



# PCB 3023

## Molecular Cell Biology

Fall 2023



### Course Description

In this course we will examine the physiology and molecular biology of cells. We will study their structure and function from the molecular level to the different sub-cellular components, and the regulation of different biological processes. Major topics will include macromolecules, genome structure and dynamics, organelles, metabolism, neuronal physiology, signal transduction pathways, the cell division cycle, and cancer.

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

**Prerequisites:** Both BSC 2010C and PCB 3063 with a C or better, and either CHM 2210 or CHM 2205, or C.I. Certain relevant topics covered in Genetics might be reviewed briefly but will not be discussed in depth. Therefore, only students who have already completed PCB 3063 or an equivalent should take this course.

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

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

**Email:** [wsotero@ucf.edu](mailto:wsotero@ucf.edu) (please indicate PCB 3023 in your messages)

**Section Number:** 0001 (82760)

**Meeting Times:** MoWeFr 9:30-10:20AM

**Classroom:** HS1 119

**Office Hours:** TuTh 11:30AM-1PM

### Course Objectives

Students should demonstrate understanding about the structures and functions of the different subcellular components of the eukaryotic cell, and how these work within the larger context of the whole cell. Students should also demonstrate understanding about the interactions between cells that lead to their regulation of functions and cell cycles. Specific learning outcomes include:

- Understand the basic functions and dynamics of the major groups of molecules of the cell.
- Understand how energy is acquired and processed by the cell.
- Understand the structure and functions of the cell membrane, with emphasis on its permeability and electrical properties.
- Understand the system of internal membranes within the context of its roles in secretory and endocytic pathways.
- Understand the ways in which cells communicate with each other, and how communication signals activate intracellular transduction pathways that lead to altered cell behavior.
- Understand the structure and functions of the cytoskeleton, with emphasis on its roles in intracellular trafficking, cell movement and muscle cell contraction.
- Understand the mechanisms of the eukaryotic cell division cycle, and how its regulation can lead to cell proliferation or programmed cell death.
- Understand how cancers develop because of failures in cell regulation.

### References and Resources

The online resources for this course are on **webcourses** (your PCB3023-23Fall 0001 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 will also find all the downloadable resources in the “**Files**” link of webcourses. You may bring printouts of these 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 for the Covid-19 pandemic lockdown have been shelved and will no longer be available as resources for this course.

**Textbook:** *Essential Cell Biology*, 5<sup>th</sup> edition, by Alberts *et.al.* Garland Science, 2019. *Recommended*, but not required. Available at the UCF Bookstore.

### **Assignments and Grading**

*You will be taking five exams in-person, the final exam online, and all the quizzes online.* Special accommodations for all the assignments will be granted to students that are approved by Student Accessibility Services (SAS, see “Course Accessibility” on page 6) 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” 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 in-person regular exams plus a comprehensive online final exam (see the “exams schedule” on page 3). *Only topics covered in the lectures will be included in the exams.* The exams may contain multiple-choice and free response questions. 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 a series of online bonus quizzes that will be worth a total of 12 bonus points (3% of the grade bonus). The dates, topics, and instructions for the quizzes will be announced in the classroom and the links will become visible in the corresponding modules. You will not see the scores of the bonus quizzes added to your cumulative total until scores of the fifth exam become available.

**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 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 First Quiz (see “Documenting” on page 4) 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. You will have **50** minutes to finish each of the five in-person (*please arrive early*) exams and **60** minutes to finish the online final exam (based on school guidelines). See the " Guidelines and Policies for Assignments” on page 4 for more information about taking the exams. The following is the schedule of exams with the modules covered in each. If any changes to this schedule become necessary, you will be notified well in advance.

<u><b>Dates</b></u>	<u><b>Modules</b></u>
<b>Exam 1:</b> September 11	1-4
<b>Exam 2:</b> October 2	5-8
<b>Exam 3:</b> October 20	9-11
<b>Exam 4:</b> November 8	12-14
<b>Exam 5:</b> December 1	15-18
<b>Final Exam:</b> December 8, 8AM	1-18

### **Schedule of Topics for the Fall 2023 Semester**

<u><b>Modules</b></u>	<u><b>Topics</b></u>	<u><b>Chapters*</b></u>
1	Introduction to cells	1
2	The molecules of the cell	2
3	Protein structure and regulation	4
4	The organization of the eukaryotic genome	5
5	DNA repair, recombination, and rearrangements	6
6	The molecular mechanisms of cell differentiation	8
7	The evolution of genes and genomes	9
8	The cell membrane	11-12
9	Energy in biochemical reactions	3
10	Cellular respiration	13-14
11	Biosynthesis of cell components	13-14
12	The system of internal membranes	15
13	Cell communication	16
14	Intracellular signal transduction	16
15	The cytoskeleton	17
16	The regulation of the cell division cycle	18
17	Apoptosis and tissue renewal	20
18	Cancer	20

\*From Alberts *et.al.*, 5<sup>th</sup> edition. The actual pages from the textbook will be indicated at the bottom of the first slide of each unit (PowerPoint file). This schedule of topics may be subject to modifications if necessary.

### **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.

### **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 **First 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 first 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.

### **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” on page 6).*
- The five regular exams will be **in-person** and the final exam will be **online**. *You are responsible for knowing the dates and times for each exam.*
- 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.
- The in-person exams will be offered in the lecture classroom at 9:30AM.
- The online final exam will start at 8:00AM.
- If you are taking the in-person exams in the classroom, you will not need to bring your own scantrons. They will be provided.
- 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. *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 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.
- 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 your 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.
- *Note:* the scores of the bonus quizzes will not be added to your total cumulative score until the scores of the fifth exam become available.

### **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.

*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.

*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 will be recorded 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), 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 other than active duty*, you missed that bonus 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.

***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.

***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 any necessary files before the end of the term if you believe you will need them to study for exams to remove the incomplete at a later date.

### **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 at SAS testing center 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 SAS.

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).
- 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 does not provide scantrons, so you will need to have your own. The instructor may be able to provide some during office hours.
- The SAS testing center also have special policies regarding students that arrive late for an exam that you should be aware of.

### **Zoom Meetings**

You may request to schedule private meetings with the instructor if necessary. 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.

Under exceptional situations, Zoom sessions may be used by the instructor to replace in-person office hours. Otherwise, Zoom meetings are not meant to be substitutes for in-person office discussions of course topics.

### **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.

