

BIMM100 (Molecular Biology) SYLLABUS

Fall 2023, 4 units

Instructor: JOSE PRUNEDA-PAZ

Office: Muir Biology Building #3214.

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Phone: 858-534-8323 (please identify yourself as a student in BIMM100).

Instructional Assistants (IA): Chou, Todd Kwang-Tao (k1chou@ucsd.edu)

Le, Michelle Kim (mle@ucsd.edu)

Lo, Courtney Chia-Roan (clo@ucsd.edu)

Mohan, Siddharth (s3mohan@ucsd.edu)

Class website: <https://canvas.ucsd.edu>

Lectures: Tuesdays & Thursdays 9:30-10:50 AM at Catalyst (CTL) #125 (podcasted).

iClicker code: **BA**

Class schedule: provided in a separate file in the course website.

Exams: MIDTERM (online), Tuesday, Oct 31 (9:30 - 10:50 AM, US Pacific Time).

FINAL EXAM (online), Thursday, Dec 14 (8:00 - 10:59 AM, US Pacific time).

Office hours:

Professor: Thursdays 1-2 PM at Muir Biology Building #1102.

Extra OH before midterm and final exams will be offered on Oct 27 and Dec 8 (Muir Biology building #1138, 2:00-3:00 PM).

Instructional Assistants:

Name	e-mail	Day, time	Place
Chou, Todd	k1chou@ucsd.edu	Mon 3-4 PM Wed 11AM-12PM	3502-Pacific Hall 3501-Pacific Hall
Le, Michelle	mle@ucsd.edu	Tue 12-2 PM	Outside Leichtag Biomedical bldg
Lo, Courtney	clo@ucsd.edu	Mon 5-6 PM Tue 3-4 PM	Starbucks-Price Center
Mohan, Siddharth	s3mohan@ucsd.edu	Wed 4-5 PM Fri 4-5 PM	MOM's café Fairbanks Coffee tent- Revelle plaza

Important dates:

Oct 2: IA office hours start

Oct 5: Professor office hours start

Oct 10: iClicker participation starts being monitored (register iClicker before this day)

Oct 31: Midterm exam

Dec 14: Final exam

Check course schedule for flipped classes (which will require for you to watch a prerecorded lecture and work in a problem set prior to class)

Other important dates must be confirmed at:

<https://blink.ucsd.edu/instructors/courses/enrollment/calendars/2023.html>.

Course Prerequisites:

Prerequisites:

BILD 1 and,

BIBC 103 or BILD 4 or BIMM 101 and,

Chem 40A or Chem 40AH or BENG 120 and,

Chem 40B or Chem 40BH or BENG 120

If you feel rusty on the material of the prerequisites, it is strongly recommended that you carefully read Chapters 1-3 and Chapter 5 (pp171-182) of the *Lodish* textbook (7th ed) or Chapters 1-3 and Chapter 6 (pp223-234) of the *Lodish* textbook (8th ed), which cover material that is considered prerequisite and will only be mentioned in passing during class.

Purpose of the course: Molecular Biology is the study of gene structure, function and regulation at the molecular level. It describes fundamental mechanisms, shaped by evolution, that underlie all known life on our planet - mechanisms that when impaired, for example by mutation or by parasitic interference, lead to human disease. You will be introduced to our current understanding of genome structure and gene expression and the key experimental observations and deductions made by scientists, which have shaped, and continues to shape, our knowledge in this rapidly developing field of biology. As you will learn, this is a field of intense research with new exciting discoveries reported daily.

Learning objectives: After taking this class, you should know the key concepts of the central dogma of molecular biology, including the composition of genomes and the basic mechanisms of DNA replication and transcription, RNA processing and turnover, and translation (how the complexes that perform these activities identify their targets, carry out their function and can be regulated to meet cellular needs). In addition, you should have a basic understanding of the experimental approaches and deductions that have shaped, and continues to shape, our understanding of these concepts. Doing well in this class requires solid prior understanding of BILD1, biochemistry and organic chemistry.

COURSE STRUCTURE:

BIMM100 is a large class with more than 300 students, which all have different ways of learning. In an attempt to teach to all students, the course structure offers multiple resources for learning.

Lectures: Lectures will cover the central topics of molecular biology in the order indicated in the schedule, although the specific order can deviate a bit from that indicated, depending on time. The order of the topics discussed during lectures is different from the order in the textbook. This is done purposefully to allow the lectures to follow the general order of the central dogma of biology (DNA->RNA->Protein). We will therefore first discuss the composition and structure of DNA, mechanisms of DNA replication and repair, the composition of genomes, the use of recombinant DNA in research, transcription, RNA processing, mRNA translation and turnover. Along the way, we will discuss key experiments and deductions that underlie the understanding of the different processes. The pages in the textbook corresponding to the material discussed during lectures are indicated in the class schedule.

On the day before each lecture (at the latest), **a copy of the lecture slides (in pdf format) will be uploaded to the course website**. It is highly recommended that you download or print out the lecture slides so that you can follow the lecture by taking notes on them. They comprise a skeletal record of what happens in the lecture. However, you may find the lecture slides unintelligible without your own written notes. Therefore, don't think of them as a second, independent "book" you can read but instead as a collaborative record of the lecture that you will create. Most lectures start with a brief (5-10 minute) overview of the material discussed in the previous class. This is meant to remind students of the most important concepts discussed as we move along, and should present an excellent opportunity for students to take notes.

Lectures will be in person (no lecture during thanksgiving week)

Audio/video podcast for each lecture will be available at [Podcast.ucsd.edu](https://podcast.ucsd.edu)

Flipped classroom: will be used as a tool for *active learning*, which is an instructional approach used to engage students in the lecture topics through *problem-solving* activities. Flipped classroom sessions will take place during lecture time as indicated in the class schedule and will require for you to watch a prerecorded lecture and work on an assigned problem set prior to attending the class. Working in groups through these activities is strongly recommended. It is important that you keep in mind that you will have the greatest learning benefits if you attempt to solve problems on your own (or with a small group of students).

During flipped classes, the professor will work with you in identifying key questions that you may have about the prerecorded lecture or assigned problem set. Thus, it is key that you work on the assigned lecture and problems before attending the class.

Textbook: Lodish et al. 'Molecular Cell Biology' 7th (2012) / 8th edition (2016) / 9th edition (2021), Freeman, is optional, but highly recommended. The textbook will give you another view of the material taught in lecture. However, **note that exams will be only on the topics explained in lecture, thus you should use lecture slides to guide your book reading**.

iClicker: iClicker questions will be used to foster interactive learning in the large classroom setting, and to allow students and professor rapidly assess learning and guide teaching.

Usually, there will be 2-3 iClicker questions during regular lectures and 10-12 iClicker questions during flipped classes.

Both mobile or a physical iClicker remote will work for this course. Information about iClickers can be found at: <https://clickers.ucsd.edu/>

- To create an iClicker Student Mobile account and register for a class, follow the instructions in this [iClicker support article](#).
- New and used physical iClickers are available at the Price Center bookstore. Make sure to get an iClicker and not a different system (iClickers 1, 2 and + are okay).

Note that there will be extra credit points for clicker usage (see below).

Assignments: will be used to engage students in the lecture topics through *problem-solving* activities and to foster critical thinking. Problem sets will allow students to integrate topics from multiple lectures and will help students get better prepared to answer exam questions.

Working in groups through these activities is strongly recommended. It is important that you keep in mind that you will have the greatest learning benefits if you attempt to solve problems on your own (or with a small group of students) before seeking for IA or professor help during office hours or flipped classes.

Problem sets will be posted on the class website most weeks of the quarter (see the class schedule for specific dates) and an answer key will follow 3 days after.

Discussion forum (in course website): we will be using Piazza to provide a virtual space for organized discussions on academic and non-academic class topics. This will give you an additional tool to address specific questions.

Note that the professor and IAs will supervise each forum daily, so students are welcome not only to ask questions but also to provide answers to posted questions.

Please, keep in mind that only short answers could be provided in the discussion forum. If you need a detailed explanation of any given topic you should attend professor or IA office hours.

Office hours (professor and IAs): will provide an additional option to discuss the material being presented in class, assignments or other related interests you may have. Course-related discussions include asking for extra help, seeking clarification of material presented in class and following up on aspects of the class you find compelling. The instructor will not have lessons planned for office hours. It is expected for students to drive these meetings with their questions and thoughts.

A good way to prepare for office hours is to review the material and your notes from class and identify as clearly as you can what you do not understand.

Office hour dates/times/locations are indicated in the first page of this Syllabus.

Discussion sections: This course will not have discussion sections.

COURSE EVALUATION:

Exams: Your grade in BIMM100 will be based entirely on the cumulative score of two exams, midterm and final, as indicated below:

Midterm (40% of final score): The midterm exam will be during class time (see schedule in course website). It will be closed book and will cover the material discussed in lecture and assignments between weeks 0-4 (see schedule and assignments in course website).

Final Exam (60% of final score): The final exam will be given in finals week (see class schedule). It is closed book and will cover the concepts on the specific material covered in lecture and assignments after the midterm (lectures 10-19)

Exam format: Exams will be taken online in Canvas and will be proctored via Zoom (see online exam guidelines below). For that you'll need to have a computer with internet access/camera. If you need a computer, you can request a loaner from UCSD at <https://basicneeds.ucsd.edu/forms/lyft-program/index.html>. For any questions regarding the Laptop Loaner Program please direct them to the following email: techlending@ucsd.edu.

Note that while you will be able to take the exams from any place, the assigned exam locations will be available in case you need them (CTL125 for midterm and TBA for final).

Guidelines for online exams (Canvas/Zoom):

- 1) Exams will be taken online and can only be attended synchronously (dates and times are indicated in the class schedule).
- 2) Exams will be taken using Canvas. You must not leave the Canvas page during the exam (please note that this will be monitored automatically by Canvas).
- 3) Exams will be proctored via Zoom. All students taking the exam **MUST** join the Zoom session (Zoom meeting link in the class website "Zoom LTI PRO" folder). You must not turn off your camera or leave your camera or Zoom session at any time during the exam.
- 4) You can have a piece of scratch paper if needed to work out problem questions, but you cannot have any other type of note (as it would be the case for a regular classroom exam).
- 5) An ID card (student ID or driver's license) will be required at every exam.
- 6) No bio breaks will be allowed for the midterm exam, so please plan ahead.

There will be no scheduled make-up exams for the midterm or finals. Failure to take the exam at the assigned time and place will result in a grade of zero for that exam. Extraordinary circumstances preventing you from taking an exam at the scheduled time must be discussed in advance with the Student Affairs Office (1128 Pacific Hall) and Dr. Pruneda-Paz. If an exception is made for these extraordinary circumstances, a make-up will be an oral exam (in person or via Zoom) given by Dr. Pruneda-Paz.

Exam question format: Mostly multiple-choice (some could be short answer).

Exam viewing: Graded exams will be made available through the class website ~one-week after the exam date.

Exam regrade requests: Requests to reconsider grading must be submitted in writing to the instructor (Dr. Pruneda-Paz) by e-mail. The full request must be received **within one week** of the exam return date. A regrading request will cause the entire exam to be regraded.

Exam and Course Grading: Letter grades will be assigned as follows:

97-100%: A+
90-97%: A
87-90%: B+
80-87%: B
77-80%: C+
70-77%: C
60-70%: D
Below 60%: F

Extra credit: You could obtain **up to 7%** extra credit points for **participating in class** through iClicker questions. You will get 0.5% of extra credit per regular class or 1% extra credit per flipped class if you provide an answer for at least 75% of the iClicker questions asked during lecture (note that this is based entirely on clicker use, not on whether you get the answers right).

Note that to get full extra credit (7% maximum) you do not need to use the iClicker in all lectures.

iClicker usage will be monitored between weeks 2-10. **To get credit, make sure that your iClicker is registered in the class website no later than Tuesday Oct 10 before class.**

Cheating with clickers by having someone other than yourself using your clicker during class is considered a breach in academic honesty and will result in the loss of all clicker points for the quarter for both yourself and the person bringing your clicker, as well as any additional disciplinary actions as indicated by the policy to maintain academic honesty. Correct clicker use will be monitored by the instructor and IAs during class.

TIPS ON HOW TO DO WELL:

BIMM100 (like many other university courses) is complex enough to reward the student who gives some thought to how to take it. **The most important trick is to keep up**

The following practices will help you best prepare for the exams:

1. Print out lecture slides before each lecture.
2. Take good notes during lectures (the lecturer will often use the board for explanation, which slows down the pace and allows you to take notes on the lecture slides).
3. Participate in class.
4. Make sure that you understand the topics in each class. Many lectures will be based on knowledge of previous ones.
5. Work through assignments alone or in groups - always before attending flipped classes or office hours (assignment questions will give you the best idea of how exam questions are formulated).
6. Actively participate in peer discussions. Your grade will be decided entirely from your final score and not based on how you do compared to other students in the class. Note that research on learning has shown that whether you are on top of the material or are having a hard time understanding the concepts, you will improve your learning by discussing the material with other students. Participation in study groups and in peer discussions is therefore highly recommended.
7. **Seek for help as early as possible.** If you need further explanation or clarification on any topic use the many resources that this class provides to keep up (depending on your learning style you could read the textbook, use the discussion forum, seek for peer mentoring or to study with a small group of students, or use IA and professor office hours).
8. A note of caution: Memorizing slides and texts is not an efficient method of learning. While some memorization is required to become literate in molecular biology, the primary goal of the course, and what you will be primarily tested on, is understanding the key concepts of molecular biology in an integrated manner and using this to formulate predictions and to interpret observations from simple molecular biology experiments. These skills are best achieved by following the practices listed above.

CLASS POLICIES:

Attendance: Attendance to lectures is optional, but very strongly recommended. You simply will not do well in the class if you are not up to date with the topics explained in lecture.

Classroom etiquette: Please refrain from eating, reading newspapers, surfing the web, texting and engaging in conversations (except when prompted during clicker questions), or anything else that might distract others and yourself from paying attention during lectures. Please make sure to shut off cell phones. If you must leave class early, please sit in the back in an aisle seat so you can exit with the least amount of disruption.

Academic integrity: Students are expected to do their own work, as outlined in the UCSD Policy on Academic Integrity (“Academic integrity” folder in the class website). **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.

Letters of recommendation requirements: Acceptance into programs to further your education can be very competitive and thus you should carefully choose letter writers who know you well and who can honestly state that you achieved one of the top scores in their class and that your demonstrated enthusiasm, diligence and hard work makes the writer confident that you will be an excellent candidate for the school of application. Therefore, for me to write a letter of recommendation, you must have received an ‘A+’ in the class and you must have been an active participant that I have had a chance of interacting with during the quarter. Given the size of the BIMM 100 class, lecturer's of smaller classes or labs, or research supervisors, will usually know you much better and their letters of recommendation will therefore usually carry much more weight.

Disabilities: 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.

Responsibilities: In a class of 300+ students it is impossible to teach directly to everyone's needs. It is my (and IAs) responsibility to come to class or office hours well prepared and to provide students with multiple pathways to learning the topics, including lecture slides, explanations on the board, assignments and office hours.

It is your responsibility to put a significant effort into the class, by coming to class with printed lecture slides, taking notes, actively participating in class/peer discussions, reading the textbook, watching prerecorded lectures, working through assignments and attending professor or IA office hours.

This way, BIMM100 should be an enjoyable and exciting learning experience. Embrace this opportunity to understand the basics of molecular biology and, perhaps, one day you will contribute to this rapidly growing field in biology and medicine!