BIMM 100 – Molecular Biology
Winter 2024, 4 units

Professor: Nan Hao, E-mail: nhao@ucsd.edu

Lecture: MWF, 11:00 – 11:50 AM, CTL 0125

Office hour: Wed 12:30 – 1:30 PM, starting from the week of Jan 15, zoom link will be provided

Instructional Assistants:

Su, Hetian hes031@ucsd.edu
OHs
Mon 1:00 – 2:00 PM, Wed 1:00 – 2:00 PM, at Art of Espresso

Ko, Alexander C a7ko@ucsd.edu
OHs
Thu 4:00 – 6:00 PM, Zoom

Qian, Chen c6qian@ucsd.edu
OHs
Thu 4:00 – 6:00 PM, at Art of Espresso

Discussion Sections and Office Hours start from the week of Jan 15!

Class hours: MWF, 11:00 – 11:50 AM, CTL 0125

Important dates (https://blink.ucsd.edu/instructors/resources/academic/calendars/2023.html**):**
January 31: MIDTERM 1
February 21: MIDTERM 2
March 18: FINAL EXAM
- For other important dates, see the Class Schedule.

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 and how insights into these concepts have been gained through experimental observations. You should also be able to interpret, and predict the outcome of, basic experiments to study factors and pathways in molecular biology processes.

The specific topics covered include the composition of genomes and the basic mechanisms of replication, transcription, RNA processing, translation, and how the complexes that perform

these activities identify their targets, carry out their function and can be regulated to meet cellular needs.

COURSE STRUCTURE:

In an attempt to teach to all students, the course is structured in a way that offers multiple learning tools. These include:

Textbook: Lodish et al. 'Molecular Cell Biology' 7th edition, Freeman, 2013 is optional (earlier editions are okay as well). There are copies on reserve in the Biomedical Library. It is a reasonable and clear reference to own if you will continue in the biomedical sciences and is also used in BICD 110 - Cell Biology. It will give you another view of the material treated in lecture. The subjects treated in lecture are the materials you will be tested on, though the particular questions may be formulated using material from the book. Reading the same topics in the book explains the selection of topics a second time, sometimes in greater depth. Some nice animations and other helpful material related to the book can be found at the textbook web site: http://bcs.whfreeman.com/lodish7e/

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. The lectures are divided into three sections covering 1) Genes & Genomes, 2) Basic mechanisms of gene expression, and 3) Regulation of gene expression. Along the way, we will discuss key experiments and deductions that underlie the understanding of the different processes. The pages in the textbook (7th ed) corresponding to the material discussed during lectures are indicated in the schedule.

On the day before each lecture (at the latest), a copy of the lecture slides (in pdf format) will be uploaded on the course website. It is highly recommended that you download and print out the lecture slides so that you can follow the lecture by taking notes on it. 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.

Podcast will be available on http://podcast.ucsd.edu/ and on Canvas.

iClicker Questions:
iCliker questions will be used for rapid feedback to foster interactive learning in a large classroom setting. iClicker questions will be used during class time to make students think about, and discuss with each other, how the newly discussed material fits within the bigger picture of molecular biology, and how experimental observation and experimental design can address questions in molecular biology.

We will use iClicker Cloud (https://edtech.ucsd.edu/instructional-tools/iclickers/index.html) for this class. Please register your i-clicker on Canvas or download the app and register using your mobile device.

Problem Sets: Problem sets will be posted on the class website on most Fridays during the quarter (see the schedule for the specific dates). Problem sets are used as a tool to promote understanding of the discussed topics through problem solving. It is optional to work through the

problem sets and they are not handed in. However, it is very strongly recommended to work through the problem sets either alone or in study groups.

To best prepare yourself for exams, I highly recommend you to sit down with each problem set and take them as if they were exams – i.e. write down your answers. Do this before hearing answers from other students, discussion sections and/or keys.

Answer keys for each problem set will be posted on the next Friday (see the schedule for the specific dates).

Discussion Sections: Discussion sections will be held through zoom by IAs once a week, most weeks of the quarter. The discussions will be based primarily on the problem sets posted in the previous week. The IAs will lead a discussion based on the problem sets to make participating students arrive at the correct answers. To get the most out of Discussion Sections, it is therefore critical to have first worked through the problem sets alone or in study groups and then to participate in the discussion during the Discussion Sections. The attendance of discussion sections will be recorded by IAs and will be used to calculate extra credits. IAs will have their personal office hours. The time and location of Office Hours are listed above and will also be posted on the class website.

EXAMS & GRADING:

Your grade in BIMM 100 is based entirely on your exam scores. Your final score will be calculated the following way:

Two Midterms (50% of final score): The midterm exam is closed book and given during the indicated times. It covers the material discussed up until the exam (see Schedule). The times of the midterms can be found in the schedule.

Final Exam (50% of final score): The final exam is given in finals week (see schedule). It is closed book and will cover the broader concepts of the entire course (cumulative).

Extra credits:

Lecture attendance (2 extra credits)

Lecture attendance will be recorded entirely based on clicker use, not on whether you get the iClicker questions right. To get credit for the whole quarter, make sure that your clicker is registered with the class no later than **Wednesday Jan 10**. You will need to answer at least 50% of i-Clicker questions to get the full extra credits.

Discussion section attendance (3 extra credits)

IAs will record your attendance of discussion sections starting from the week of Jan 15. Be sure to attend zoom via registered UCSD accounts. You will need to attend 75% of discussion sections to get the full extra credits.

TIPS ON HOW TO DO WELL:

BIMM 100 (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 pace is unrelenting because BIMM 100 must sometimes move rapidly using less than 30 lectures to cover the field of molecular biology, which is a rapidly expanding field due to intense research.

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

1. Print out lecture slides before each lecture.
2. Be present if possible and 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. Actively participate in thinking about, and in peer discussions of, polling/iclicker questions.
4. Sit down and work through problem sets writing down all answers to the best of your ability - always before getting answers from Discussion Sections, Review Class, posted keys or other students. These (along with polling questions) will give you the best idea of how exam questions are formulated.
5. Actively participate in discussions of the problem sets during Discussion Sections.

A note of caution: Memorizing slides and texts is not an efficient method of learning for this class. 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 broader concepts of molecular biology and using this to formulate predictions and to interpret observations from simple molecular biology experiments as tested primarily through problem solving questions in the exams. These skills are best achieved by following the practices listed above.

CLASS POLICIES:

Attendance: Attendance in Lectures and Discussion sections is optional, but very strongly encouraged and will be rewarded by extra credits. You simply will not do well in the class if you do not put in significant effort.

Academic integrity: All suspicions of academic misconduct will be reported to the Academic Integrity Office according to university policy.

Those students found to have committed academic misconduct will face administrative sanctions imposed by their college Dean of Student Affairs and academic sanctions imposed by me. The standard administrative sanctions include: the creation of a disciplinary record (which will be checked by graduate and professional schools); disciplinary probation; and attendance at an Academic Integrity Seminar (at a cost of $75). Students can also face suspension and dismissal from the University; those sanctions are not at my discretion. Academic sanctions can range from a score of zero on an exam to an F in the class. The appropriate sanctions are determined by the egregiousness of the Policy violation. Students who assist in or are complicit with cheating could also be in violation of the Policy. Thus, students who become aware of their peers either facilitating academic misconduct or committing it should report their suspicions to me for investigation.

Please review UCSD's Policy on Academic Integrity, which can be found on this website: http://students.ucsd.edu/academics/academic-integrity/defining.html

It should be needless to say that it is much easier to pass this course, and any future courses that use this course as a prerequisite, by putting the energy into understanding the material of the course rather than into an attempt to pass the course 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, lecturers 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.

Responsibilities:
In a class of 300 students it is impossible to teach directly to everyone's needs.

It is my (and the IAs) responsibility to keep the class organized, to come to class well prepared and to provide students with multiple pathways to learning the topics, including lecture slides, explanations on the board, polling/iclicker questions, assignments, discussion sections, 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 polling questions/peer discussions, reading the textbook, working through assignments and actively participating in the discussion of assignments during IA discussion sections.

This way, BIMM 100 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!

GOOD LUCK!