EUKARYOTIC CELL STRUCTURE AND FUNCTION
PCB 3134 Section 3387 and 01H3, Fall – 2023
3 credits

PREREQUISITES: A grade of "C" or better in Core Biology (BSC 2010, 2010L, 2011, 2011L); Organic Chemistry (CHM 3210 or 3200) or equivalent courses.

CLASS SCHEDULE: This is a virtual course with a fixed schedule: M, W, F, 3rd Period (9:35AM – 10:25 AM). The virtual classes will be given through Zoom (ID: **914 3391 8928**, Passcode: **299629**). The class schedule is provided in the next page. **You are highly recommended to attend the virtual classes via Zoom.**

TEXTBOOK: Karp's Cell and Molecular Biology: Concepts and Experiments, 9th ed., John Wiley & Sons, Inc., New Jersey, 2016. Author – Janet Iwasa & Wallace Marchall.

COURSE WEBSITE: https://ufl.instructure.com/. Please select PCB 3134 (Section 3387 or 01H3).

SUPPLEMENTAL MATERIALS: Materials including the syllabus, individual lecture Powerpoint notes and lecture videos, practice tests with answer keys, your test and quiz results, as well as information related to assignments and testing will be posted on the web page.

INSTRUCTOR: Dr. Zhonglin Mou
Office: 1249 Microbiology and Cell Science Building (MCS)
Telephone: 352-392-0285
Email: please use Canvas email

OFFICE HOURS: M, W, F 4:00 PM – 5:00 PM EST via Zoom (meeting ID: **949 525 0208** and passcode: **MCB6772**)

COURSE OBJECTIVES: The objectives of the course are to provide an understanding of the structural, molecular and functional organization of eukaryotic cells. Emphasis will be placed on:

(1) The structural organization of cells and cell organelles;
(2) The specific function(s) of each organelle;
(3) Compartmentalization of functions within the cells and organelles;
(4) The integration of functions that are compartmentalized within cells;
(5) The regulation of cell functions;
(6) Transmission of genetic information;
(7) Cell proliferation;
(8) Experimental approaches to the study of cell structure and functions.

Students will be responsible for mastering materials covered in the lectures and assigned reading materials from the textbook. The chapters parallel to the lecture materials are listed on the course calendar in the next page. It is recommended that you should read the materials assigned from the text prior to each virtual lecture or watching each lecture video in order to benefit the most from the lectures.

Lecture topics for the course are listed in the course calendar (see below). The topics to be covered will follow the order indicated in the schedule of lecture topics; however, the amount of coverage of specific topics may vary somewhat from the list.

Lecture date	*Topic*	*Reading Assignment (Chapters)*
	Introduction to the Study of Cell and Molecular Biology	Chapter 1
Lecture 1 (8/23, W)	Course introduction, WileyPLUS introduction	
Lecture 2 (8/25, F)	Overview of cell organization	
Lecture 3 (8/28, M)	**Techniques in Cell and Molecular Biology**	Chapter 18
	The Chemical Basis of Life	Chapter 2
Lecture 4 (8/30, W)	Chemical bonds, water, pH, and buffers	
Lecture 5 (9/1, F)	Overview of molecular composition of cells	
	Bioenergetics, Enzymes and Metabolism	Chapter 3
Lecture 6 (9/6, W)	Thermodynamics, free energy, reaction equilibrium	
Lecture 7 (9/8, F)	Enzymes – properties, activation energy, mechanisms, kinetics	
Lecture 8 (9/11, M)	Metabolism - oxidation/reduction, energy transfer, regulation	
	The structure and Function of the Plasma Membrane	Chapter 4
Lecture 9 (9/13, W)	Overview - understanding membrane structure, membrane composition - lipids	
Lecture 10 (9/15, F)	Membrane composition - carbohydrates, proteins	
Review 1 (9/18, M)	**Review for Test 1**	
9/19-22*	**FIRST TEST** (Honorlock)	
Lecture 11 (9/20, W)	Lipids and membrane fluidity, dynamic nature of plasma membrane, erythrocyte membrane	
Lecture 12 (9/22, F)	Movement of substances across cell membranes	
Lecture 13 (9/25, M)	Membrane potentials, nerve impulses	
	Aerobic Respiration and the Mitochondrion	Chapter 5
Lecture 14 (9/27, W)	Mitochondria structure/function, oxidative metabolism, tricarboxylic acid cycle	
Lecture 15 (9/29, F)	Oxidation/reduction, electron transport, proton motive force	
Lecture 16 (10/2, M)	ATP formation, other roles of the proton motive force, peroxisomes	
	Photosynthesis and the Chloroplast	Chapter 6
Lecture 17 (10/4, W)	Chloroplast structure/function, overview of photosynthesis, pigments	
Lecture 18 (10/9, M)	Photosynthetic units, reaction centers, photophosphorylation	
Lecture 19 (10/11, W)	Carbon dioxide fixation, carbohydrate synthesis	
	Interaction Between Cells and Their Environment	Chapter 7
Lecture 20 (10/13, F)	Extracellular space, interaction of cells with the extracellular matrix	
Review 2 (10/16, M)	**Review for Test 2**	
10/17-20*	**SECOND TEST** (Honorlock)	
Lecture 21 (10/18, W)	Cell-cell interaction, cell junction, plant cell walls	
	Cytoplasmic Membrane Systems: Structure, Function and Membrane Trafficking	Chapter 8
Lecture 22 (10/20, F)	Endomembrane systems, smooth endoplasmic reticulum, rough endoplasmic reticulum (RER)	
Lecture 23 (10/23, M)	Complete RER, Golgi complex, vesicle transport	
Lecture 24 (10/25, W)	Lysosomes, proteasomes, plant vacuoles, endocytosis, importing proteins	
	The Cytoskeleton and Cell Motility	Chapter 9
Lecture 25 (10/27, F)	The cytoskeleton, microtubules, intermediate filaments	
Lecture 26 (10/30, M)	Microfilaments, molecular motors, cilia and flagella	

Lecture 27 (11/1, W)	Muscle contractility, nonmuscle motility	
	The Nature of the Gene and the Genome	Chapter 10
Lecture 28 (11/3, F)	Chromosomes, chemical nature of DNA	
Lecture 29 (11/6, M)	Structure of the genome, stability of the genome	
Review 3 (11/8, W)	**Review for Test 3**	
11/9-12*	**THIRD TEST** (Honorlock)	
	The Central Dogma: DNA to RNA to Protein	Chapter 11
Lecture 30 (11/13, M)	Overview of central dogma, ribosomal RNA, 5S RNA	
Lecture 31 (11/15, W)	Transfer RNA, messenger RNA, genetic code	
Lecture 32 (11/17, F)	Structure of tRNA, translation - initiation, elongation, termination	
	Control of Gene Expression	Chapter 12
Lecture 33 (11/20, M)	The nucleus - nuclear envelop, nuclear pore, nucleocytoplasmic exchange	
Lecture 34 (11/27, M)	Chromatin/chromosomes, nuclear organization	
	DNA Replication	Chapter 13
Lecture 35 (11/29, W)	Replication is semiconservative, replication in prokaryotes, DNA polymerases, fidelity of replication, replication in eukaryotes	
	Cell Division	Chapter 14
Lecture 36 (12/1, F)	Cell cycle, cell cycle regulation	
Lecture 37 (12/4, M)	Mitosis, cytokinesis, meiosis, recombination	
Review 4 (12/6, W)	**Review for Test 4**	
12/9-12*	**Fourth Test** (Honorlock)	
12/12-15*	**Make-up Test** (Honorlock)	

* The test will be available in the 4 days from **6:00 AM to 11:30 PM EST**.

LECTURE ATTENDANCE: There will be virtual lectures via Zoom at the assigned dates. The lectures will be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

If there is no virtual lecture on an assigned date, a video will be posted online on that day. If there is virtual lecture, a video from the Zoom recordings will be made available the day after the assigned lecture day. You are expected to watch the video if you miss a vitrual lecture. The students are responsible for all materials covered in lectures or videos and Powerpoint notes, including any announcements related to the course. It is recommended that you read the Powerpoint notes for each lecture and related text materials, and watch the lecture videos for the virtual lectures you miss. This will allow you to have enough time to understand and remember the content and to perform well in the quizzes and tests.

TESTING: On the tests, you will be responsible for materials covered in lecture, Powerpoint notes as well as the assigned readings. Much of the materials covered in lecture will reinforce the materials covered in the text. In addition, there will be materials covered in lecture that is not covered in the text. You will be responsible for the lecture materials whether or not it is covered in the assigned reading. Most test questions will be based on materials covered in lecture, Powerpoint notes, and related materials in the text or materials that are specifically assigned for study and not covered in lecture. A few of the test questions may come from materials in the reading

assignments, which are not covered in lecture. Tests will cover the units of materials indicated under the TEST SCHEDULE.

To perform well in each test, a fully functional computer, not a mobile device, with smooth, stable internet connections to **Honorlock** will be needed, as all four tests will consist of computer-based multiple-choice questions and will have a fixed amount of time and thus must be finished in one sitting. Examples of the type of questions that will be asked can be found in practice tests, which are available through CANVAS. All students must take the tests through **Honorlock** during the periods of test days. Students are responsible to contact **Honorlock** and set up their own test schedules. Exams will be automatically closed at the end of each test period. Each test must be finished in a single sitting. **It is not allowed to take tests in groups.**

All exams will be proctored using **Honorlock**. The use of multiple devices to take exams and attempts to Screen Print or record during exams are strictly forbidden and will be prosecuted as Honor Code violations. Anyone not able to meet the above laptop computer requirements should contact the instructor as soon as possible.

Proctoring standards

A **=>110˚ field of view USB external camera** is required for taking the four proctored exams. Please order the camera as early as possible to ensure you can test it before Test 1 (A used one will be fine as long as it works). Here is an example of the camera (https://www.amazon.com/Desktop-with110-Degree-Digital-Microphone-Recording/dp/B082CJPNB5). However, if you have ordered a camera with a 110-degree field of view, it will work, but it should be placed further away (4-6 ft) from the test taker to include the head, computer, keyboard, and hands in the view. The 110-degree camera may need to be located at a distance greater than the length of the desk. *If you have financial difficulty purchasing the camera, please let the instructor know as soon as possible.* If you take the exam without using the external camera, or the camera position does not meet standards, points will be deducted. In order to gain access to Exam-1, you **must** first complete the **External Camera Certification** process. Detailed camera specifications and position requirements can be found at the Canvas course website.

In addition to the four tests, there will be 10 quizzes given during the semester. The quizzes will be online through CANVAS **(NOT requiring Honorlock)**. Each quiz will have 6 questions. Although only 6-8 minutes will be needed for each quiz, we will allot 20 minutes to make reasonable accommodation for all students. Each quiz will be based on materials covered in lectures, Powerpoint notes, or assigned reading materials that are covered in the few lectures before the quiz day. The quizzes will remain open in CANVAS for 2 days. Three attempts will be allowed during the 2 days and the best grade will be used. Correct answers to the quiz questions will be released after the 2 days.

All quizzes will be included for calculating your final grade. The exact dates for quizzes will be announced in Canvas through email.

TEST SCHEDULE: The four tests will be given through Honorlock. Each test will cover materials presented in lecture, Powerpoint notes, and in the assigned readings for the lectures indicated below. There will be 35 questions in each test.

1st TEST	Materials covered in lecture 1 to lecture 10 and assigned readings
2nd TEST	Materials covered in lecture 11 to lecture 20 and assigned readings
3rd TEST	Materials covered in lecture 21 to lecture 29 and assigned readings
4th TEST	Materials covered in lecture 30 to lecture 37 and assigned readings

MAKE-UP TEST (optional): A make-up test is scheduled at the end of the semester to give you an opportunity to retake the test for which you have the **lowest** score. For example, if you earn 85 for Test 1, 90 for Test 2, 86 for

Test 3, 97 for Test 4, you can retake Test 1. The make-up test will cover the same materials as the regular test but the questions will be different.

GRADING: The course grade will be determined by your performance on the four tests and the 10 quizzes. Each test will determine 22.5 percent of your grade and the quizzes will determine 10 percent of your grade. For example, if you earn 85 for Test 1, 90 for Test 2, 86 for Test 3, 97 for Test 4, and 98 (average) for quizzes, your final grade will be: 85 × 22.5% + 90 × 22.5% + 86 × 22.5% + 97 × 22.5% + 98 × 10% = 90.35, and you will have an "A-" for the course. **Please note that the automatically calculated course grade in Canvas will not necessarily reflect exactly the above calculation. Please also bear in mind that depending on the performance of the whole class, a curved-grading mechanism may be applied, which means that your final score may be different from the above calculation.**

Grade Scale:

Grade	Percent of total points	Grade	Percent of total points
A	>92 - 100	C	>64 - 69
A-	>86 - 92	C-	>60 - 64
B+	>82 - 86	D+	>55 - 60
B	>79 - 82	D	>51 - 55
B-	>76 - 79	D-	>45 - 51
C+	>69 - 76	E	0 - 45

OFFICE HOURS: Office hours are listed at the top of the course syllabus or will be held at other times as announced or by appointment. Any change in the listed office hours will be announced on the course web page. If you have any problems in the course, I encourage you to take advantage of my Zoom office hours for whatever your specific needs may be.

COURSE EVALUATION: Last but not least, students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/. **One point (1%) will be given to each student at the end of the class if more than 70% of the students complete the online evaluation.**

STUDENTS REQUIRING ACCOMMODATIONS: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center (https://disability.ufl.edu/get-started/). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

NETIQUETTE GUIDE FOR ONLINE COURSES: It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette, and be found in the follow URL: http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

UNIVERSITY HONESTY POLICY: UF students are bound by The Honor Pledge, which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code". On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor

received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructors in this class.

CAMPUS RESOURCES: Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

HEALTH and WELLNESS:

- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575;
- Student Mental Health, Student Health Care Center, 392-1171, personal counseling.
- Sexual Assault Recovery Services (SARS) at the Student Health Care Center, 392-1161.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.
- For emergency, please call University Police Department, 392-1111 (or 9-1-1 for emergencies). http://www.police.ufl.edu/

ACADEMIC RESOURCES:

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.
- Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. http://www.crc.ufl.edu/
- Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. http://writing.ufl.edu/writing-studio/

ADDITIONAL COMMENTS REGARDING ACADEMIC INTEGRITY: Students are encouraged to discuss course-related materials with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other. However, the following is considered academic dishonesty, and the instructors expect that no student will ever do any of the following:

- Have another person complete a quiz or test in this course
- Copy another student's quiz or test answers in this course
- Collaborate with anyone during a quiz or test in this course
- Discuss the questions and answers of a quiz or test with other students while the quiz/test window is still open.
- Manipulate and/or distribute any materials provided in this course for any dishonest purpose (including course lecture slides).
- Use any materials provided by a previous student taking the course.

SOFTWARE USE: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damage and/or criminal penalty for the individual violator. Because such violations are also against university policies

and rules, disciplinary action will be taken as appropriate.

Microsoft Office 365 Software is free for UF students: http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/
Other free software is available at: http://www.software.ufl.edu/
To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

UNIVERSITY OF FLORIDA COMPLAINTS POLICY AND STUDENT COMPLAINT PROCESS: Most problems, questions and concerns about the course can and will be resolved by professionally communicating with the instructors.

The University of Florida believes strongly in the ability of its students to express concerns regarding their experiences at the University. The University encourages its students who wish to file a written complaint to submit that complaint directly to the department that manages that policy.

If a problem really cannot be resolved by communicating with the instructors (or the TAs) you can contact:

Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.
Online Course: http://www.distance.ufl.edu/student-complaint-process.