BIOL 2050

Biology of the Eukaryotic Cell

Thursdays 3-6 PM, TBA

Spring 2020

INSTRUCTOR: Prof. Richard Freiman: MCB Department, Brown University

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Room 407 at 70 Ship St (LMM)
Telephone: 401-863-9633
Available to meet with students before and after each class and via email.

COURSE DESCRIPTION:

BIOL 2050 is a graduate level course that will cover both fundamental and applied aspects of cell and molecular biology. In this course, we will review the basic molecular pathways that ensure that the eukaryotic genome is properly packaged, replicated and expressed and repaired in healthy cells. We will also explore the structure and compartmentalization inside an outside of the eukaryotic cell that help determine how cells respond to their environment and communicate with each other. In addition to covering fundamental cell biological principles and mechanisms emphasis of the material will examine how the disruption of such exquisite regulation leads to disease states and apply this mechanistic knowledge towards improving human health.

REQUIRED TEXT: ***Essential Cell Biology*** ***5th edition*** by Alberts, Bray, Hopkin, Johnson, Lewis, Raff, Roberts, and Walter, 2019. www.garlandscience.com/ECB5-students. Garland Press (Abbreviated to ECB in reading assignments.)

Primary Literature: In addition to the textbook reading, we will also analyze and critique recently published review and experimental papers that apply to the cell biological system that are covered each week and will instruct how this knowledge can be used for improving human health in the future.

Weekly Format: The first half of each week's class will encompass a more traditional lecture-type presentation by the instructor on the topic specified on the schedule followed by a class discussion of the an assigned paper in the second half of the class. Both textbook and primary literature will be assigned for each class.

COURSE REQUIREMENTS:

1. Regular attendance and participation in class (**30 pts**)
2. Completion of assigned readings and submission of QUestions And Critiques (QUACs) of the assigned primary literature (**3 points each; 30 pts)**.
3. Satisfactory completion of three in class exams (**Exam I Thurs. Feb. 20; Exam II Thurs. March 26; Exam III, Thurs. April 23; 100 pts each, 300 points total).**
4. Completion of final presentation (**40 pts**).

QUestions And Critiques (QUACs)
On all lecture topics (except our first session on Jan. 23), please hand in two short and insightful QUACs you have about the assigned primary literature reading for that day. Ideally one could be a question you have about the paper and one could be a critique of the paper. These QUACs can be used to ask questions during the discussion of the primary literature and bring up important points of discussion. Each QUAC will be evaluated and worth 3 points.

Exams and Grading:
Three 100 point exams will be given throughout the semester that will be a combination of multiple choice and short answer questions. Each exam will focus on the material presented in the previous third of the course and will cover the assigned readings from the textbook and the primary papers. Graded exams will be returned approximately one week after they are taken. Please look over your graded exams carefully and discuss any questions or problems with me directly. You should bring any grading issues to my attention within two weeks after the graded exams have been returned.

Final grades will be determined based on attendance, participation, QUACs, final presentations and scores on three exams. The final grade for the course will be calculated by a percentage from a total of 400 points. The final grade will be determined by the absolute performance of the student, not by a statistical curve. Students receiving between **50-69.5%** of the course points will receive a **C**, between **70-84.9%** of the points will receive a **B**, and in excess of **85%** of the points, are guaranteed to receive an **A**. Students receiving below 50% of the points for the course will receive no credit (NC) for the course. I will not calculate a mean or median grades for exams since my concern is for the individual student – rather than for collective data based on the whole class. We hope that you will achieve your individual goals for BIOL 2050, and I will work with you to help you achieve those goals by providing support through multiple means.

GRADING OPTION: ABC/NC or S/NC (student choice)

CANVAS WEB SITE: A BIOL 0500 Cell and Molecular Biology Canvas-based web site will be used throughout the course. It is available at [http://canvas.brown.edu/]. It will include the syllabus, announcements, assigned readings and papers, links to other sites. Please let me know if you have difficulty accessing or navigating the Canvas site for the course.

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Course Schedule and Reading Assignments

Date	Topic	Reading
Thurs Jan 23	Course Introduction, DNA and Chromatin	ECB pages 50-65, 121-133, ECB Chapter 5
Thurs Jan 30	DNA Replication & Repair	ECB Chapter 6
Thurs Feb 6	RNA Polymerase and Transcription	ECB Chap. 7 pages 223-232, Chapter 8
Thurs Feb 13	Ribosomes and Protein Translation	ECB Chap. 7 pages 232-253
Thurs Feb 20	Review and Exam I (material from Jan 23 – Feb 13)	
Thurs Feb 27	Cell Membranes and Transport	ECB Chapter 11 and 383-403
Thurs Mar 5	Intracellular Compartments and Trafficking	ECB Chap 15
Thurs Mar 12	Cell Communication and Signaling	ECB Chapter 16
Thurs Mar 19	Review and Exam II (material from Feb 27– Mar 12)	
Thurs Mar 26	No class - Spring Recess	
Thurs Apr 2	Cell Cycle Regulation and Apoptosis	ECB Chapter 18
Thurs Apr 9	Mitosis and Meiosis	ECB Chapter 18, Chapter 19 pages 645-657
Thurs Apr 16	Cancer Therapeutics	ECB Chapter 19 pages 712-725
Thurs Apr 23	Stem Cells and Regenerative Medicine	ECB Chapter 19 pages 702-712,
Thurs Apr 30	Review and Exam III (material from Apr 2– Apr 23)	
Thurs May 7	Final Student Presentations	

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