



# PCB 3063

## Genetics

### Spring 2024



#### Course Description and Format

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 analysis.

This is a **face-to-face** lecture course with in-person and online assignments.

**Prerequisites:** BSC 2010C (with a C or better) and CHM 2046, or C.I.

**Instructor:** *Dr. Walter D. Sotero*

**Instructor's Office:** Bio 202B

**Email:** [wsotero@ucf.edu](mailto:wsotero@ucf.edu) (please indicate PCB 3063 in your messages)

**Section Number:** 0002 (12152)

**Meeting Times:** WeFr 12-1:15PM

**Classroom:** CSB 101

**Office Hours:** TuTh 10:30AM-12:30PM

**Teaching Assistant:** *Charles Ferron.*

Office hours: M 11:30-1:30 & W 1:30-2:30, Bio 202B.

Both the course instructor and the teaching assistant will be available during their office hours to answer your questions, assist you with course topics, and to let you see your old exams. There is no need to make appointments to meet during scheduled office hours. *You may simply show up.* Contact us if our office hours do not work for you.

#### 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.

## Resources and References

The online resources for this course are on **webcourses** (your PCB3063-24Spring 0002 course on <https://webcourses.ucf.edu/>). This course is organized in a series of **Modules** (the “**Modules**” link and the **schedule of topics** are on the home page of webcourses). Each module will contain **class notes** as downloadable PowerPoint files. Some modules will also contain links to **assignments** and other resources such as downloadable PDF files. You may bring printouts of the files to class, or you may access them in the classroom from a laptop, tablet, or phone. As the modules are posted, you will be able to access their contents at any time. *Note*: the recorded lectures produced during the Covid-19 pandemic lockdown have been shelved and will no longer be available as resources for this course unless special circumstances merit their use.

**Textbook**: Genetics: A Conceptual Approach, 7<sup>th</sup> edition, by Benjamin A. Pierce. W. H. Freeman, 2019. *Recommended*, but not required. Available at the UCF Bookstore.

**Achieve**: this online product from Macmillan<sup>®</sup> 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 Achieve”. *Recommended*, but not required.

**Important**: the homework and quizzes on Achieve are meant for studying and practice purposes only and will *not* count toward your grade.

## Assignments and Grading

***You will be taking four in-person exams, five online practice quizzes, and an online final exam.*** Special accommodations for all the assignments will be granted to students that are approved by Student Accessibility Services (SAS, see “Course Accessibility”) for extended exam time and/or alternative testing environment. You will find the online assignments in the “**Assignments**” link on the webcourses home page. You will also see links to the online assignments in the appropriate modules. Be sure you will have reliable internet access to take the online assignments wherever you are. See “Guidelines and Policies for Assignments” for more information. All scores will be posted on webcourses (the “**Grades**” link). You will receive a score of 0 for any exam or quiz that you miss.

**Exams**. There will be four regular in-person exams plus a comprehensive online final exam. *You are responsible for knowing the dates and times for each exam.* Only topics covered in the lectures will be included in the exams. The in-person exams may include a combination of multiple-choice and free-response questions. The online final exam will consist of multiple-choice questions only. The total for each of these exams will be **90** 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 first five 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. The exams will count toward **90%** of your grade.

**Practice quizzes**. There will also be five online practice quizzes. The due dates will always be two days before an exam, except for the last one before the final exam. The total for each practice quiz will be **10** points. The lowest of your *five* practice quiz scores will be dropped and will not count toward your final grade. The practice quizzes will count toward **10%** of your grade.

**Bonus quizzes.** You will also be offered a series of optional online bonus quizzes for extra credit. The dates, topics, and instructions for the quizzes will be announced at later dates. You will not see the scores of the bonus quizzes added to your cumulative total until the scores of the fourth exam are posted.

**Grading.** The following formula will be used to calculate your total score at the end of the semester: the sum of your **four** highest exam scores plus the sum of your **four** highest practice quiz scores, divided by **4**. The following standard grading scheme will be applied to determine your final grade from your total score: 100-90%: A, <90-80%: B, <80-70%: C, <70-60%: D, <60-0%: F. No plus/minus (+/-) grades will be used in the scale. The score of the "Preview Quiz" (see "Documenting") will *not* count toward your final grade. *There will be no additional assignments or opportunities for extra credit.*

### **Exams Schedule**

You are expected to take the exams on the scheduled days and times. The in-person exams will be in the classroom. You will have **75** minutes to finish each in-person exam and **60** minutes to finish the online final exam. All the exams, except for the final, will start at 12PM. See the "Guidelines" for more information about taking the exams. The following is the schedule of exams with the modules covered in each (see webcourses and the schedule of topics on this page), *which may be subject to change.*

<b><u>Exam Dates</u></b>	<b><u>Modules</u></b>
<b>Exam 1:</b> February 2	1-4
<b>Exam 2:</b> March 1	5-8
<b>Exam 3:</b> April 3	9-12
<b>Exam 4:</b> April 19	13-16
<b>Final Exam:</b> April 24, <b>10AM</b>	1-16

### **Practice Quizzes Schedule**

The topics for each practice quiz will be the same as the exam that follows it, and the links will become visible in the corresponding modules. For each of these quizzes, you will have **15** minutes to finish once you open it, within a 24-hour window of time that begins at 12:00PM on the day before the due date. See the "Guidelines" for more information about taking these quizzes. The *due dates* will be the following:

- Practice quiz 1:** January 31
- Practice quiz 2:** February 28
- Practice quiz 3:** March 29
- Practice quiz 4:** April 17
- Practice quiz 5:** April 22

### **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 **Preview Quiz** by 11:59 PM on the Friday of the first week of class. You will find this quiz in **module #0**. *Failure to do so may result in a delay in the disbursement of your financial aid.*

When taking this quiz, make sure you can see the illustrations in this quiz. If not, try a different device. That way you will be ready to see the illustrations in the online assignments. You will be allowed unlimited attempts for the first quiz.

### Schedule of Topics for the Spring 2024 Semester

<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, 7<sup>th</sup> 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. This schedule of topics may be subject to modifications.

### Attendance

Your instructor will not keep a record of your attendance to class. Therefore, you do *not* need to provide excuses for missing classes. However, attending the lectures is *strongly* encouraged. The topics to be discussed in class may not be limited to those found in the textbook or class notes.

Please show respect for your instructor and classmates by arriving on time to class and by staying until the lecture is over. Please silence your phones or any other devices during the lectures. *Do not use your phones for talking, texting, or using social media in the classroom during lectures.* No smoking or vaping is allowed in the classroom.

### Accessing Achieve

This *optional* resource contains animations, videos, interactive exercises, and practice questions, and includes a digital version of the textbook. To purchase access, go to the “**Macmillan Learning**” tab on the left menu of webcourses, click “**Achieve**”, and follow the prompts to purchase it. Instructions about other ways to purchase can be found at <https://macmillan.force.com/macmillanlearning/s/article/Achieve-Join-a-course>. Once you purchase Achieve, you will have the option to access it through the same “Macmillan Learning” link on the left menu. In the event that you need to retake the course, Macmillan will grant you access for an additional term for free.

## Guidelines and Policies for Assignments

- The word “**assignment**” refers to any in-person or online exam or quiz.
- You will be notified well in advance about any changes to the schedule or the format of any assignment.
- *If you will be taking the in-person exams at the Student Accessibility Services (SAS) testing center, there are special additional guidelines that you will need to be aware of (see “Course Accessibility”).*
- For the online assignments, make sure you can distinguish between the day and time an assignment becomes available, and the “**due date**” on webcourses.
- ***Make sure you are using a reliable internet connection for the online assignments.*** If you know your Wi-Fi is not always reliable, consider connecting your computer directly to the internet source, having a hotspot ready, or finding a location where you can take the exam confidently. Your instructor’s ability to help you if an accessibility problem occurs during an online assignment is *very* limited, and you might not get a second chance to complete the assignment.
- ***Honor code:*** do not save or share copies in any form of the questions or answers of the online assignments. Do not disseminate the contents of the online assignments in any way.
- You will only be allowed one attempt per assignment, except for the preview quiz.
- The in-person exams will be offered in the classroom.
- If you are taking the in-person exams in the classroom, you will not need to bring your own scantrons. They will be provided.
- You will need to bring your own pencil to take the in-person exams.
- If you arrive late to the classroom on an in-person exam day, you will be allowed to take the exam, but you will be required to finish by the scheduled time.
- You will need a calculator for the second exam, but it can not be your phone or a data-storing device.
- You may not have any visible communication devices with you during the in-person exams. This includes phones, tablets, laptops, and music players. You may not have any open class notes or textbooks with you during the in-person exams.
- You may not leave the classroom before turning in your exam without authorization. This will result in the disqualification of your exam.
- Know your *Student I.D. Number* for the exams (your PID, not your NID).
- *Do not write the answer letters on the sides of the exam pages. This will be considered enabling cheating and will carry an automatic **2-points deduction** from your exam score.*
- Be sure you have finished filling all the bubbles for your answers and your I.D. number on your scantron before time expires. *You may not take any additional time to do this. Failure to follow this guideline may result in a **2-points deduction** from your exam score.* To avoid this, you are encouraged to complete the I.D. number section of your scantron before answering any exam questions.
- Failure to fill out the I.D. number section on your scantron (and without errors) may result in a delay in receiving your exam score.
- When you take an online assignment, you will see one question at a time, but you will be able to go back to previous questions.

- If the time allowed to finish an online assignment expires before you submit it, it will automatically close, and your answers will be saved.
- Once the exam scores become available on webcourses, you may review them during the regular office hours. Be ready to show a photo identification. However, you may not take any notes or photos when reviewing your old exams.

### **Make-up Exams and Incomplete Grades**

Requests for rescheduling exams and 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, religious observances, or any other justified reasons approved by the school. You may be required to produce evidence to justify your case. All make-up exams will be offered at the Biology testing center, which will run on Tuesdays and Fridays, 1:30-3:30.

***A request for rescheduling an exam must be made by email prior to the day of the exam or on the day of the exam at the latest.*** The day and time to take a make-up exam must be agreed by the student and the instructor. You may not make that decision on your own. Failure to follow these instructions may disqualify you from being granted a make-up exam. You are expected to be diligent in communicating with the instructor.

***Make-up exams will only be offered at the Biology testing center at the specific times scheduled by the department.*** These are TBA (unless you will be taking the in-person exams at the SAS testing center). Make-up exams for in-person exams need to be scheduled at least two days in advance so be sure to coordinate with the instructor in a timely manner. Students that have been granted permission to take the in-person exams at the SAS testing center and request make-up exams for in-person exams need to coordinate with both the instructor and SAS in a timely manner.

***Conflicting exams schedules are not a valid reason for rescheduling exams.*** The only exception for this rule is if the conflict is due to an exam time extension approved by SAS, in which case you must notify the instructor to make appropriate arrangements. Do not enroll in overlapping courses if it will result in conflicts (see the schedule of exams).

***Your work schedule is not a valid reason to miss exams and will not be considered an excuse for granting make-up exams.*** You are expected to plan your work schedule around your obligations as a student, *not the other way around*. The recent situation due to the COVID-19 pandemic did 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. Plan your term accordingly.

***Once you take an exam, your score must be counted (unless it turns out to be your lowest score), even if you do not finish it, and you will not be allowed to re-take it.*** Do not take an exam if you have an emergency that can be documented. It is important that if you become ill or have any emergency, you contact the instructor immediately and *before* attempting to take an exam.

***The instructor will ultimately decide the merit of each case.*** It is preferable that, if justified, an exam be rescheduled for a date *before* the regularly scheduled day and time (see the schedule of exams). A make-up exam can also be offered after the regularly scheduled exam day and time, but only if justified by properly documented reasons.

***Religious observances.*** According to UCF regulation 5.020, a student who desires to observe a religious holy day of their religious faith must notify all of the instructors teaching the class(es) from which the student desires to be excused *no later than the tenth*

*business day of the term.* This includes requesting rescheduling of exams. For more information about this regulation, go to <https://regulations.ucf.edu/chapter5.asp> and click on UCF-5.020.

**Active duty.** Students who are deployed active-duty military and/or National Guard personnel and require special accommodations such as rescheduling of exams or practice quizzes should contact the course instructor as soon as possible after the semester begins and/or after they receive notification of deployment to make appropriate arrangements.

***There will be no make-up practice quizzes, bonus quizzes, or the final exam.*** You will have a twenty-four hour window of time to take each quiz. If you miss a quiz *for any reason other than active duty*, you missed that quiz. The university does not allow make-up final exams. However, you have the option to request an incomplete grade if you have a justifiable reason to miss the final exam.

**Incomplete grades.** If you take any assignments after the 60% of the term date, your status will be “finished the course” for the purpose of any inquiries from the school about your participation in the course at the end of the term. That means you will not be eligible for an “incomplete” grade *unless you request one before the grades due date.* If you are unable to take all the exams and wish to be granted an incomplete grade, you must request it to the instructor. You will be required to present evidence of justification and complete an agreement form before the end of the term. Otherwise, you will be given a grade according to your total score. If the agreement includes taking the final exam at a later date, it will be an in-person version. *Important:* you will not be able to access any online course resources after the course ends, so be sure to download and save any necessary files before the end of the term so you can have them to study for exams to remove the incomplete.

### **Course Accessibility**

If you believe you would benefit from special accommodations for taking exams and quizzes because of a disabling chronic physical or mental condition, you are encouraged to contact **Student Accessibility Services (SAS)**, <http://sas.sdes.ucf.edu> at 407-823-2371 or at [sds@ucf.edu](mailto:sds@ucf.edu) to explore options about accommodations such as extended exam times or a special environment to take the exams. The SAS office and testing center is located at Ferrell Commons, room 185. Other services such as notetaking and video captioning are also available through the SAS office.

If you will be taking the in-person exams at the SAS testing center, you need to be aware of the following guidelines:

- You are responsible to make sure that you are approved by SAS for the right exam dates (the same dates specified in this syllabus).
- The SAS testing center does not provide scantrons, so you will need to have your own. The instructor may be able to provide some during office hours.
- If you are allowed extra time, you may choose, and are *encouraged* to do so if possible, to begin your exams *before* the regularly scheduled times rather than to finish later, whenever possible. You will need to notify SAS in advance if you want to choose this option for the in-person exams. If you want to choose this option for the final exam, you may contact the instructor.
- The SAS testing center also have special policies regarding students that arrive late for an exam that you should be aware of.

### **Zoom Meetings**

Your instructor will have a Zoom session (with waiting room) during the final exam in case you have questions. *Entering this Zoom session is entirely **optional**.* You may also request to schedule private meetings with the instructor if needed. You may use the “Zoom” link on webcourses. You may also use your UCF NID and password at <https://ucf.Zoom.us> to schedule your own meetings. Visit the UCF Zoom Guides at <https://cdl.ucf.edu/support/webcourses/Zoom/>, where you can also get support if you experience any technical issues.

### **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 about the Family Educational Rights and Privacy Act, visit <https://registrar.ucf.edu/ferpa/>.

### **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](mailto: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.

### **Academic Integrity**

As a UCF student, you are expected to follow the standards of conduct established in the Office of Student Conduct and Academic Integrity (<https://scai.sdes.ucf.edu>). 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 enrolled in this 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.

Portions of this course, including exams, may be moved to online format in case of unforeseen circumstances, in which case you will be notified promptly.

**Students are required to notify the university if they receive a positive COVID-19 test result or diagnosis by calling the UCF COVID Line at 407-823-2509.** This will ensure robust tracing of cases at UCF and will help the university identify and contain potentially impacted populations.

An extended version of this syllabus, which includes expanded sections on University services, resources, and policy statements can be found on webcourses.

