

PCB 4684-0001
Population Genetics
Spring Semester, 2018

This course will serve as an introduction into the field of population genetics. Of primary importance is an understanding Mendel's laws and other genetic principals as they affect entire populations of organisms. This course will also include the study of the various forces that result in evolutionary changes through time. Moreover, this class will focus on how to estimate population parameters that are important descriptors of genetic variation. These concepts will necessarily be based on genetic models and require a quantitative approach to genetics. Overall, the aim of this class is to enable you to apply insights gained from classic and modern genetic techniques to understand how genetic variation is produced, maintained, and distributed within and among populations.

Time and Place: Lecture: 10:00 – 11:15 am on Monday and Wednesday in HPA1 room 207.
Please do not be late or leave early, this disrupts the class.

Credit: 3 semester hours.

Contact: 2 hours per week of lecture; 1 hour per week of discussion.

Instructor:

Dr. Eric A. Hoffman
Department of Biology
Office BL 426, Phone 407-823-4007
E-mail: eric.hoffman@ucf.edu

Office Hours: Wednesday and Thursday from 2:30 –3:30 pm. Unless there are extenuating circumstances, I will be able to see you at any time during my office hours. If I am not in my office, then look for me in my lab (Rm. 427). If you cannot make these times, I can arrange to meet you at other times if you make an appointment. It would be ideal if you could schedule an appointment even during office hours to ensure that I can dedicate my time to you. Please do not plan to see me just before class, as I will probably be busy getting prepared.

Prerequisites: Grade B or better in undergraduate genetics and Evolutionary Biology or consent of instructor. An excellent understanding of genetics and evolution are very important. I strongly encourage you to drop this class if you are not well grounded in genetics and evolution.

Text: Hedrick. Genetics of Populations, Fourth Edition. Jones and Bartlett Publishers.

Readings: In addition to the text there will be supplemental papers I will make available to you each week. I will either email pdf's or give you references for papers. As an upper level class, it is important that we study the most up-to-date material and this necessitates reading the primary literature. Please have papers read prior to lecture.

Evaluation: Your grade in this class will be derived from several sources:

- 1) **Exams** – There will be two midterms and a final exam in this course. Exams will be in-class and cover material from the book chapters covered. The final exam will be cumulative.
- 2) **Lab Exercise** – There will be 4 computer laboratory exercises whereby you will analyze data presented in class and summarize the results. These labs will take place in the computer lab and will be turned in 1 week following the date assigned. If you wish, you can pair up with another undergraduate in the class and work on the labs together.
- 3) **Discussions** – As mentioned above, you are **REQUIRED** to read all papers assigned for discussion. Each week we will discuss the assigned paper in detail. Your grade will be based on your ability to participate in the discussions over the course of the term.

Grading Procedure: The following scale will be used to assign course grades.

91 – 100 = A	77 – 79 = C+
90 – 91 = A-	71 – 76 = C
88 – 89 = B+	70 – 71 = C-
81 – 88 = B	<70 = F
80 – 81 = B-	

Points will be assigned as follows:

Mid-term 1 = 60 points

Mid-term 2 = 60 points

Lab Exercise = 10 points/lab (4 labs) = 40 points

Class participation = 20 points

Final Exam = 60 points

Cheating: I will not tolerate ANY cheating or plagiarism of any type and will pursue disciplinary actions to the fullest extent possible. Do not copy anything from the web. Use primary literature and cite it!

Tentative Lecture Outline and Discussion Topics
(I reserve the right to change this schedule)

Date	Subject	Book Chapter
1/08/18	Introduction to course; probability	Chapter 1
1/10/18	Genetic Variation	Chapter 1
1/15/18	NO CLASS – MLK DAY	
1/17/18	Hardy-Weinberg Principle I	Chapter 2
1/22/18	After discussion , Wet Lab Show and Tell	paper discussion , then BL 427
1/24/18	HWE II	Chapter 2
1/29/18	HWE III	paper discussion
1/31/18	LAB 1a and 1b	Diversity and HWE
2/05/18	Natural Selection (part 1)	Chapter 3
2/07/18	Natural Selection (part 2)	Chapter 3
2/12/18	Genetic Drift I	Chapter 4, paper discussion
2/14/18	LAB 1c	Diversity and HWE
2/19/18	EXAM 1	Chapters 1, 2, 3
2/21/18	Genetic Drift II,	Chapter 4
2/26/18	Mutation	Chapter 5
2/28/18	Neutral Theory and Coalescence	Chapter 6
3/05/18	Drift and Selection	Paper discussion
3/07/18	Inbreeding	Chapter 8
3/12/18	NO CLASS – SPRING BREAK	
3/14/18	NO CLASS – SPRING BREAK	
3/19/18	Gene flow and genetic structure	Chapter 7
3/21/18	LAB 2	Gene Flow
3/26/18	Outlier loci and testing for selection	Paper discussion
3/28/18	Gene flow and genetic structure	Chapter 7
4/02/18	More gene flow	Chapter 7
4/04/18	LAB 3	STRUCTURE and AMOVA
4/09/18	EXAM 2	Chapters 4, 5, 6
4/11/18	Genetic structure	Paper discussion
4/16/18	Quantitative Genetics, Genomics and other odds and ends	Parts of chapter 9
4/18/18	Population assignment	Paper discussion
4/23/18	Population genomics	Paper discussion
4/30/18	FINAL EXAM	10:00 – 12:50

Important dates:

- Withdrawal deadline, March 21st
- Grades available on MyUCF, May 5th