



PCB 3063

Genetics

Spring 2021



Course Description

In this General Genetics course, we will cover eukaryotic, prokaryotic, viral, and organelle genetics. During the first half of the session we will study Genetics through the classical and cytological approaches to learn about the principles of heredity and the behavior of genes. During the second half, we will study the molecular basis of heredity. We will study the structure and replication of nucleic acids as well as the mechanisms of gene expression and regulation. We will also learn about experimental methods and their applications, ending with an introduction to DNA technology and forensic DNA analysis.

Prerequisites: BSC 2010C and CHM 2046, or C.I.

Instructor: *Dr. Walter D. Sotero*

Email: wsotero@ucf.edu

Please indicate your section number in your message.

Section Numbers: 0001 (12378) & 0002 (12529)

Office Hours: Zoom meetings (see page 5) beginning with the first meeting on Tuesday, January 12th

Section 0001: TuTh 9:30-10 AM

Section 0002: TuTh 11-11:30 AM

References and Resources

You will find everything you will need on **webcourses** (the PCB3063_CMB-21Spring 00128 course on <https://webcourses.ucf.edu/>). This course is organized in a series of **Modules** (see the "**Modules**" section on webcourses and the **schedule of topics** table on page 3). Each module will contain **class notes** as downloadable PowerPoint files and a **recorded lecture**. Some modules may contain **other resources** (downloadable PDF files of problem sets and reviews) and links to the **assignments** (exams and quizzes). You will also find all downloadable resources in the "**Files**" section of webcourses. As the modules are posted, you will be able to access their contents at any time.

Textbook: *Genetics: A Conceptual Approach*, 6th edition, by Benjamin A. Pierce. W. H. Freeman, 2017. Recommended, but not required. Available at the UCF Bookstore.

Sapling Learning: this online product from Macmillan[®] contains animations, videos, interactive exercises, and practice questions that are chosen by your instructor to complement class instruction. **It includes a digital version of the textbook, and it is priced much lower.** See "Accessing Sapling" on page 4. **Strongly recommended**, but not required. **Important:** the homework and quizzes on **Sapling** are meant for studying and practice purposes only and will *not* count toward your grade.

Course Objectives

Students should demonstrate understanding of the basic concepts of Genetics, demonstrate an ability to use information in new situations to solve problems, and be able to distinguish between concepts and draw connections. Learning outcomes include:

- Understand how the inheritance of alleles and characters relates to chromosome dynamics during meiotic cell division.
- Understand the principles of Mendelian and non-Mendelian inheritance of characters, distinguish between them, and apply this knowledge to new situations.

- Understand the concepts underlying gene mapping in eukaryotes, how it relates to chromosome interactions during meiosis, and apply this information.
- Understand inheritance and gene transfer in bacteria, and the infection cycles of the major categories of viruses.
- Understand and distinguish between the cellular processes of DNA replication, transcription, RNA processing, and translation. Be able to draw connections.
- Understand and be able to apply knowledge related to the principles of gene regulation in prokaryotes and eukaryotes.
- Understand methods of molecular genetics and their applications.

Exams and Grading

You will be taking all the exams and quizzes on webcourses. You will find them in the “**Assignments**” section on webcourses. You will also see links to assignment in the appropriate modules. Be sure you will have reliable internet access to take the exams and quizzes on the dates and times of the assignments and wherever you are. Your instructor does not have the capacity to remedy any technical issues that students might encounter when taking exams or quizzes. Recommended browsers for the assignments are Chrome, Firefox, Internet Explorer for Windows, and newer versions of Safari in Apple devices. All scores will also be posted on webcourses (the “**Grades**” section). You will receive a score of 0 for any exam or quiz that you miss.

Exams. There will be four regular exams plus a comprehensive final exam. *Only topics covered in the recorded lectures will be included in the exams.* All five exams will consist of fifty multiple-choice questions (2 points/question). The total for each exam will be **100** points. The lowest of your *five* exam scores will be dropped and will not count toward your final grade. For example, if you take the four regular exams and do not take the final exam, you will receive a score of 0 for the final exam but that score will be dropped and will not count toward your final cumulative score. You will receive a score of 0 for any exam that you miss, but will not count if you take the other four.

Bonus quiz. In addition to the exams, you will also be offered a quiz that will be worth 10 bonus points (2.5% of the grade bonus). The date, topics, and instructions for this quiz will be announced at a later date in an email message. You will not see the score of the bonus quiz added to the total until after the fourth exam.

Grading. The following formula will be used to calculate your cumulative score and course grade: sum of your *four* highest exam scores plus your score in the bonus quiz/4. The following grading scale will be applied to determine your final grade: 90-100%: A, 80-89%: B, 70-79%: C, 60-69%: D, 0-59%: F. No plus or minus (+/-) grades will be used in the scale. The score of the Practice Quiz (see “Documenting” on page 3) will *not* count toward your final grade. There will be no additional assignments or opportunities for credit after the final exam.

Exams Schedule

All the exams will be *synchronous*, so you are expected to take the exams at the scheduled dates and times along with all your classmates. All the exams will begin at 9:30 AM (for section 0001) and 11 AM (for section 0002), except for the final exam (see the schedule below). You will have 60 minutes to finish each exam, except for the final exam for which you will have 75 minutes. Additional time will be allowed for all the

exams for students that are approved by Student Accessibility Services (SAS, see “Course Accessibility” on page 5) to receive extra time. To allow you enough time to access and open each exam, the window of time for every exam will be five minutes longer than the actual time limits. See the "Guidelines for Exam Taking" on page 4 for more information.

The following is the schedule of exams with the **modules** (see webcourses and the schedule of topics on this page) covered in each.

<u>Dates</u>	<u>Modules</u>
Exam 1: February 4	1-4
Exam 2: March 4	5-8
Exam 3: April 1	9-12
Exam 4: April 22	13-16
Final Exam:	1-16
Section 0001: April 29, 7am	
Section 0002: May 4, 10 am	

Documenting Students’ Academic Activity

All faculty members are required to document students' academic activity at the beginning of each term. In order to comply, please take the **Practice Quiz** in the “**Assignments**” section of webcourses by 11:59 PM on the Friday of the first week of class. *Failure to do so may result in a delay in the disbursement of your financial aid.* The score of this quiz will *not* count toward your final grade. Make sure you can see the illustration in question #1 of the practice quiz. If not, try a different device or browser. That way you will be ready to see illustrations in the regular exams. You will be allowed unlimited attempts for the practice quiz.

Schedule of Topics for the Spring 2021 Semester

The following schedule of topics may be subject to modifications.

<u>Modules</u>	<u>Topics</u>	<u>Chapters*</u>
1	The chromosomal basis of genes and heredity	2
2	Mendelian genetics	3
3	Sex determination	4
4	Extensions of Mendelian genetics, part 1	5
5	Extensions of Mendelian genetics, part 2	5, 24
6	Pedigree analysis	6
7	Linkage: non-Mendelian genetics	7
8	Bacteria and bacteriophage genetics/Extranuclear inheritance	9, 11
9	The genetic material	10, 11
10	The replication of DNA	12
11	RNA and transcription	13
12	Eukaryotic gene structure and RNA processing	14
13	The genetic code and translation	15
14	Gene regulation in prokaryotes and eukaryotes	16, 17
15	Epigenetics	21
16	DNA technology, genome editing, and forensic DNA profiling	19

*From Pierce, 6th edition. The actual pages from the textbook will be indicated at the bottom of the first slide of each PowerPoint file. Even within those pages you might find material that are not relevant to the course, so you are advised to study the modules before the textbook references.

Accessing Sapling

You may purchase access to Sapling for one semester in one of two ways. Both include a digital version of the Pierce, 6th edition textbook.

- (A) Purchase **Genetics Sapling Access** from the UCF Bookstore for \$63.75. This is an access code to Sapling for this course and the digital version of the Pierce textbook. You might need to use this option if you are receiving financial aid for textbooks through UCF's textbook purchase program. *Or,*
- (B) Purchase **Sapling Homework for Genetics** at the Macmillan student storefront at <https://store.macmillanlearning.com/us/storefront/202005663> for \$59.99. You will be asked to find your course (school and instructor name) before registering.

Once you purchase Sapling, you will have the option to access it through the “**Macmillan Learning**” link on webcourses. In the event that you need to retake the course, Macmillan will grant you access for an additional term for free.

Guidelines for Exam Taking

- All the exams will be synchronous. You are responsible for knowing the dates and times for each exam.
- **Honor code:** you may have the textbook and the class notes with you during the exams, but you must ***work by yourself***.
- You will only be allowed one attempt per exam.
- Do not save copies of any kind of the questions of the exams and the bonus quiz. Do not disseminate the contents of the exams and the bonus quiz in any way.
- When you take an exam or quiz, you will see one question at a time, but you will be able to go back to previous questions.
- Unfortunately, because of the school restrictions due to the COVID-19 pandemic, and because of the online format of the exams, you will not be able to see your exams after you take them. Understandably, students usually want to see what they got wrong after they take an exam, but unfortunately you will not have that opportunity this semester. The instructor will not be on campus at any time during this semester.
- You will not be able to see your exam score until after the due time.
- If you take all the exams except the final, or if you take *any* four exams, you will have completed the minimum number of assignments required for calculating the final grade from exams taken, as detailed in the grading guidelines (see “Grading” on page 2). In that case, you will be considered a “finished the course” student for the purpose of any inquiries from the school about your participation in the course after the end of the term. That means you will not be eligible for an “incomplete” grade, *unless you request it before the grades due date*.
- The university will not allow us to meet in person, so it will not be possible for you to see your old exams after they are graded.

Make-up exams

Requests for make-up exams may be granted under special circumstances such as health issues, family emergencies, attendance to professional conferences, post-graduate school interviews, job interviews, military duties, jury duties, or any other justified reasons. You will be required to produce evidence to justify your case.

Your work schedule is not a valid reason to miss exams and will not be considered as an excuse for granting rescheduling of exams or for make-up exams. You are expected to plan your work schedule around your obligations as a student, *not the other way around*. The current class format situation due to the COVID-19 pandemic does not change that. You are expected to take the exams at the scheduled dates and times along with all your classmates regardless of your work schedule.

Technology and equipment problems may be considered valid reasons to make-up exams but will be evaluated on a case-by-case basis. If you encounter any such problem, you must notify the instructor within twenty-four hours after the exam due date and time with evidence of the problem. Problems with browsers are not a valid excuse. Make sure your browser is compatible (see “**Documenting**” on page 3).

The instructor will ultimately decide the merit of each case. It is preferable that make-up exams be scheduled for days and times before the regularly scheduled dates (see “**Exams Schedule**” on page 2), in which case they need to be scheduled at least one weekday in advance. Make-up exams can also be offered after regularly scheduled dates, but only if justified.

Once you take an exam, your score must be counted, even if you do not finish it, and you will not be allowed to re-take it. It is important that if you become ill or have any emergency situation, you contact the instructor immediately before attempting to take an exam.

There will be no make-ups for the bonus quiz. You will have a twenty-four hours window of time to take this quiz. If you miss the bonus quiz *for any reason*, you missed the bonus quiz.

Zoom Meetings

Because of the continued remote instruction requirement due to the COVID-19 pandemic, this course will use Zoom meetings as a replacement for on campus office hours for student’s questions and discussion of course topics. The meetings will start at the same time we would have had face-to-face lectures on campus (see the office hours schedule on page 1). The meetings may run longer than the scheduled 30 minutes if necessary, up to 75 minutes. Also, Zoom meetings with waiting room will be open during exam periods in case you have questions during an exam. Please familiarize yourself with Zoom by visiting the UCF Zoom Guides (<https://cdl.ucf.edu/support/webcourses/zoom/>). You may choose to use Zoom on your mobile device (phone or tablet) or computer.

The link to the meetings will be sent to you via email by the instructor. This link will be good for the entire semester.

Attendance to the Zoom meetings is entirely optional.

Things to Know About Zoom:

- Access our Zoom meetings through the link provided by the instructor via email message. After you use the link once, you will be able to access all meetings at <https://ucf.zoom.us> using your UCF NID and password.
- The Zoom meetings may be recorded.

- You can contact webcourses support (<https://cdl.ucf.edu/support/webcourses/>) if you have any technical issues accessing Zoom.

Course Accessibility

If you believe you would benefit from special accommodations for taking exams because of physical, mental, or psychological reasons, you are encouraged to contact Student Accessibility Services (SAS, <http://sas.sdes.ucf.edu>) at 407-823-2371 or at sds@ucf.edu to explore options about special accommodations such as extra time.

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

UCF Cares

UCF Cares is a resource available to help you with your academic success and your overall well-being. It is an umbrella of care-related programs and resources dedicated to fostering a caring community of Knights. Visit <http://cares.sdes.ucf.edu> if you are seeking help for yourself or if you are worried about a friend or classmate. Free services and information are included for a variety of student concerns, including but not limited to substance abuse, sexual violence response, bias incidents, LGBTQ support, mental health concerns, financial and housing challenges, and active duty military students support and accommodations. You will find links to the Knights Helping Knights Pantry, the Just Knights Response Team, UCF Victims Services, Veterans Academic Resource Center, Housing, Health Care, Legal Services, Counseling Services, Group Counseling Resources, UCF Safe Zone, and much more. You can also e-mail ucfcares@ucf.edu with questions or for additional assistance. You can reach a UCF Cares staff member between 8 a.m. and 5 p.m. by calling 407-823-5607.

If you are in immediate distress, please call Counseling and Psychological Services to speak directly with a counselor 24/7 at 407-823-2811.

Privacy of Student's Educational Records

The Family Educational Rights and Privacy Act (FERPA) of 1974 is a Federal law that protects the privacy of student education records. In accordance to this law, instructors may not disclose any personally identifiable information or student's records to anyone (including parents) without the written and signed consent of the student (unless ordered by a court or in case of an emergency, if the information is necessary to protect the health or safety of the student). These include student ID number, social security number, residency status, race/ethnicity, email address, test scores, grades, GPA, academic standings, class schedule, and transcripts.

In order to comply with FERPA, instructors may not disclose information about exam scores, grades or any other personally identifiable information or records to students via email, telephone or text messages. This information can only be released to the student in person and with a valid identification.

FERPA also gives students the right to review their educational records, the right to request amendment to records they believe to be inaccurate, and the right to limit disclosure from those records. For more information visit <https://www2.ed.gov/policy/gen/guid/fpco/index.html>.

Academic Integrity

As a UCF student, you are expected to follow the standards of conduct established in the Office of Student Conduct (<https://osc.sdes.ucf.edu/process/roc/>). Any violations to the standards of conduct may result in judicial action, which could result in suspensions or expulsion from the University. At a minimum, violations of these rules may result in a permanent record of the infraction being placed in your degree audit.

You are responsible for knowing all course rules and policies. If any changes to the syllabus become necessary, the instructor will notify all the students about the changes in a timely manner before they are implemented. By remaining in the class, you accept the terms and conditions of the syllabus.

The instructor has the ultimate authority to determine the correct interpretation of the contents of this syllabus.

If at any time you test positive for Covid-19, call the UCF's COVID Line at (407) 823-2509 as soon as possible for contact tracing.

An extended version of this syllabus, which includes expanded sections on University services, resources, and policy statements can be found on webcourses (the "Syllabus" section).

