

## Syllabus-Fall 2023

\*\*Syllabus subject to change\*\*

**Course name:** PCB4522-Molecular Genetics; 3 credits

**Sections:** 18787 & 29172; 29428

**Course description:** In this course, we will delve into the synthesis and manipulation of DNA and explore the fundamental principles of gene expression at the molecular level in prokaryotes and eukaryotes. We will cover various topics, including an overview of DNA replication, repair mechanisms, and the packaging of genetic material into chromosomes. To make the most of this course, it is advisable to have a solid understanding of introductory biology at the college level. Additionally, we recommend having prior exposure to at least one other specialized biology course, such as Microbiology, Botany, Zoology, Genetics, or Biochemistry.

**Course goals:** The main goal of PCB4522 (Molecular Genetics) is to enable students to comprehend the functions of DNA and RNA in prokaryotes (Eubacteria and Archaea) as well as eukaryotes, encompassing yeast, plants, drosophila, and humans.

**Prerequisites:** A grade of “C” or better in Core Biology (BSC 2010, 2010L) or equivalent courses.

**Class schedule:** This is an asynchronous course. Recorded lectures will be posted on Canvas every Tuesday and Thursday.

**Textbook:** Lewin’s Genes XII, Authors: Krebs, Goldstein, and Kilpatrick. (Strongly recommended)

**Course website:** <https://ufl.instructure.com/courses/485008>

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

**Office hours:** T & R 11:00 AM – 12:00 PM EST via Zoom conferences feature in Canvas by appointment.

**Course objectives:** The students will be able to:

- Describe the central dogma of life.
- Evaluate the roles of DNA and RNA in prokaryotes and eukaryotes, including humans, by analyzing their organization and evolution.
- Demonstrate understanding of DNA replication in various organisms, such as bacteria, plasmids, transposable elements, and eukaryotic organelles.
- Analyze the molecular events involved in DNA repair and recombination, assessing their importance for maintaining genome integrity.
- Comprehend the molecular mechanisms governing gene expression at the transcriptional level, with a focus on eukaryotes.

### **Course Structure:**

The course will consist of several modules that include lectures, videos, and supplementary materials designed to help students grasp the fundamental principles of molecular genetics. To assess their understanding, students will participate in weekly quizzes, engage in discussion boards, complete assignments, and take examinations.

It will be the students' responsibility to thoroughly comprehend the lecture content and assigned readings from the textbook. The course calendar provides a list of chapters corresponding to the lecture materials and topics (refer to the calendar below). The topics covered will follow the sequence outlined in the schedule of lecture topics; however, the depth of coverage for specific subjects may vary slightly from the provided list.

Lecture date	Topic	Reading /Quizzes
<b>Module 1: Gene organization and structure</b>		Chapters 1 & 3
Aug 24 R	Course introduction; Central dogma: From gene to RNA to proteins	Quiz 1
Aug 29 T	The interrupted Gene: Exons versus Introns	
<b>Module 2: Common approaches in molecular biology</b>		Chapter 2
Aug 31 R	Methods in Molecular Biology 1	Quiz 2
Sept 5 T	Methods in Molecular Biology 2	
<b>Module 3: Genomes</b>		Chapters 4-5; 7-8
Sept 7 R	Genomes organization and sequences	Quiz 3
Sept 12 T	Chromosomes and Chromatin function and organization	
Sept 14 R	Review**	
Sept (15-18)	Exam 1*	
<b>Module 4: Replication and cell cycle</b>		Chapters 9-10
Sept 19 T	Replication is connected to the cell cycle	Quiz 4
Sept 21 R	Initiation of replication	
<b>Module 5: Replicons</b>		Chapters 11-12
Sept 26 T	DNA Replication: initiation, elongation, and termination	Quiz 5
Sept 28 R	Extrachromosomal replication; <i>Agrobacterium</i> biology	
<b>Module 6: DNA repair systems</b>		Chapters 14-15
Oct 3 T	DNA repair systems	Quiz 6
Oct 5 R	Transposable elements	
Oct 10 T	Review	
Oct (11-14)	Exam 2*	
<b>Module 7: Transcription initiation</b>		Chapters 17-18
Oct 12 R	Transcription process in prokaryotes	Quiz 7
Oct 17 T	Transcription process in eukaryotes	
<b>Module 8: RNA splicing and translation</b>		Chapters 19-20; 22
Oct 19 R	messenger RNA generation	Quiz 8
Oct 24 T	Translation: from mRNA to protein	
<b>Module 9: Gene regulation</b>		Chapter 24
Oct 26 R	The <i>Lac</i> Operon	Quiz 9
Oct 31 T	The <i>Trp</i> Operon	
Nov 2 R	Review	
Nov (3-6)	Exam 3*	
<b>Module 10: Eukaryotic transcription regulation</b>		Chapter 26
Nov 7 T	Activators and repressors; Yeast-2-Hybrid approach	Quiz 10
Nov 9 R	Chromatin remodeling	
<b>Module 11: Epigenetics</b>		Chapters 27-28
Nov 14 T	Part I	Quiz 11
Nov 16 R	Part II	
<b>Module 12: RNA biology</b>		Chapters 29-30
Nov 21 T	Noncoding RNA	Quiz 12
Nov 28 T	RNA regulators: CRISPR, small RNA molecules	

Nov 30 R	Review	
Dec (1-4) <sup>a</sup>	<b>Exam 4*</b>	
Dec (10-13) <sup>a</sup>	Make-up exam (optional)	

\*\* It will be performed via Zoom.

\* The exam will be available in the 4 days from **6:00 AM to 11:59 PM EST**.

<sup>a</sup> May change

### **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 text 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, an 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. Exams windows will be **open for 4 days** and must be taken within that period. The windows will open at 6AM 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 exams, assignments and other work can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**Make-up exam (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. The make-up test will cover the same materials as the regular test, but the questions will be different.

<b>Exams</b>	<b>Material covered</b>	<b>Dates*</b>
1 <sup>st</sup>	Modules: 1-3	Sept 15-18
2 <sup>nd</sup>	Modules: 4-6	Oct 11-14
3 <sup>rd</sup>	Modules: 7-9	Nov 3-6
4 <sup>th</sup>	Modules: 10-12	Dec 1-4

\*May change

**Quizzes:** Short quizzes will be assigned to each module. There will be a total of 14 quizzes given during the semester. (12 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 the 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 and Honorlock quizzes are required and may not be dropped.

**Assignments (open book):**

There will be 5 analytic assignments, each worth 8 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)	84%
Quizzes (x10)	8%
Analytical assignments (x5)	5%
Discussion Board (3X)	3%
Total	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 four exams, 5 analytical assignments, 10 quizzes, and 3 board discussions. 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 following URL: [https://www.cise.ufl.edu/wp-content/uploads/2019/08/CISE\\_Netiquette\\_Guide.pdf](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](http://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](mailto: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](#)