

BIO101: Molecular and Cellular Biology (WITH LABS!)

Meeting Mondays, 6-9pm, in room 101 or in Kanbar Center on select dates (see schedule). (3 credits)

Instructor:

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Course:

This course will cover the fundamental principles of molecular and cellular biology, including the structure and function of the major cell organelles, the replication of DNA, RNA transcription and regulation, protein synthesis, cell cycle and cell division, gene regulation and signal transduction. There will also be introductions to and discussion of more specialized topics in genetic engineering, genome sequencing, microbiology and related fields of current interest from the latest scientific articles, along with laboratory sessions.

This course involves lectures, problem sets, a writing assignment based on primary scientific literature, participatory journal club sessions and 4 laboratory sessions (15%) held in the Kanbar Center (held during scheduled class time). There will also be 2 Exams (1 take home) worth 20% apiece.

Lectures will also be, on occasion, supplemented with additional material outside of the required textbook readings.

Textbooks:

Biology

2nd Ed ISBN 978-0-07-353221-9

Authors: Brooker, Widmaier, Graham, Stiling.

(Available as PDF file)

Molecular Cell Biology

7th Ed

Authors: Lodish, Berk, Kaiser, Krieger, Scott, Bretscher, Ploegh, Matsudaira.

(Available as PDF file)

Grading:

EXAMS 30%	Exam 1 Exam 2 (Take Home)	15% 15%	Details: Exams not intentionally cumulative, but material builds on prior chapters. (There may be bonus points on exams.)
LABS 20%	Post-Lab 1 Post-Lab 2 Post-Lab 3 Post-Lab 4	5% ea	Post-labs (lab write-ups) will be due on the following lab.
New and Views Article 15%	 1st Draft Final Draft	 2.5% 12.5%	The News and Views article is a writing assignment based on a journal article that you select from a posted list of scientific articles that you will also be presenting as a group journal club article. The articles have been chosen to reflect advanced topics related to the lecture material. However, the articles will be much more sophisticated than what is presented in lecture. The purpose of this assignment (and the journal club) is to get you introduced and used to reading primary scientific literature. If you are intending for a career in science or medicine there is no way around this, you will be reading a lot of articles! The best way to start is to just dive in. It will be difficult at first and I strongly encourage you to take advantage of my office hours and to contact me with questions via email throughout the semester. Another good place to post question is directly on the class Moodle, so that everyone can view questions and their respective answers.
Problem sets 15%	Pset 1 Pset2 Pset3 Pset4 Pset5	3% 3% 3% 3% 3%	Unlike the exams and post-labs, problem sets will be graded solely on completeness of answers, rather than correct answers, i.e. you won't get points off for a wrong answer as long as you at least attempt to answer the question! The main goal of the problem sets is to help you prepare for the exams and reinforce concepts learned in lecture and in lab.
Final Journal Talk Presentation 20%	Final Presentations	20%	
Total 100%	Total	100%	A: 100-90, B: 89.9-80, C: 79.9-70, D: 69.9-65, F<65. Come to all classes, be engaged with lectures, ask good questions; Responsible in lab, helpful to others! Study in groups but <u>P-sets should be done alone.</u>

SYLLABUS:**BIOLOGY 101. MONDAY 6-9PM ROOM 101, PROF MEDVEDIK.**

Week #	Lecture Topic:	Due Dates for Assignments
Jan 21 (Tuesday)	Info + Interests Poll. Overview of course Assigned Weekly Readings: (Brooker) Ch 1: An Introduction to Biology Ch 2: The chemical basis of life Ch 3: Organic molecules Ch 4: General Features of Cells (Lodish) Ch 1: Molecules, Cells and Evolution Ch 2: Chemical Foundations	Check weekly for problem set uploads!
Jan 27	(Brooker) Ch 6: An Introduction to Energy, Enzymes and Metabolism. (Lodish) Ch 3: Protein Structure and Function	Problem Set#1 posted
Feb 3	(Brooker) Ch 11: Nucleic Acid Structure, DNA Replication and Chromosome Structure (Lodish) Ch 4: Basic Molecular genetic Mechanisms sections 4.1; Structure of Nucleic Acids , 4.5; DNA Replication Ch 6: Genes, Genomics and Chromosomes	Journal Club: Meselson and Stahl
Feb 10	(Brooker) Ch 12: Gene Expression at the Molecular Level. (Lodish) Ch 4: Basic Molecular Genetic Mechanisms Sections 4.2; Transcription of Protein-Coding Genes and Formation of Functional mRNA Ch 7: Transcriptional Control of Gene Expression	Problem set #1 due Problem set #2 posted
Feb 17	No Class	

Feb 24	Lab 1 (Kanbar): Polymerase Chain Reaction Amplification of Human Genetic Loci and reporter gene.	Problem set #2 due Problem set#3 posted
Mar 3	(Brooker) Ch 13: Gene Regulation (Lodish) Ch 4: Basic Molecular Genetic Mechanisms Sections 4.3; The Decoding of mRNA by tRNAs, 4.4; Stepwise Synthesis of Proteins on Ribosomes Ch 8: Post Transcriptional Gene Control	Problem Set #3 due
<u>Mar 10</u>	Exam 1 (DNA→RNA→Proteins)	
<u>Mar 17</u>	Spring Break	
Mar 24	Lab 2 (Kanbar): Plasmid (pUC19) restriction digests and gel electrophoresis	
Mar 31	(Brooker) Ch 5: Membrane Structure, Synthesis and Transport (Lodish) Ch 10: Biomembrane Structure Ch 11: Transmembrane transport of Ions and Small Molecules Ch 13: Moving Proteins into Membranes and Organelles	Problem Set #4 posted Choose a primary scientific research article from the assigned journal club list for which to write a “News and Views” style article. Email me your choice by next class.
Apr 7	Lab 3 (Kanbar): Cloning of genes into expression construct (pUC19)	Problem Set#4 Due
Apr 14		Problem Set #5 posted

	(Lodish) Ch 14: Vesicular Traffic, Secretion and Endocytosis	First draft due of News and Views Article due either in class or in course DropBox.
Apr 21	Lab 4 (Kanbar): Protein purification of reporter gene and protein gel.	Problem Set #5 Due
Apr 28	(Brooker) Ch 7: Cellular Respiration, Fermentation and Secondary Metabolism Ch 8: Photosynthesis (Lodish) Ch 12: Cellular Energetics	Take home exam posted (Exam 2)
May 5	(Brooker) Ch 15: The Eukaryotic Cell cycle and Mitosis Ch 14: Mutation, DNA Repair and Cancer (Lodish) Ch 4: Basic Molecular Genetic Mechanisms Only sections 4.6; DNA repair and Recombination Ch 19: The Eukaryotic Cell Cycle Sections 19.1 through 19.8	Final Draft of News And Views Article Due either in class or in course Dropbox.
May 12	Journal Club Group Final Presentations	Take home Exam Due

EID 325: Eukaryotes for Engineers (with Labs)
Bio 101: Molecular and cellular Biology (with Labs)

Thursday 6-9pm, Room 427, 41 Cooper Sq.
Monday 6-9pm, Room 101, 41 Cooper Sq.