# BENG 230B - Cell and Molecular Biology - Engler [WI24]

✎ Edit

**BENG230B: Cell and Molecular Biology - Winter 2024**

**Instructor**: Professor Adam J. Engler (**aengler@ucsd.edu (mailto:aengler@ucsd.edu)** )

**Graduate Instructional Assistants (GIA)**: Madison Kane (**m1kane@ucsd.edu (mailto:m1kane@ucsd.edu)** ), Carrie Bishop (**ctbishop@ucsd.edu (mailto:ctbishop@ucsd.edu)** ), Abel Demoz (**ademoz@ucsd.edu (mailto:ademoz@ucsd.edu)** )

**Teaching Assistant:** Abhi Banerjee (**abbanerjee@ucsd.edu (mailto:abbanerjee@ucsd.edu)** )

**In-Person Class Lectures**: Center Hall 214, Tuesdays and Thursdays, 9:30 AM – 10:50 AM

**Instructor Office Hours**: via Zoom (https://ucsd.zoom.us/j/92520655340?pwd=SUhKQkdxSHdaOEJSU3ZCeHVGOXkxUT09), Wednesdays, 10-11 AM or by appointment (unless otherwise noted in the schedule of lectures)

**Assistants' Office Hours**: via Zoom (https://ucsd.zoom.us/j/99928505377?pwd=RTd3RnRXQVRycHUvWkIrZnVKTTZlQT09), Fridays, 10-11 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 section, it is also a great tool as a targeted refresher should you feel that you need it.

**GIA/TA Office Hours**

During office hours, GIAs and 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 GIA and/or TA. ***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 will be posted on CANVAS. Slides will be available at least 24 hours in advance. The course will only occur live in person, but Zoom A/V will be posted shortly after class. Despite the availability of recorded material, I would strongly encourage your active, synchronous, in-person participation. Note that office hours are not 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 18th and 19th.

**2) Exams**

Midterm and final exams will be ***in person only*** and are “open book and notes.” 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 GIAs and 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/qeCrd41vXkSeCUaZ6)** .

**4) Extra Credit**

In person 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 in person during lecture 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 |
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| Tue Jan 9, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982466&include_contexts=course_51435) | 9:30am to 11am |
| Wed Jan 10, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982423&include_contexts=course_51435) | 10am to 11am |
| Thu Jan 11, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982467&include_contexts=course_51435) | 9:30am to 11am |
| Fri Jan 12, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982455&include_contexts=course_51435) | 10am to 11am |
| Tue Jan 16, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982468&include_contexts=course_51435) | 9:30am to 11am |
| Wed Jan 17, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar? | 10am to 11am |

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| Thu Jan 18, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982469&include_contexts=course_51435) | 9:30am to 11am |
| Fri Jan 19, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982456&include_contexts=course_51435) | 10am to 11am |
| | Biochem Quiz (https://canvas.ucsd.edu/courses/51435/assignments/748755) | due by 5pm |
| | Biochem Quiz - KL (https://canvas.ucsd.edu/courses/51435/assignments/754596) | due by 5pm |
| Mon Jan 22, 2024 | Biochem Quiz - Make-up (https://canvas.ucsd.edu/courses/51435/assignments/754918) | due by 5pm |
| Tue Jan 23, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982470&include_contexts=course_51435) | 9:30am to 11am |
| Wed Jan 24, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982425&include_contexts=course_51435) | 10am to 11am |
| Thu Jan 25, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982471&include_contexts=course_51435) | 9:30am to 11am |
| Fri Jan 26, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982457&include_contexts=course_51435) | 10am to 11am |
| Tue Jan 30, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982472&include_contexts=course_51435) | 9:30am to 11am |
| | BENG 230B Office Hours (Dr. | |

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| Wed Jan 31, 2024 | Engler) (https://canvas.ucsd.edu/calendar?event_id=982426&include_contexts=course_51435) | 10am to 11am |
| Thu Feb 1, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982473&include_contexts=course_51435) | 9:30am to 11am |
| Fri Feb 2, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982458&include_contexts=course_51435) | 10am to 11am |
| Tue Feb 6, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982474&include_contexts=course_51435) | 9:30am to 11am |
| Wed Feb 7, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982427&include_contexts=course_51435) | 10am to 11am |
| Thu Feb 8, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982475&include_contexts=course_51435) | 9:30am to 11am |
| | HW Project #1 (https://canvas.ucsd.edu/courses/51435/assignments/748804) | due by 11:59pm |
| | Peer Assessment for HW Project #1 (https://canvas.ucsd.edu/courses/51435/assignments/748814) | due by 11:59pm |
| Fri Feb 9, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982459&include_contexts=course_51435) | 10am to 11am |
| Tue Feb 13, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982476&include_contexts=course_51435) | 9:30am to 11am |
| | Midterm 2024 | due by 11am |

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| | (https://canvas.ucsd.edu/courses/51435/assignments/760328) | |
| Wed Feb 14, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982428&include_contexts=course_51435) | 10am to 11am |
| Thu Feb 15, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982477&include_contexts=course_51435) | 9:30am to 11am |
| Fri Feb 16, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982460&include_contexts=course_51435) | 10am to 11am |
| Tue Feb 20, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982478&include_contexts=course_51435) | 9:30am to 11am |
| Wed Feb 21, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982429&include_contexts=course_51435) | 10am to 11am |
| Thu Feb 22, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982479&include_contexts=course_51435) | 9:30am to 11am |
| Fri Feb 23, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982461&include_contexts=course_51435) | 10am to 11am |
| Tue Feb 27, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982480&include_contexts=course_51435) | 9:30am to 11am |
| Wed Feb 28, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982430&include_contexts=course_51435) | 10am to 11am |

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| Thu Feb 29, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982481&include_contexts=course_51435) | 9:30am to 11am |
| Fri Mar 1, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982462&include_contexts=course_51435) | 10am to 11am |
| Tue Mar 5, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982482&include_contexts=course_51435) | 9:30am to 11am |
| Wed Mar 6, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982431&include_contexts=course_51435) | 10am to 11am |
| Thu Mar 7, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982483&include_contexts=course_51435) | 9:30am to 11am |
| Fri Mar 8, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982463&include_contexts=course_51435) | 10am to 11am |
| Tue Mar 12, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982484&include_contexts=course_51435) | 9:30am to 11am |
| Wed Mar 13, 2024 | BENG 230B Office Hours (Dr. Engler) (https://canvas.ucsd.edu/calendar?event_id=982432&include_contexts=course_51435) | 10am to 11am |
| Thu Mar 14, 2024 | BENG230B Class (https://canvas.ucsd.edu/calendar?event_id=982485&include_contexts=course_51435) | 9:30am to 11am |
| | HW Project #2 (https://canvas.ucsd.edu/courses/51435/assignments/748808) | due by 11:59pm |

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| | Peer Assessment for HW Project #2 (https://canvas.ucsd.edu/courses/51435/assignments/748816) | due by 11:59pm |
| Fri Mar 15, 2024 | BENG 230B Office Hours (GIAs/TAs) (https://canvas.ucsd.edu/calendar?event_id=982464&include_contexts=course_51435) | 10am to 11am |
| Mon Mar 18, 2024 | Final Exam March 18th (https://canvas.ucsd.edu/courses/51435/assignments/771183) | due by 11am |
| Tue Mar 19, 2024 | Final Exam March 19th (https://canvas.ucsd.edu/courses/51435/assignments/771185) | due by 11:10am |