

WELCOME TO MCB 60!

In-class discussion: Mondays and Wednesdays from 10:30am to 11:45am in TBD.

Here is a PDF of the [course calendar](#) which lists topics, due dates, and exams for the entire semester.

Quick links:

[Watch party info](#) & [Lab section info](#) & [Office hour info](#)

What you can expect from the course:

- connecting fundamental biology to daily life, from medicine to ethics
- flipped classroom model with extensive in-class discussions
 - many opportunities to engage with and learn the material with staff support
- a learning focused class
 - data-driven problem sets and assessments
 - open notes assessments (not focused on memorization)
 - no final exam
- a lab focusing on experimental design and data analysis
 - design your own experiments and collect data
 - develop science communication skills
 - learn to read primary literature
- an outstanding group of TFs and facilitators

If the embedded calendar doesn't work, you can [view our course calendar here](#).

Course meeting times

Material on two or three topics comprising of videos and reading material will be posted weekly on the course website. This will be followed by mandatory, in-class discussions with the instructors. We will meet in person every Mondays and Wednesday from 10:30am to 11:45am in TBD. Each student will also enroll in to a mandatory combined lab plus section that meets once every week in the teaching labs.

Course website

<https://canvas.harvard.edu/courses/137232>

Instructors

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Course description

Prerequisites

Life and Physical Sciences A or Life Sciences 1a or LS50 AB required; Life Sciences 1b recommended

Fulfills

Half the Intermediate Biology requirements for MCB and CPB concentrations; the Molecular Biology requirement for HDRB; elective of BME; half-course in Biology and Neuroscience for Neurobiology; half-course introduction to broad fields of Biology for OEB/IB concentration.

For pre-meds MCB 60 fulfills the requirement for a half course in Biology that includes a lab.

Overall approach and objectives

This course provides an introduction to the principles of molecular and cellular biology and their connections to biomedicine. We explore how medical syndromes provide insights into biological processes and how biological mechanisms underlie human disease and physiology. Topics range from DNA repair, protein folding and vesicle transport to metabolism, cell migration, and cancer. Lectures focus on the experimental evidence for key concepts, and the weekly sections combine a discovery-based laboratory research project with discussions that emphasize problem solving and primary literature analysis.

We have designed this course to give all students, regardless of concentration or career path, insight not only into some of the fundamental concepts of cellular and molecular biology, but also the process by which these discoveries were made, tools to critically analyze scientific data and develop their own

conclusions, and insight into the connections between science and medicine. The laboratory portion of the course will allow students to develop their own hypotheses about a relevant biological question, and to understand the scientific method through in-depth analysis and oral presentation of research articles.

Pre-class videos and in-class discussion sessions

Voice-over presentation videos covering 2-3 topics will be made available on the course website every week followed by an in-person discussion with the instructors. Discussion sessions will be dedicated to answering questions and breakout sessions with in-class polling. Poll responses are scored for effort (responses), not correctness, and contributes to the participation score of the course grade.

Section/Lab

Sections are mandatory and will combine lab and lecture review.

In the first lab module (week 1 to week 10), you will execute a laboratory project based on DNA damage response (DDR). You will be trained on conducting three assays, how to analyze, interpret, and present the data. The laboratory background information and protocols will be available on the course [lab page](#) prior to the week's lab. You will complete a weekly worksheet to guide your thinking and understanding of the lab. Using the techniques and methodology learned during the first weeks, your group will then design and execute your own experiments, and present your working hypothesis, experimental plans, results and conclusions as part of the capstone project of the first module.

In the second lab module (week 11 to week 13), you will learn to read and analyze primary literature. You will learn how scientists develop a scientific question, create working models, test these hypotheses with experiments, analyze the data and draw conclusions. The capstone project for the second module will be a group oral presentation of a scientific paper selected from [this list](#).

You will review material from a week's worth of lecture at the beginning of lab each week. Engagement during review forms part of the participation section of the course grade.

Materials

Required readings: *Alberts et al. Essential Cell Biology 5th edition*

Online version available from the library (limited 3 hours access at a time; 3 students can access at a time):

Check Library Reserves Tab

Available for rent or for sale on Amazon:

<https://www.amazon.com/Essential-Biology-Fifth-Bruce-Alberts/dp/0393680363>

Hard copies and online versions also available for purchase or rent with Harvard COOP:

<https://store.thecoop.com/>

Assignments and collaboration policy

Please refer to the summary table below for details on each assignment.

Task	Submission	Collaboration policy	Notes	Pedagogy/Purpose
			Taken on canvas on the material to be covered in lectures. Quizzes will be made available a few days before the deadline. Once	

<i>Lecture Quizzes</i>	Individual	Collaborative, can discuss with classmates	started, you have until the deadline to complete them. Lecture quiz will be due before the live sessions each week. Quizzes will be graded for correctness on the reading questions. The open ended discussion questions are graded for completion but the quality (not right or wrong) of your responses will be used to determine participation points at the end of the semester.	Prime you with information that will be relevant for the week's live discussions
<i>Lab worksheets and Data Submissions</i>	Group	Project members will share and analyze data together.	Worksheets can be completed as a group, but individuals may be called on at the beginning of the following lab to answer specific questions from the worksheet. This will contribute to your participation score. Data submissions will be submitted by each group.	Develop experimental design and data analysis skills and, serve as checkpoints of lab progress
<i>Experimental design final project</i>	Group	All members must contribute		Develop and investigate a research question using techniques taught during lab and lectures. Develop scientific communication skills
<i>Primary literature presentation</i>	Group	All members must present	12 min seminar-style formal oral presentation of a research article.	Learn Scientific method, develop collaborative and oral scientific presentation skills
<i>Problem sets</i>	Individual	Can discuss with classmates Can clarify questions with teaching staff Individual submission must be in your own words and reflect your own thinking	There are nine psets that will be released on canvas on Saturday every week and due the next Friday. The lowest score will be automatically dropped.	Develop problem solving skills (collaborative) and demonstrate individual rationalization of logic (non-collaborative)
<i>Assessments</i>	Individual	Strictly no collaboration	There are three classroom assessments, one 8.5 x 11 "cheat sheet" allowed. Administered online on canvas.	Individual understanding of the material

If you have any questions about this policy, please contact your teaching fellow or one of the instructors.

Grading Procedures

The grade breakdown for the course is summarized below.

Course material	% of total grade
Assessments (3 assessments)	30%
Online quizzes	5%
Problem sets (9 psets at 50 pts each)	25%
Data Analysis lab module	
<i>Supply List + Proposal (5%), Final Project (10%),</i>	20%
<i>Weekly Data submissions (5%)</i>	
Primary Literature lab module	
<i>Presentation file (5%) and Oral Presentation (5%)</i>	10%
Class discussion and section participation	
<i>(Engagement, questions, participation, preparedness)</i>	10%

Assignment deadlines and important tips

Answer keys will be posted on the web site about two days after the deadline.

Extension requests must be submitted before the deadline and will be reviewed by the course staff on a case-by-case basis. Extensions cannot be granted beyond the day when answer keys are due to be released (48 hours past deadline).

For all assignments released on canvas, you will need to download the file (you will find two file formats, .docx and PDF, which are identical in content), enter your answers, and upload the file in PDF format for submission. Make sure you have successfully submitted files on canvas (for example, it should no longer show up in your “eto-do” list).

All assignment deadlines can be viewed on and are enforced by canvas. A timestamp later than the deadline up to two days will have points deducted according to the following: 25% of the total assigned score per day up to two days after which you will be unable to receive any credit. Please do not wait until the last minute to submit assignments. *Typically, you should give yourself at least an hour before the deadline to make sure you are uploading the correct document, and that there are no technical glitches (internet and other unpredictable failure).*

The PDF of the course calendar is a good source of assignment deadlines and other events. Please note that this PDF file is released at the start of semester and might not update to incorporate changes to the schedule due to unforeseen circumstances. Any change in schedule will be announced via Canvas and can be accessed via the announcements page.

Accommodations for students with disabilities

Students needing academic adjustments or accommodations because of a documented disability must present their Faculty Letter from the [Accessible Education Office \(AEO\)](#) and speak with the professor by the end of the second week of the term, (fill in specific date). Failure to do so may result in the Course Head's inability to respond in a timely manner. All discussions will remain confidential, although Faculty are invited to contact AEO to discuss appropriate implementation.