accommodations.

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### Grading:

The grade for this course will be based on four aspects. Grades will be assigned according to the following scale: **A** = 90-100; **B+** = 87-89; **B** = 80-86; **C+** = 77-79; **C** = 70-76; **D+** = 67-69; **D** = 60-66; **F** = ≤ 59. No rounding will be implemented and no other grade adjustments will be made.

Three semester **exams** will be given on the dates indicated on the schedule. They will consist of multiple choice and short answer questions. (20% each)

One cumulative **final exam** will have the same format as the semester exams and will take place on Thursday, 10 December, at 10:00 am. (24%)

Pre-reading **quizzes** will be administered online through Webcourses approximately once a week. 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 covered in detail during class. You may take each quiz twice and the highest of the two scores will be your grade for that quiz. The lowest of the 12 quizzes will be dropped. The quiz will be open for several days before the due date—do not wait until the last minute because late quizzes will not be accepted under any circumstances. All quizzes are due by **11:00 am** on their due dates. (8%)

**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 students will discuss broad questions and write a consensus answer that will be turned in for credit. The lowest discussion assignment will be dropped. (8%)

**Final Note:** The professor reserves the right to change the syllabus and management of the class at any time during the semester. These changes will be announced in lecture.

## Evolutionary Biology PCB 4683 Fall 2015

### Schedule:

The following schedule is approximate and dates may be changed by the instructor depending on the flow of the class.

<b>Evolutionary Biology (PCB 4683) Fall 2015 Schedule</b>			
<u>Date</u>	<u>Topic</u>	<u>Readings/Quizzes</u>	
25-Aug	T	A Case for Evolutionary Thinking: Understanding HIV	Chapter 1
27-Aug	TH	A Case for Evolutionary Thinking; The Pattern of Evolution	Chapters 1, 2
1-Sep	T	Evolution by Natural Selection	Chapter 3; <b>Quiz 1</b> Ch 1, 2, 3
3-Sep	TH	<b>Class Cancelled for Football Game</b>	
8-Sep	T	Estimating Evolutionary Trees	Chapter 4; <b>Quiz 2</b> Ch 4
10-Sep	TH	Estimating Evolutionary Trees	Chapter 4
15-Sep	T	Variation Among Individuals; Review for Exam	Chapter 5
17-Sep	TH	<b>Exam 1</b>	Chapters 1-5
22-Sep	T	Mendelian Genetics in Populations: Selection and Mutation	Chapter 6; <b>Quiz 3</b> Ch 6
24-Sep	TH	Mendelian Genetics in Populations: Selection and Mutation	Chapter 6
29-Sep	T	Mendelian Genetics in Populations: Migration, Drift, and Nonrandom Mating	Chapter 7; <b>Quiz 4</b> Ch 7
1-Oct	TH	Mendelian Genetics in Populations: Migration, Drift, and Nonrandom Mating	Chapter 7
6-Oct	T	Evolution at Multiple Loci: Linkage and Sex	Chapter 8; <b>Quiz 5</b> Ch 8
8-Oct	TH	Evolution at Multiple Loci: Quantitative Genetics	Chapter 9
13-Oct	T	Evolution at Multiple Loci: Quantitative Genetics; Review for Exam	Chapter 9; <b>Quiz 6</b> Ch9
15-Oct	TH	<b>Exam 2</b>	Chapters 6-9
20-Oct	T	Studying Adaptation: Evolutionary Analysis of Form and Function; Sexual Selection	Chapters 10, 11
22-Oct	TH	Sexual Selection	Chapter 11; <b>Quiz 7</b> Ch 10, 11
27-Oct	T	The Evolution of Social Behavior	Chapters 12
29-Oct	TH	Aging and Other Life History Characters	Chapter 13; <b>Quiz 8</b> Ch 12, 13
3-Nov	T	Evolution and Human Health	Chapter 14
5-Nov	TH	Genome Evolution and the Molecular Basis of Adaptation; Review for Exam	Chapter 15; <b>Quiz 9</b> Ch 14, 15
10-Nov	T	<b>Exam 3</b>	Chapters 10-15
12-Nov	TH	Mechanisms of Speciation	Chapter 16; <b>Quiz 10</b> Ch 16
17-Nov	T	Mechanisms of Speciation	Chapter 16
19-Nov	TH	The Origins of Life and Precambrian Evolution	Chapter 17; <b>Quiz 11</b> Ch 17
24-Nov	T	Evolution and the Fossil Record	Chapter 18
26-Nov	TH	<b>Thanksgiving NO CLASSES</b>	
1-Dec	T	Development and Evolution	Chapter 19; <b>Quiz 12</b> Ch 18, 19
3-Dec	TH	Human Evolution; Review for Exam	Chapter 20
10-Dec	TH	<b>Final Exam 4 10:00 am-12:30 pm</b>	Chapters 16-20 + Cumulative