Syllabus-Spring 2024
Syllabus subject to change

Course name: PCB3134: Eukaryotic Cell Structure and Function; 3 credits

Sections: 14685 & 14757

Course description: This course is for undergraduate students and is designed to introduce the students to the field of cell biology with emphasis on the interrelation of structure and function, the regulation of metabolism, and the specialized activities of plant and animal cells.

Course goals: Upon completion of this course, the students should have a solid knowledge of the general characteristics and differences of plant and animal cells. The students will have a general understanding of how cells operate, communicate, and control their activities.

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 (9:35 AM – 10:25 AM). The virtual classes will be given through Zoom. **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, 2020. Author – Janet Iwasa & Wallace Marchall.

Course website: **https://ufl.instructure.com/courses/499337**

Instructor: Dr. Jessie Fernandez
Office: 1149 Microbiology and Cell Science Building (MCS)
Telephone: 352-294-9167
Email: Please use Canvas email

Office hours: W 11:00 AM – 12:30 PM EST via Zoom conferences feature in Canvas by appointment.

Course objectives: The students will be able to:

- Identify the structural organization of cells and cell organelles.
- Describe the specific function(s) of each cell organelle.
- Explain the compartmentalization of functions within the cells and organelles.
- Distinguish the function of cell proliferation.
- Identify the major cellular components that are used to generate and utilize energy in cells.
- Explain the central dogma of life.
- Describe how gene expression is regulated at the transcriptional and post-transcriptional levels.
- Describe the cellular components underlying mitotic cell division.
- Explain the different experimental approaches to the study of cell structure and functions.

Course Structure:
The course will have a collection of modules that contain lectures, videos, and other materials to be viewed by the student to facilitate learning of basic principles of eukaryotic cell structure and function. Students will be assessed through weekly quizzes, discussion boards, assignments, case studies, and examinations. Feedback will be provided to students for their assessments via comments/messages on Canvas and individual meetings during office hours.
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 and lecture topics 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 /Quizzes
Module 1: Introduction to the Study of Cell and Molecular Biology (p1)		Chapter 1
Lecture 1 (1/8, M)	Course introduction; Overview of cell organization	
Lecture 2 (1/10, W)	Overview of cell organization	
Module 2: The Chemical Basis of Life (p31)		Chapter 2
Lecture 3 (1/12, F)	Bonds, acids/bases, biological molecules	**Quiz 1**
Lecture 4 (1/17, W)	Molecular composition of cells: Carbs, lipids & proteins	
Lecture 5(1/19, F)	Molecular composition of cells: proteins, chaperones & nucleic acids	
Module 3: The Structure and Function of the Plasma Membrane (p137)		Chapter 4
Lecture 6 (1/22, M)	Overview in membrane function & composition- lipids, carbs	**Quiz 2**
Lecture 7 (1/24, W)	Membrane composition- proteins; membrane fluidity	
Lecture 8 (1/26, F)	Nature of plasma membrane, movement of substances across cell membranes, membrane potentials, nerve impulses	
Module 4: Aerobic Respiration and the Mitochondrion (p203)		Chapter 5
Lecture 9 (1/29, M)	Mitochondria structure/function, aerobic metabolism, tricarboxylic acid cycle	**Quiz 3**
Lecture 10 (1/31, W)	Oxidation/reduction, electron transport, proton motive force	
Lecture 11 (2/2, F)	ATP formation, ATP synthase, peroxisomes and glyoxysomes	
Review 1 (2/5, M)	**Review for Exam 1 *****	
2/6-2/10*	**FIRST EXAM** (Honorlock)	
Module 5: Photosynthesis and the Chloroplast (p239)		Chapter 6
Lecture 12 (2/7, W)	Chloroplast structure/function, photosynthesis, chromoplasts	**Quiz 4**
Lecture 13 (2/9, F)	Photosynthetic units, reaction centers, photophosphorylation	
Lecture 14 (2/12, M)	Carbon dioxide fixation, carbohydrate synthesis	
Module 6: Interaction Between Cells and Their Environment (p267)		Chapter 7
Lecture 15 (2/14, W)	Extracellular space, interaction of cells with the extracellular matrix	**Quiz 5**
Lecture 16 (2/16, F)	Cell-cell interaction, cell junction	
Lecture 17 (2/19, M)	Plant cell wall	
Module 7: Cytoplasmic Membrane Systems: Structure, Function and Membrane Trafficking (p307)		Chapter 8
Lecture 18 (2/21,W)	Endomembrane systems, Approaches to the study of endomembranes, Endoplasmic reticulum: rough, smooth	**Quiz 6**
Lecture 19 (2/23, F)	Complete RER, Golgi complex, vesicle transport	
Lecture 20 (2/26, M)	Lysosomes, proteasomes, plant vacuoles, endocytosis, importing proteins	
Review (2/28, W)	**Review for Exam 2**	
2/29-3/4*	**SECOND EXAM** (Honorlock)	
Module 8: The Cytoskeleton and Cell Motility (p369)		Chapter 9
Lecture 21 (3/1, F)	The cytoskeleton, microtubules, motor proteins	**Quiz 7**
Lecture 22 (3/4, M)	MTOC, cilia, and flagella intermediate filaments	
Lecture 23 (3/6, W)	Cellular motility, muscle contractility	
Module 9: The Central Dogma: DNA to RNA to Protein (p477)		Chapter 10/11
Lecture 24 (3/8 F)	Chemical nature of genes	**Quiz 8**

3/9-3/17	**Spring Break**	
Lecture 25 (3/18, M)	Central Dogma, ribosomal RNA	
Lecture 26 (3/20, W)	Transfer RNA, messenger RNA, genetic code	
Lecture 27 (3/22, F)	Structure of tRNA, translation - initiation, elongation, termination	
Module 10: Control of Gene Expression (p537)		Chapter 12
Lecture 28 (3/25, M)	Operon in bacteria, the nucleus - nuclear envelope, nuclear pore, nucleocytoplasmic exchange	**Quiz 9**
Lecture 29 (3/27, W)	Chromatin/chromosomes, nucleus organization, gene regulation and transcriptional control	
Lecture 30 (3/29, F)	Transcriptional repression, RNA processing & posttranslational control	
Review (4/1, M)	**Review for Exam 3**	
4/2-4/6*	**THIRD EXAM** (Honorlock)	
Module 11: DNA Replication and Repair (p605)		Chapter 13
Lecture 31(4/3, W)	Replication is semiconservative, replication in prokaryotes, DNA polymerases,	
Lecture 32 (4/5, F)	Fidelity of replication, replication in eukaryotes, DNA repair	
Module 12: Cell division (p637)		Chapter 14
Lecture 33 (4/8, M)	Cell cycle, cell cycle regulation, mitosis, cytokinesis, meiosis, recombination	**Quiz 10**
Module 13: Cell Signaling and Signal Transduction (p685)		Chapter 15
Lecture 34 (4/10, W)	The basic elements of cell signaling systems Extracellular messages and receptors G protein-coupled receptors and second messengers	**Quiz 11**
Lecture 35 (12, F)	Protein-Tyrosine phosphorylation as a mechanism for signal Transduction Green cells: Auxin signaling	
Lecture 36 (4/15, M)	The role of calcium as an intracellular messenger Convergence, divergence, and cross-talk among different signaling pathways	
Lecture 37 (4/17, W)	The role of NO as an intracellular messenger Apoptosis	
Module 14: Techniques in Cell and Molecular Biology (p692)		Chapter 18
Lecture 38 (4/19, F)	Techniques in Cell and Molecular Biology	
Lecture 39 (4/22, M)	Techniques in Cell and Molecular Biology	
Review (4/24, W)	**Review for Final exam**	
4/24-4/28	**Make-up exam (1-3)**	
4/28-5/2[a]	**FOURTH EXAM** (Honorlock)	

** It will be performed via Zoom.

* The exam will be available in the 3 days from **9:00 AM to 11:59 PM EST**.

[a] May changes

Lecture attendance:

There will be virtual lectures via Zoom on the assigned dates. The lectures will be audio-visually recorded for students in the class to refer back to 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 unmute 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 are prohibited.
If there is no virtual lecture on an assigned date, a video will be posted online on that day. If there is a 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 virtual 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 quizzes and exams.

Reviews: The day of the review is the perfect opportunity to pose any last-minute questions before the exam. The goal of the review is to address questions about the exam topics. It won't be a formal lecture; we'll cover the material for the exams, but the main focus is on answering questions about the lectures. It's strongly suggested that you attend. The meeting will be on Zoom and recorded.

Examinations:
On the exams, you will be responsible for materials covered in lectures, PowerPoint notes as well as the assigned readings. Much of the materials covered in the lectures will reinforce the materials covered in the exam. Most exam questions will be based on materials covered in the lectures, PowerPoint notes, and related materials in the textbook or materials that are specifically assigned for study and not covered in the lectures.
All exams will be proctored using **Honorlock**. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You DO NOT need to create an account, download software, or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, a USB external side-view camera (more details will be provided on Canvas), and a stable Internet connection. All exams will be administered through Honorlock using Canvas.

Exam schedule: The four exams will be given through Honorlock. Each exam will cover materials presented in the lectures, PowerPoint notes, and the assigned readings for the lectures indicated below. The fourth exam is not cumulative. Exam windows will be open for 4 days and must be taken within that period. The windows will open at 9 AM EST and close at 11:59 PM EST. If you live in a different time zone, please take this into account. Canvas will cut your exam off at 11:59 PM Eastern Standard Time.
Make-up of missed exams will follow UF policy. Further information regarding make-up assignments, and other work can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Exams	Material covered	Dates
1st	Module 1-4	Feb 7-9
2nd	Module 5-7	Mar 2-4
3rd	Module 8-10	Apr 4-6
4th	Module 11-14	Apr 30-May 2nd*

*May change

Make-up exam (optional): A make-up test is scheduled at the end of the semester to allow you to retake the test for which you have the **lowest** score. The make-up test will cover the same materials as the regular test, but the questions will be different. It will only be available for Exam 1, 2 and 3 not for the final exam 4.

Quizzes: Short quizzes will be assigned to each module. There will be a total of 13 quizzes given during the semester. (11 module quizzes plus orientation and honorlock quizzes). **Only 10 quizzes will be included for calculating your final grade.** The quizzes will be online through CANVAS **(NOT requiring Honorlock)**. Each quiz will have 10 questions. Although only 6-8 minutes will be needed for each quiz, we will allow 15 minutes to provide 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, and they are open book. The quizzes will remain open in

CANVAS for 5 days. Two attempts will be allowed during the 5 days and the best grade will be used. The quiz window closes once the due date passes so students will not have access to quizzes if they have not been attempted at least once. Correct answers to the quiz questions will be released after due day. The exact dates for quizzes will be announced on Canvas through email. Quizzes cannot be taken late so missed quizzes will count as a zero and can count towards a quiz drop. The orientation quiz is required and may not be dropped.

Case studies (open book): There will be 2 case studies, each is worth 8 points and will typically consist of several multiple-choice questions that are based on a case-study scenario with an associated set of analytical questions. These are made available ahead of time so you can answer all the questions before submitting the answers. Students are welcome to collaborate on these quizzes. However, each student is responsible for submitting his/her own quiz by the posted due date.

Assignments (open book):
There will be 4 analytic assignments, each worth 15 points. The assignments are short answer questions about specific topics/concepts covered or uncovered in class.

Discussion board (open book): There will be 3 graded discussion board activities assigned throughout the semester; one discussion is the "introduce yourself" and the other two discussions are based on assigned videos or readings that supplement the weekly lecture material. Each discussion board activity is worth 15 points. The "introduce yourself" discussion board activity is only 5 points.

Extra credit Assignments: There will be no extra credit assignments given in this course.

Assessment	Value of Total Grade
Exams (x4)	69%
Quizzes (x10)	10%
Analytical assignments (x4)	8%
Study case (x2)	8%
Discussion board (x3)	5%
	100%

Grade Scale: The cutoffs for letter grades will be as follows.

Grade	Range	Grade	Range
A	100 % to 93.0%	C	< 74.99 % to 72.0%
A-	< 92.99 % to 88.0%	C-	< 71.99 % to 68.0%
B+	< 87.99 % to 86.0%	D+	< 67.99 % to 65.0%
B	< 85.99 % to 82.0%	D	< 64.99 % to 61.0%
B-	< 81.99 % to 78.0%	D-	< 60.99 % to 57.0%
C+	< 77.99 % to 75.0%	E	< 56.99 % to 0.0%

Grade rounding will be done as outlined above. (For example, a final grade of 81.95 is a B-)

Grading: The course grade will be determined by your performance on the 4 exams, 4 analytical assignments, 10 quizzes, 3 board discussions, and 2 case studies. 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.

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/.

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:
https://www.cise.ufl.edu/wp-content/uploads/2019/08/CISE_Netiquette_Guide.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.

Technical difficulties:
For issues with technical difficulties for Canvas, please contact the UF Help Desk at:

- helpdesk.ufl.edu (Links to an external site.)
- (352) 392-HELP (4357)
- Walk-in: HUB 132

Any requests for make-ups due to technical issues should be accompanied by the ticket number received from the Help Desk when the problem was reported to them. The ticket number will document the time and date of the problem. You should e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Health and Wellness:

- **U Matter, We Care**: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit the U Matter We Care website to refer or report a concern and a team member will reach out to the student in distress.
- **Counseling & Wellness Center:** Visit the UF Counseling & Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
- **Student Health Care Center:** Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the UF Student Health Care Center website.
- **University Police Department**: Visit the UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- **UF Health Shands Emergency Room/Trauma Center:** For immediate medical care in Gainesville, call 352-733-0111, or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; UF Health Shands Emergency Room/Trauma Center website.

Academic resources:

- **Career Connections Center:** Career assistance and counseling services. 352-392-1601; UF Career Connections Center website (Links to an external site.).
- **Library Support:** Various ways to receive assistance with respect to using the libraries or finding resources. UF George A. Smathers Libraries Ask-A-Librarian website (Links to an external site.)
- **Teaching Center:** General study skills and tutoring. 352-392-2010; UF Teaching Center website (Links

to an external site.)

- **Writing Studio:** Help brainstorming, formatting, and writing papers. 352-846-1138; University Writing Program Writing Studio website