

BENG 230B - Cell and Molecular Biology - Engler [WI23]

BENG230B: Cell and Molecular Biology - Winter 2023

Instructor: Professor Adam J. Engler (aengler@eng.ucsd.edu (<mailto:aengler@ucsd.edu>))

Teaching Assistants: Madison Kane (m1kane@ucsd.edu (<mailto:m1kane@ucsd.edu>)), Tianyang Xu (t8xu@ucsd.edu (<mailto:t8xu@ucsd.edu>)), and

Yazmin Hernandez (y4hernandez@ucsd.edu (<mailto:y4hernandez@ucsd.edu>))

In-Person Class Lectures: PFBH191, Tuesdays and Thursdays, 9:30 AM – 10:50 AM

(also Synchronous Zoom Class Lectures - see links below)

Instructor Office Hours: via Zoom ([https://ucsd.zoom.us/j/93451819118?](https://ucsd.zoom.us/j/93451819118?pwd=NmZpa09xODkzQ1NzTkpiU2k0b3hOQT09)

[pwd=NmZpa09xODkzQ1NzTkpiU2k0b3hOQT09](https://ucsd.zoom.us/j/93451819118?pwd=NmZpa09xODkzQ1NzTkpiU2k0b3hOQT09)), Wednesdays, 10-11 AM (or by appointment)

TA Office Hours: via Zoom ([https://ucsd.zoom.us/j/95711412196?](https://ucsd.zoom.us/j/95711412196?pwd=a3d4MDFYY0VQR0RENEN3bFhIR1dwUT09)

[pwd=a3d4MDFYY0VQR0RENEN3bFhIR1dwUT09](https://ucsd.zoom.us/j/95711412196?pwd=a3d4MDFYY0VQR0RENEN3bFhIR1dwUT09)), Fridays, 9-10 AM

Textbook: Molecular Biology of the Cell (Alberts et al), 6th edition (a.k.a. MBoC; 7th edition available)

Course Objectives

BENG230B is an intermediate level graduate course designed to introduce students to the molecular components and physiological mechanisms that underlie the structure and function of cells. The course is designed to be an in-depth survey covering general concepts in cell biology and to emphasize these concepts within the context of current research questions and technical applications. Lectures will focus on: (i) basic biochemistry in cell biology, (ii) cellular and molecular biology techniques, (iii) structure-function relationships within and outside the cell, and (iv) specialized cell types. However, the format and content of the course overall will convey both the details of what is known in cell biology as well as how to apply it to fundamental and still unanswered questions.

Background Preparation

If the life sciences, even when taught from a quantitative perspective, seems daunting to you, I would suggest some of the following resources to help in your preparation. First, our textbook MBoC comes in a lite version called “Essential Cell Biology.” This is still a somewhat comprehensive, graduate level textbook but is much more accessible to an introductory audience. Should not be an appropriate entry point to this material, I would further suggest the “AP® Biology” course at the Khan Academy, which is an online, free tutorial/instructional website. Please avoid sections on the history of biology

and plant biology; those are not relevant for this course. Since this site has broken down the background material into digestible sections, it is also a great tool as a targeted refresher should you feel that you need it.

TA Office Hours

During office hours, TAs will primarily discuss homework questions, exam answers, and clarify any concepts from lecture. However, a portion of this course is dedicated to understanding and critically evaluating scientific literature in cell biology, especially the engineering tools used to solve problems within biology. A recently published paper in cell biology will be suggested for you to read, and a corresponding weekly discussion will be held that will be led by the TAs. This discussion is not intended to be additional lecture time and is completely optional. However, it should provide an opportunity to apply course concepts, design experiments, and propose engineering approaches to cell biology. If you are unable to attend, all content is accessible online and virtual discussion sections are available via CANVAS.

Lecture A/V

To facilitate learning, all slides and lecture audio will be posted on CANVAS. Slides will be available at least 24 hours in advance and Zoom A/V posted shortly after class. However, I would strongly encourage your active, synchronous participation. Note that all classes and office hours are recorded.

Course Evaluation

1. Biochemistry Basics "Quiz" (5%)
2. Midterm (25%) and Final (30%)
3. Two homework projects (20% each for a total of 40%)

2) Biology and Biochemistry Basics Quiz

Working knowledge of the common language in biochemistry is essential for cell biology. To ensure that everyone has the vocabulary for cell and molecular biology, a closed book/notes quiz on relevant molbio and biochemistry terminology will be provided to you during Week 2 of the course. Content will come from MBoC chapters 2 and 3. Answers will be posted 1-2 days after the quiz. The quiz will be administered online via CANVAS and you will have 30 minutes to take the quiz between January 19th and 20th.


2) Exams

Midterm and final exams will be in person and are “open book and notes.” Use of previous exams and answer keys as your “notes” is prohibited. Old questions are *not* reused but the question format will be identical to old HW and exams. Use of the internet is prohibited. Each exam will be administered in class.

3a) Homework Problem Sets

At least two homework problem sets will be distributed via CANVAS along with answers prior to each exam. These will *not* be graded. If you would like feedback on your answers, it can be provided by TAs on the "due date," but for feedback, we would appreciate knowing where guidance is most needed.

3b) Homework Projects

As a team-based way to prepare for exams and to hopefully reduce stress in preparing for exams, teams (of up to 4 students) will create their own exam prompt and set of questions and answers before the midterm and final exams (two assignments). Prompts must be one page in length and provide scientific experiments that must be applied to a set of questions asked by the team in order to answer them. A "Peer Assessment" paragraph will also be required for each student to describe their contribution as well as those of their teammates. A rubric will be provided for grading along with the assignment. To sign up with your teammates, please go to this [Google Form](https://forms.gle/gz7ry9T7jyi1UNkV7). 
<https://forms.gle/gz7ry9T7jyi1UNkV7>

4) Extra Credit

Class participation is essential to learning and the development of the level of critical thinking required in graduate school. We will use a variety of interactive methods, including Kahoot!-based Q&A for class-wide participation, individual-based Q&A for impromptu questions in class, and "thought experiments." Students participating via these methods in a majority of class lectures (10 or more of 19 lectures) will receive 1% on top of their final class average.


“Regrade,” Exam, and Academic Misconduct Policies

Students are encouraged to write all final answers in pen or to type answers. If there is a grade discrepancy, submit (electronically) the original exam written in pen along with a written re-grade request to a TA within ONE WEEK of the date that the assignment was returned. Except for simple errors in adding points together for a final exam score, the entire assignment is subject to re-grading. Exams may not be missed without prior approval from the instructor. Academic dishonesty will not be tolerated. Any suspected incident will be dealt with in accordance with UCSD policy, which includes reporting the misconduct.


Course Summary:

Date	Details	Due
Tue Jan 10, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar?event_id=848180&include_contexts=course_42223)	9:30am to 11am
Wed Jan 11, 2023	 Dr. Engler's office hours (https://canvas.ucsd.edu/calendar?event_id=848127&include_contexts=course_42223)	10am to 11am
Thu Jan 12, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar?event_id=848191&include_contexts=course_42223)	9:30am to 11am
Fri Jan 13, 2023	 TA office hours (https://canvas.ucsd.edu/calendar?event_id=856985&include_contexts=course_42223)	9am to 10am
Tue Jan 17, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar?event_id=848181&include_contexts=course_42223)	9:30am to 11am
Wed Jan 18, 2023	 Dr. Engler's office hours (https://canvas.ucsd.edu/calendar?event_id=848128&include_contexts=course_42223)	10am to 11am
	 BENG 230B - Cell and	

Thu Jan 19, 2023

 [Molecular Biology - Engler \[WI23\]](https://canvas.ucsd.edu/calendar?event_id=848192&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=848192&include_contexts=course_42223)
[event_id=848192&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848192&include_contexts=course_42223))

9:30am to 11am

 [TA office hours](https://canvas.ucsd.edu/calendar?event_id=856986&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=856986&include_contexts=course_42223)
[event_id=856986&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=856986&include_contexts=course_42223))

9am to 10am

Fri Jan 20, 2023


 [Biochem Quiz](https://canvas.ucsd.edu/courses/42223/assignments/599531)
(<https://canvas.ucsd.edu/courses/42223/assignments/599531>)

due by 5pm

 [Biochem Quiz - Extra Time](https://canvas.ucsd.edu/courses/42223/assignments/599532)
(<https://canvas.ucsd.edu/courses/42223/assignments/599532>)


due by 5pm

Tue Jan 24, 2023

 [BENG 230B - Cell and
Molecular Biology - Engler \[WI23\]](https://canvas.ucsd.edu/calendar?event_id=848182&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=848182&include_contexts=course_42223)
[event_id=848182&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848182&include_contexts=course_42223))


9:30am to 11am

Wed Jan 25, 2023

 [Dr. Engler's office hours](https://canvas.ucsd.edu/calendar?event_id=848129&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=848129&include_contexts=course_42223)
[event_id=848129&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848129&include_contexts=course_42223))


10am to 11am

Thu Jan 26, 2023

 [BENG 230B - Cell and
Molecular Biology - Engler \[WI23\]](https://canvas.ucsd.edu/calendar?event_id=848193&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=848193&include_contexts=course_42223)
[event_id=848193&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848193&include_contexts=course_42223))


9:30am to 11am

Fri Jan 27, 2023


 [TA office hours](https://canvas.ucsd.edu/calendar?event_id=856987&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=856987&include_contexts=course_42223)
[event_id=856987&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=856987&include_contexts=course_42223))

9am to 10am

Tue Jan 31, 2023


 [BENG 230B - Cell and
Molecular Biology - Engler \[WI23\]](https://canvas.ucsd.edu/calendar?event_id=848183&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=848183&include_contexts=course_42223)
[event_id=848183&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848183&include_contexts=course_42223))

9:30am to 11am

 [Dr. Engler's office hours](https://canvas.ucsd.edu/calendar?event_id=848137&include_contexts=course_42223)
([https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=848137&include_contexts=course_42223)
[event_id=848137&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848137&include_contexts=course_42223))

11am to 12pm

 [BENG 230B - Cell and
Molecular Biology - Engler \[WI23\]](#)

Thu Feb 2, 2023	(<u>https://canvas.ucsd.edu/calendar?event_id=848194&include_contexts=course_42223</u>)	9:30am to 11am
Fri Feb 3, 2023	 <u>TA office hours</u> (https://canvas.ucsd.edu/calendar?event_id=856988&include_contexts=course_42223)	9am to 10am
Tue Feb 7, 2023	 <u>BENG 230B - Cell and Molecular Biology - Engler [WI23]</u> (https://canvas.ucsd.edu/calendar?event_id=848184&include_contexts=course_42223)	9:30am to 11am
Wed Feb 8, 2023	 <u>Dr. Engler's office hours</u> (https://canvas.ucsd.edu/calendar?event_id=848131&include_contexts=course_42223)	10am to 11am
	 <u>BENG 230B - Cell and Molecular Biology - Engler [WI23]</u> (https://canvas.ucsd.edu/calendar?event_id=848195&include_contexts=course_42223)	9:30am to 11am
Thu Feb 9, 2023	 <u>HW Project #1</u> (https://canvas.ucsd.edu/courses/42223/assignments/604793)	due by 11:59pm
	 <u>Peer Assessment for HW Project #1</u> (https://canvas.ucsd.edu/courses/42223/assignments/604794)	due by 11:59pm
Fri Feb 10, 2023	 <u>TA office hours</u> (https://canvas.ucsd.edu/calendar?event_id=856989&include_contexts=course_42223)	9am to 10am
Mon Feb 13, 2023	 <u>Dr. Engler's office hours</u> (https://canvas.ucsd.edu/calendar?event_id=866281&include_contexts=course_42223)	12pm to 1pm
Tue Feb 14, 2023	 <u>BENG 230B - Cell and Molecular Biology - Engler [WI23]</u> (https://canvas.ucsd.edu/calendar?event_id=848185&include_contexts=course_42223)	9:30am to 11am
	 <u>Dr. Engler's office hours</u>	

Wed Feb 15, 2023	(https://canvas.ucsd.edu/calendar? event_id=848132&include_contexts=course_42223)	10am to 11am
Thu Feb 16, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar? event_id=848196&include_contexts=course_42223)	9:30am to 11am
Fri Feb 17, 2023	 TA office hours (https://canvas.ucsd.edu/calendar? event_id=856990&include_contexts=course_42223)	9am to 10am
Tue Feb 21, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar? event_id=848186&include_contexts=course_42223)	9:30am to 11am
Wed Feb 22, 2023	 Dr. Engler's office hours (https://canvas.ucsd.edu/calendar? event_id=848133&include_contexts=course_42223)	10am to 11am
Thu Feb 23, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar? event_id=848197&include_contexts=course_42223)	9:30am to 11am
Fri Feb 24, 2023	 TA office hours (https://canvas.ucsd.edu/calendar? event_id=856991&include_contexts=course_42223)	9am to 10am
Tue Feb 28, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar? event_id=848187&include_contexts=course_42223)	9:30am to 11am
	 Dr. Engler's office hours (https://canvas.ucsd.edu/calendar? event_id=848138&include_contexts=course_42223)	11am to 12pm
Thu Mar 2, 2023	 BENG 230B - Cell and Molecular Biology - Engler [WI23] (https://canvas.ucsd.edu/calendar? event_id=848198&include_contexts=course_42223)	9:30am to 11am

**TA office hours**

([https://canvas.ucsd.edu/calendar?
event_id=856992&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=856992&include_contexts=course_42223))

Fri Mar 3, 2023

9am to 10am

**BENG 230B - Cell and
Molecular Biology - Engler [WI23]**

([https://canvas.ucsd.edu/calendar?
event_id=848188&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848188&include_contexts=course_42223))

Tue Mar 7, 2023

9:30am to 11am

**Dr. Engler's office hours**

([https://canvas.ucsd.edu/calendar?
event_id=848135&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848135&include_contexts=course_42223))

Wed Mar 8, 2023

10am to 11am

**BENG 230B - Cell and
Molecular Biology - Engler [WI23]**

([https://canvas.ucsd.edu/calendar?
event_id=848199&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848199&include_contexts=course_42223))

Thu Mar 9, 2023

9:30am to 11am

**TA office hours**

([https://canvas.ucsd.edu/calendar?
event_id=856993&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=856993&include_contexts=course_42223))

Fri Mar 10, 2023

9am to 10am

**BENG 230B - Cell and
Molecular Biology - Engler [WI23]**

([https://canvas.ucsd.edu/calendar?
event_id=848189&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848189&include_contexts=course_42223))

Tue Mar 14, 2023

9:30am to 11am

**Dr. Engler's office hours**

([https://canvas.ucsd.edu/calendar?
event_id=848136&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848136&include_contexts=course_42223))

Wed Mar 15, 2023

10am to 11am

**BENG 230B - Cell and
Molecular Biology - Engler [WI23]**

([https://canvas.ucsd.edu/calendar?
event_id=848200&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=848200&include_contexts=course_42223))

Thu Mar 16, 2023

9:30am to 11am

**Homework Project #2**

(<https://canvas.ucsd.edu/courses/42223/assignments/614173>)

due by 11:59pm

**TA office hours**

([https://canvas.ucsd.edu/calendar?
event_id=856994&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=856994&include_contexts=course_42223))

Fri Mar 17, 2023

9am to 10am

Mon Mar 20, 2023

 **BENG 230B - Special Office
Hour**

[https://canvas.ucsd.edu/calendar?
event_id=876278&include_contexts=course_42223](https://canvas.ucsd.edu/calendar?event_id=876278&include_contexts=course_42223)

2pm to 3pm

Wed Mar 22, 2023

 **Final Exam Submission**

<https://canvas.ucsd.edu/courses/42223/assignments/620411>

due by 11:15am

 **Midterm Exam**

<https://canvas.ucsd.edu/courses/42223/assignments/614060>

 **Peer Assessment for HW
Project #2**

<https://canvas.ucsd.edu/courses/42223/assignments/614182>
