



PCB 3063

Genetics

Spring 2023



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 forensic DNA analysis.

This is a face-to-face lecture course with in-person exams, online exams, and online quizzes. **Prerequisites:** BSC 2010C (with a C or better) and CHM 2046, or C.I.

Instructor: *Dr. Walter D. Sotero*

Instructor's Office: Bio 202B

Office Hours: TuTh 10:30AM-12:20PM

Email: wsotero@ucf.edu. Please indicate PCB 3063 in your messages.

Section Number: 0001 (14804)

Meeting Times: MoWeFr 11:30AM-12:20 PM

Classroom: CSB 101 (College of Sciences Building)

Teaching Assistant: *Daniel Gamarra*

TA's Office Hours: 9:30-10:20AM, Bio 202B

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 PCB3063-23Spring 0001 course on <https://webcourses.ucf.edu/>). This course is organized in a series of **Modules** (find the “**Modules**” link on the menu on the left side of the home page of

webcourses, and the **schedule of topics** table on page 3). Each module will contain **class notes** as downloadable PowerPoint files and a **recorded lecture**. The recorded lectures were produced in 2020 during the Covid-19 pandemic and are included for your convenience but *are not meant to be substitutes for attending in-person lectures*. Some modules may contain other resources such as downloadable PDF files. You may bring printouts of these files to class, or you may access them in the classroom from a laptop, tablet, or phone. Some modules may also contain links to **online exams quizzes**. As the modules are published and the files are posted, you will be able to access their contents at any time.

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

Achieve: 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 Achieve” on page 4. *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.

Exams and Grading

You will be taking three exams in person, three exams online, and all the quizzes online. You will find the online exams and quizzes in the “Assignments” link on webcourses. You will also see links to the online exams and quizzes in the appropriate modules. Be sure you will have reliable internet access to take the online exams and quizzes wherever you are. See “Guidelines for exam taking” on page 4 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 five regular exams plus a comprehensive final exam. Some of the exams will be in person and others online (see the “exams Schedule” on page 3). ***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 exams will consist of multiple-choice questions only. The total for each exam will be **80** points. The lowest of your *six* 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 five.

Bonus quizzes. In addition to the exams, you will also be offered online bonus quizzes that will be worth a total of 8 bonus points (2% of the grade bonus). The dates, topics, and instructions for the quizzes will be announced at later dates. You will not see the score of the bonus quizzes added to your cumulative total until after the fifth exam.

Grading. The following formula will be used to calculate your total score at the end of the semester: sum of your **five** highest exam scores plus your scores in the bonus quizzes, divided by **4**. The following 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 Practice Quiz (see “Documenting” on page 4) will *not* count toward your final grade. There will be no additional assignments or opportunities for extra credit after the final exam.

Exams Schedule

You are expected to take the exams on the scheduled days and times. The in-person exams will be in classroom CSB 101. You will have 50 minutes to finish the first two in-person exams and 90 minutes to finish the in-person final exam. For the rest of the exams, which will be online, you will have a *time window* of 50 minutes that will begin at 11:30AM to open the exam and finish it. Once you open an exam, you will have 45 minutes *within the 50 minutes time window that ends at 12:20PM* to finish it. Special accommodations for all the exams will be granted to students that are approved by Student Accessibility Services (SAS, see “Course Accessibility” on page 7) for extended exam time and/or alternative testing environment. See the "Guidelines" on page 4 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*.

<u>Exam Dates</u>	<u>Modules</u>
Exam 1: February 3 (online)	1-3
Exam 2: February 24 (in person)	4-6
Exam 3: March 24 (in person)	7-9
Exam 4: April 12 (online)	10-12
Exam 5: April 24 (online)	13-16
Final Exam: April 26, 10AM (in person)	1-16

Schedule of Topics for the Spring 2023 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, 7th 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. The schedule of topics may be subject to modifications.

Attendance

Attendance to the classroom lectures is *not* required. Your instructor will not keep a record of your attendance to class. Therefore, you do *not* need to provide excuses for missing classes. Although you will have the option of watching the recorded lectures at home, attending the classroom lectures is still strongly encouraged. The recorded lectures are not meant to be substitutes for in person lectures, and do not include all the topics covered in class. If you do attend, please show respect for the instructor and your 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 use your phone for talking or texting in the classroom during lectures. No smoking or vaping is allowed.

The topics to be discussed in class may not be limited to those found in the textbook or class notes. *Only topics covered in class will be included in the exams.*

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.*

When taking this practice 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 regular exams. You will be allowed unlimited attempts for the practice quiz.

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 Taking Exams

- *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” on page 7).*
- All the exams will be **synchronous**. *You are responsible for knowing the dates and times for each exam.*
- **Make sure you are using a reliable internet connection for the online exams.** 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 such a

- problem is confronted during an exam is *very* limited, and you might not get a second chance to take the exam (see “Make-up exams” on page 5).
- **Honor code:** you may have the textbook and the class notes with you during the online exams, but you must **work by yourself**.
 - **Honor code:** do not save or share copies in any form of the questions or answers of the online exams and the bonus quizzes. Do not disseminate the contents of the exams and the bonus quizzes in any way.
 - We will not meet in the classroom on online exam days, but your instructor will be on Zoom to take your questions (see “Zoom Meetings” on page 8).
 - You will only be allowed one attempt per exam and bonus quiz.
 - All the in-person exams will be offered in the lecture classroom at 11:30AM except for the final exam which will begin at **10AM**. You will have 90 minutes to finish the final exam.
 - If you are taking the exams in the classroom, you will not need to bring your own scantrons. They will be provided.
 - If you arrive late on an exam day, you will be allowed to take the exam, but you will be required to finish by the scheduled time. However, *once the first student has finished the exam and left the room, no other students will be allowed in to begin the exam.*
 - You will need a calculator for the *third* exam, which cannot be a communication device, data-storing device, or include a camera.
 - You may not have any visible communication devices with you during 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.
 - 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.
 - It is particularly critical that you fill out the I.D. number section on your scantron without errors on your final exam. If you do not, the score of the final exam *may not count* because the instructor might not be able to receive your score before the grades due deadline.
 - When you take an online exam or quiz, 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 your online exam expires before you submit it, your exam will automatically close, and your answers will be saved.
 - You will be able to see your online exam or quiz score on webcourses shortly after the due time.

- Once the exam scores become available on webcourses, you may review them during the regular office hours. Be ready to show your UCF student identification. However, you may not take any notes or photos when reviewing your old exams.
- The deadline to review your first four exams and all the quizzes is April 21st. You are encouraged not to wait until the end of the term to see the exams because traffic through the office may be too high. You may review exam 5 and the final exam during final exams week.
- If you decide not to take the final exam, you do *not* need to show up on the day of the final exam or write your name on a scantron. You will automatically get a score of zero (which will not count if it's your lowest score).
- If you take any exams or quizzes 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 it to the instructor 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 and complete an agreement form. Otherwise, you will be given a grade according to your total score.
- *Note:* the scores of the bonus quizzes will not be added to your total cumulative score until the scores of the fourth exam are received.

Make-up exams

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. ***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.

Make-up exams for in-person exams will only be offered at the Biology testing center at the specific times scheduled by the department. These are Mondays and Tuesdays, 9-11AM in Bio 104 (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 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.

Technology and equipment problems may be considered valid reasons for make-up exams and will be evaluated on a case-by-case basis, but your instructor's ability to help you if such problems are confronted during an exam is very limited. If you encounter any such problem, notify the instructor within twenty-four hours after the exam due day and time with evidence of the problem. *Problems with browsers are not valid excuses.* Make sure your browser is compatible.

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), in which case they need to be scheduled at least one weekday in advance. A make-up exam can also be offered after the regularly scheduled exam day and time, but only if justified by properly documented reasons.

There will be no make-up bonus quizzes or the final exam. You will have a twenty-four hour window of time to take each bonus quiz. If you miss a bonus quiz *for any reason*, you missed that bonus quiz. The university does not allow make-up final exams.

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 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.

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 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 exams at 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 choose this option).

Zoom Meetings

Your instructor will have a Zoom session (with waiting room) during each online exam scheduled period in case you have questions during the exam. *Entering the Zoom sessions during the online exams is entirely optional.* You may also request to schedule private meetings with the instructor if needed. You can use Zoom on your mobile device (phone or tablet) or computer. 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 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.

