

**PCB 4683 Evolutionary Biology, Spring Semester 2024**

This course provides an introduction to the topics of population biology, population genetics and evolutionary biology. The approach will not be descriptive but instead will emphasize basic principles and theory. Basic evolutionary genetics will be considered as the foundation underlying all aspects of evolutionary biology. Concepts in speciation, adaptation, classification, and macroevolution will be considered. The importance of evolutionary concepts to all facets of biology will be stressed, with special emphasis on the interplay between evolution and the traditional fields of ecology, genetics, and development.

**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.

This class requires you attend Face-to-Face lectures. These lectures will have periodic in-class discussions (for points) that require you attend to earn those points.

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**PREREQUISITES:**

A Grade of C or better in undergraduate genetics 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: 11:30 – 1:20 Tuesday/Thursday in HSI room 119.

**CREDIT:**

Lecture (PCB 4683A): 4 semester hrs.

| LECTURE INSTRUCTORS     |
|-------------------------|
| Dr. Francesco Janzen    |
| Department of Biology   |
| Office:                 |
| E-mail:                 |
| Office Hours in person: |
| Office Hours via Zoom:  |
|                         |

**Graduate Teaching Assistant: Katie Martin**

Katie teaches one of the lab sections and also assists with lecture. You will see her occasionally in class and she also holds weekly office hours and exam review sessions.

E-mail: [katherine.martin@ucf.edu](mailto:katherine.martin@ucf.edu)

Katie's office hours: Tuesday/Wednesday 9 – 10 am; Tuesday via zoom (<https://ucf.zoom.us/j/4518807838>) and Wednesday in-person in BIO 425.

**OFFICE HOURS:**

Generally, I will be available during my respective office hours. However, this may not be the case on any specific day. Therefore, you are requested to please email ahead if you can.

**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

Section 0011: Monday 8:30 – 10:20 am

Section 0012: Monday 10:30 am – 12:20 pm

Section 0013: Monday 12:30 – 2:20 pm

**WEBCOURSES SITE:**

I use Webcourses (<https://webcourses.ucf.edu>) 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 email function in Webcourses or via my regular email at [eric.hoffman@ucf.edu](mailto:eric.hoffman@ucf.edu).

**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](http://www.pearsonhighered.com/herron)

Online materials affiliated with this textbook, including quizzes, activities, and answers to the questions at the end of each chapter are now available for free at this site:

[http://wps.pearsoned.com/bc\\_freeman\\_evol\\_5/239/61342/15703574.cw/index.html](http://wps.pearsoned.com/bc_freeman_evol_5/239/61342/15703574.cw/index.html)

**Textbook First Day Inclusive Access Program:**

This course is part of an inclusive access model called First Day™. You can easily access the required materials for this course at a discounted price, and benefit from single sign-on access with no codes required in UCF Webcourses.

*UCF Student Accounts* will bill you at the discounted price as a course charge for this course.

It is recommended that you Opt-In as these materials are required to complete the course. You can choose to Opt-In on the first day of class, right within Canvas. Be sure to Opt-In before the Add/Drop deadline to have access to your course materials at the discounted price.

**Attention: VA/VR/DBS and Dual Enrollment students, DO NOT Opt-In. You will need to contact the bookstore for your course materials.**

By placing your digital course materials on Webcourses@UCF, the UCF Campus Store and the publisher of your textbooks have discounted your course materials to bring you the **lowest price available**. To take advantage of this **discounted rate**, you will need to **Opt-In** to have the cost of these materials billed to your UCF Student Account under a fee called “Digital Course Materials”. This means you can access the course materials today, and will not have to pay for them until the UCF fee payment deadline on your UCF Student Account. The Opt-In deadline is this Friday of the first week of class at 11:59pm.

**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. Quizzes are based on material from the book!
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 try to arrive on time as not to be a distraction to the classroom.
6. Hateful or offensive speech or writing will not be tolerated.
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 SAS (Ferrell Commons 185; 407-823-2371; sas@ucf.edu) to talk about academic accommodations.

**Respect for Diversity:**

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. Specifically:

- If you have a name and/or set of pronouns that differ from those that appear in your UCF records, please let me know.
- If any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. If you prefer to speak with someone outside of the course, you can contact the Biology Department Undergraduate Coordinator Dr. Christa Dirksen ([Christa.Diercksen@ucf.edu](mailto:Christa.Diercksen@ucf.edu)).
- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by me or anyone else) that made you feel uncomfortable, please talk to me about it (or contact the resources listed above if you feel more comfortable).

Despite aiming to be objective, science has been historically built on and biased by a small subset of privileged voices. Many of the readings for this course, including the textbook, were authored by white men. Furthermore, the course often focuses on historically important evolution experiments which were mostly conducted by white men. I strive to include more diverse perspectives and studies in my lectures and in the reading assignments outside of the textbook. However, I acknowledge that there may be both overt

and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science. Please contact me if you have any suggestions to improve the quality of the course materials.

**EVALUATION:**

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

(1) Four **exams** will be given on the dates indicated on the schedule, administered in class. Exams will primarily consist of multiple choice questions, covering concepts from lecture, examples from lecture, new scenarios you will need to interpret, population genetic math problems, and other quantitative problems. I will sometimes include 1-2 short answer questions. 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. All exams will be delivered during regular class time or final exam time during the semester. **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. 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 *average* of the two scores will be your grade for that quiz. All quizzes are due by 11:59 pm on their due dates. (20%)

(3) Discussion assignments will take place during class throughout the semester. Dates will often not be announced in advance, so regular attendance is necessary to complete all of these assignments. Groups of students will discuss broad questions based on textbook material and primary literature and write a consensus answer that will be turned in for credit. Additionally, four **paper discussion assignments** will take place during class throughout the semester. For these discussions, your assignment will be to read a recent scientific paper (provided at least a week in advance) covering a topic relevant to class, then answer a series of 3-4 questions provided to you about key features of the paper. During the in-class discussion I will go over the key points of the paper and answer questions, and **one question on each exam will be about the paper we discuss**, so you are responsible for understanding the main points. Two Discussions can be dropped without penalty because I expect that all students will not be able to attend all lectures. (8%)

**GRADES:**

The following scale will be used to assign course grades. Note that this grade scale can (and often is) adjusted in favor of the students. However, this scale will never be adjusted to hurt student grades.

|            |            |
|------------|------------|
| 91-100 = A | 78-79 = C+ |
| 90 = A-    | 69-77 = C  |
| 88-89 = B+ | 60-68 = D  |
| 82-87 = B  | ≤ 59 = F   |
| 80-81 = B- |            |

**On the next page you will find the  
TENTATIVE LECTURE OUTLINE AND DISCUSSION TOPICS**

**I reserve the right to change this schedule on a moment's notice. Changes will be posted on the course web site!**

TENTATIVE LECTURE OUTLINE AND DISCUSSION TOPICS

I reserve the right to change this schedule; changes will be posted on WebCourses!

| Date    | Topic/Activity   | Reading  |
|---------|--|--|
| 1/09/24 | Introduction to Evolution;<br>Evolutionary case study HIV        | Chapter 1  |
| 1/11/24 | Evidence of Evolution  | Chapter 2;<br>Online quiz 1 (Chapters 1 & 2)   |
| 1/16/24 | Finish Evidence of Evolution                                     |  |
| 1/18/24 | Natural Selection  | Chapter 3; Online quiz 2 (Chapter 3)   |
| 1/23/24 | Finish Selection   | Chapter 3; Directed Reading 1  |
| 1/25/24 | Phylogenetic Reconstruction                                      | Chapter 4; Online quiz 3 (Chapters 4 & 5)  |
| 1/30/24 | Phylogenetic Reconstruction                                      | Chapter 4  |
| 2/01/24 | Mutation and Genetic<br>Variation                                | Chapter 5  |
| 2/06/24 | <b>Exam 1</b>  | Intro material & Chapters 1-5  |
| 2/08/24 | Population Genetics: HWE and<br>Selection                        | Chapter 6  |
| 2/13/24 | Population Genetics: HWE and<br>Selection                        | Chapter 6; Online quiz 4 (Chapters 6 & 7)  |
| 2/15/24 | Population Genetics:<br>Migration, Drift and<br>nonrandom mating | Chapter 7; Population Genetics assignment handed out –<br>Simulation and modeling of population genetics |
| 2/20/24 | finish Population Genetics                                       | Chapter 7  |
| 2/22/24 | Linkage & Sex  | Chapter 8; Directed Reading 2  |
| 2/27/24 | Quantitative Genetic Variation                                   | Chapter 9;   |
| 2/29/24 | <b>Exam 2</b>  | Chapters 6-9   |
| 3/05/24 | Studying Adaptation /<br>Experimental design                     | Chapter 10; Online quiz 5 (Chapter 10)   |
| 3/07/24 | Sexual Selection   | Chapter 11   |
| 3/12/24 | Sexual Selection   | Chapter 11   |
| 3/14/24 | Kin Selection and Social<br>Behavior I                           | Chapter 12; Online quiz 6 (Chapters 11 & 12); Directed<br>Reading 3                                      |
| 3/19/24 | <b>SPRING BREAK</b>  | Have fun   |
| 3/21/24 | <b>SPRING BREAK</b>  | Have fun   |
| 3/26/24 | Finish Social Behavior   | Chapter 12;  |
| 3/28/24 | Life History Evolution   | Chapter 13; Online quiz 7 (Chapter 13)   |
| 4/02/24 | Life History Evolution   | Chapter 13   |
| 4/04/24 | <b>Exam 3</b>  | Chapters 10-13   |
| 4/09/24 | Evolution & Human Health   | Chapter 14; Online quiz 8 (Chapters 14 & 16)   |
| 4/11/24 | Mechanisms of Speciation   | Chapter 16   |
| 4/16/24 | Human Evolution  | Chapter 20; Online quiz 9 (Chapter 20)   |
| 4/18/24 | Human Evolution  | Chapter 20; Directed Reading 4   |
| 4/25/24 | <b>Final Exam 10 AM-12:50 PM</b>                                 | ~50% Chapters 14, 16, 20; ~50% cumulative material   |

Withdrawal deadline is March 29<sup>th</sup>, 2024