# Syllabus BICD 110: Cell Biology Spring 2024

**What:** This course will cover the structures, pathways, and principles that organize the inner workings of cells. The course will start by covering the biochemical fundamentals that govern cellular organization and techniques used to probe the cell. Second, we will discuss the sorting pathways that control protein movement through the cell. In the latter half of the course, we will discuss signaling cascades, the cytoskeleton, and the cell cycle. We will conclude by examining how these processes are integrated into tissue biology and go awry in cancer.

**When:** Monday, Wednesday, and Friday, 9:00-9:50am
All lectures will be podcasted and available at https://podcast.ucsd.edu/

**Where:** CTL 0125

**Who:** Dr. Andrew Muroyama
Assistant Professor
Cell and Developmental Biology
3218 Muir Biology
Email: amuroyama@ucsd.edu
Note: Please include "BICD 110" in the subject line to ensure prompt reply.

**Office Hours:** In-person: Tuesdays @ 2-3pm in Muir Biology, Rm 1102
Virtual (zoom): Wednesdays @ 10:30-11:30am
Meeting ID: 917 6094 3397
https://ucsd.zoom.us/j/91760943397

**Instructional assistants:** **All students have a designated IA based on last name**
Andrew Bellaart, abellaart@ucsd.edu (Last name: A-G)
Sarah Bergendahl, sbergend@ucsd.edu (Last name: H-M)
Kaitlyn Callahan, kcallaha@ucsd.edu (Last name: N-R)
Charlotte Hou, chou@ucsd.edu (Last name: S-Z)

**Course Materials:** Molecular Cell Biology (9th Edition), Lodish et al.
The textbook is **optional**.

All course materials, including the syllabus, lecture slides, and problem sets will be posted to Canvas.
(https://canvas.ucsd.edu)

**Prerequisites:** BIBC 100 or BIBC 102 or CHEM 114A or CHEM 114B

**Quizzes and exams:** Quiz 1 – Wed, April 17, in-class
**Midterm** – Wed, May 1, in-class
Quiz 2 – Monday, May 20, in-class
**Final exam** – Thurs, June 13, 8:00-11:00am, Location TBD

**Assessment:** To accommodate student flexibility and provide ample opportunities for students to demonstrate their knowledge, there are two available grading rubrics.

| **Grading rubric 1:** | | **Grading rubric 2:** | |
|---|---|---|---|
| Best of the two quizzes: | 125 pts | Midterm: | 200 pts |
| Midterm: | 150 pts | Final: | 300 pts |
| Final exam: | 225 pts | | |

If a student has taken both quizzes, then the student's final grade will be calculated using both rubrics and the final grade will be the higher score. If a student has missed either of the two quizzes, then grading rubric 2 will be used to calculate the final grade.

**Important note**: To use grading rubric 1, the student must take **both** quizzes and the midterm. If a student misses either of the two quizzes without a valid excuse (e.g. doctor's note), grading rubric 2 will be used.

Extra Credit Opportunities:

-If >90% of the class completes the mid-quarter anonymous survey, everyone will be awarded 10 extra pts towards their final grade.

-If >90% of the class completes their final course evaluations, everyone will have 10 extra pts added to their final grade.

Optional: 5-minute recorded presentation about either a A) research paper or B) current topic – up to 30 pts to your final grade

**A)** Three cell biology-related research publications will be posted to Canvas by the midterm. A group of **up to three** students may choose one of these three papers and submit a recorded presentation of up to 5 minutes that includes: 1) the motivation for the study, 2) methods used, 3) walk-through of one figure, 4) main conclusions, and 5) a discussion of why these findings are novel. Each point must be accompanied by a presentation slide and all group members are expected to share equal speaking time. The presentation must be submitted by the end of week 9 (**May 31st, by 5pm**) to be reviewed. Each of these five points must be adequately addressed to receive full credit.

**B)** Biology does not exist just within the confines of academia. It is essential for and impacts all aspects of our society! In this spirit, a group of **up to three** students can submit a recorded presentation of up to 5 minutes about a current issue related to the topics covered in class that 1) details the issue as it appears in popular media, 2) provides context for the issue, 3) describes how the issue relates to the material in the course, and 4) briefly summarizes an academic article that treats the topic. The report must be sent to me by email end of week 9 (**May 31st, by 5pm**) to be reviewed. Each point must be accompanied by a presentation slide and all group members are expected to share equal speaking time. Each of these four points must be adequately addressed to receive full credit.

You can let your creativity shine and choose something you are passionate about! Possible topics are endless and include, for example, the visibility of scientists from historically marginalized communities, the effects of increasing heat stress on plant cells, new technologies to control mosquito populations, etc. **Important:** The topic and the paper must be approved by the instructor by email by **Friday, May 3rd @ 5pm**.

**Final grades** will be calculated according to the following scale:

481 – 500 pts: A+
461 – 480 pts: A
450 – 460 pts: A-
431 – 449 pts: B+
411 – 430 pts: B
400 – 410 pts: B-
381 – 399 pts: C+
361 – 380 pts: C
350 – 360 pts: C-
300 – 349 pts: D
Below 300 pts: F

**Regrade policy:** Regrades will only be accepted up to one week after the exam return date. If a regrade is requested, the student must supply 1) a written explanation of the error and 2) the original exam.

For initial requests, please email your assigned IA (see page 1 for assignment based on student last name).

**Makeup tests:** There will be no makeup exams. If there is a family or medical emergency, the instructor must be contacted ahead of time. Failure to do so will result in an automatic 0 on the missed quiz or exam.

**Problem sets:** Problem sets will be provided via Canvas and will cover the previous week's material. The problem sets will **not be graded** and are meant to reinforce key concepts from past lectures. The questions on the problem sets will be similar to those on the quizzes and exams, and are, therefore, meant to be an extra preparation tool to make sure you stay up to speed as the class moves along. Answer keys will be provided after the discussion section meets.

**Discussion sections:** The allotted discussion section time (Fridays @ 10am in CTL0125) will be used as a study hall and office hours. Attendance is optional. IAs will be present to go over problem sets and/or course material.

| Week | Lecture # | Date | | Topic |
|---|---|---|---|---|
| 1 | 1 | 1-Apr | M | Introduction |
| | 2 | 3-Apr | W | Molecular Building Blocks; Proteins |
| | 3 | 5-Apr | F | Methods in Cell Biology |
| 2 | 4 | 8-Apr | M | Lipid bilayers |
| | 5 | 10-Apr | W | Endoplasmic reticulum (ER) & Signal sequences I |
| | 6 | 12-Apr | F | Signal sequences II & Protein quality control |
| 3 | 7 | 15-Apr | M | UPR & Transport into mitochondria and chloroplasts |
| | | 17-Apr | **W** | **In-class Quiz I (lectures 1-7)** |
| | 8 | 19-Apr | F | Secretory pathway I: Secretory pathway intro |
| 4 | 9 | 22-Apr | M | Secretory pathway II: Vesicle assembly |
| | 10 | 24-Apr | W | Secretory pathway III: Golgi & TGN |
| | 11 | 26-Apr | F | Channels and transporters |
| 5 | 12 | 29-Apr | M | (Pre-recorded lecture) Nuclear transport |
| | | 1-May | W | **Midterm Exam (lectures 1-12)** |
| | 13 | 3-May | F | Signal Transduction I: Signaling cascades |
| 6 | 14 | 6-May | M | Signal Transduction II: GPCRs |
| | 15 | 8-May | W | Signal Transduction III: RTKs and MAPK |
| | 16 | 10-May | F | Cytoskeleton I: F-actin |
| 7 | 17 | 13-May | M | Cytoskeleton II: Microtubules and intermediate filaments |
| | 18 | 15-May | W | Cytoskeleton III: Cytoskeletal motors |
| | 19 | 17-May | F | Cytoskeletal functions: Cell migration and cilia |
| 8 | | 20-May | M | **In-class Quiz II (lectures 13-19)** |
| | 20 | 22-May | W | Cell Cycle I: Stages and cyclins |
| | 21 | 24-May | F | Cell Cycle II: Mitosis |

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|---|---|---|---|---|
| | | 27-May | M | Memorial Day – No Class |
| **9** | 22 | 29-May | W | Cell Cycle III: Cell cycle checkpoints & Cancer intro |
| | 23 | 31-May | F | Pathways in cancer |
| | | | | |
| | 24 | 3-Jun | M | (Pre-recorded lecture) Stem cells |
| **10** | 25 | 5-Jun | W | (Pre-recorded lecture) Course review: key themes and ideas |
| | | 7-Jun | F | Review |
| | | | | |
| | | **13-Jun** | **T** | **Final Exam 8:00-10:59am (lectures 1-25)** |

Please note that the subject matter covered over the course is subject to change (except for quiz/exam dates and the grading policies) as needed to enhance student learning and outcomes.

**Inclusion:** I am committed to fostering a learning environment where all students are supported and one that embraces diversity of thought, opinion, identity, and experience. As I will highlight in my lectures, our community is made stronger and science advances when as many perspectives as possible are uplifted. Please feel free to reach out to me if you have ideas about inclusion. More resources are also available from the Office of Equity, Diversity, and Inclusion: https://diversity.ucsd.edu/

**Accessibility:** Students requesting accommodations and services due to a disability for this course need to provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. **Please note that instructors are unable to provide accommodations unless they are first authorized by OSD**. For more information, contact the OSD at (858) 534-4382 (voice), **osd@ucsd.edu**, or visit **osd.ucsd.edu**.

**Academic integrity: Please, do not cheat.** Students are expected to do their own work, as outlined in the UCSD Policy on Academic Integrity. **Academic misconduct** is broadly defined as any prohibited and dishonest means to receive course credit, a higher grade, or avoid a lower grade. Academic misconduct misrepresents your knowledge and abilities, which undermines the instructor's ability to determine how well you're doing in the course. Please do not risk your future
by cheating.

**Other student resources**:

Throughout your time at UC San Diego, you may experience a range of issues that can negatively impact your learning. These may include physical illness, housing or food insecurity, strained relationships, loss of motivation, depression, anxiety, high levels of stress, alcohol and drug problems, feeling down, interpersonal or sexual violence, or grief. These concerns or stressful events may lead to diminished academic performance and affect your ability to participate in day-to- day activities. If there are issues related to coursework that are a source of particular stress or challenge, please speak with us so that we are able to support you. UC San Diego provides a number of resources to all enrolled students, including:

Counseling and Psychological Services (858-534-3755) | caps.ucsd.edu)

Student Health Services (858-534-3300) | studenthealth.ucsd.edu)

CARE at the Sexual Assault Resource Center (858-534-5793 | care.ucsd.edu)

The Hub Basic Needs Center (858-246-2632) | basicneeds.ucsd.edu)