Course Information and Syllabus for
BIMM 100 Molecular Biology • Spring 2023

Class days, time and location: Tuesdays & Thursdays, 3:30-4:50 PM, PETER 110
Classes will be held in-person*; recorded lectures will be made available in Canvas
*Class will be asynchronous (recorded lectures) June 6 and June 8
Clickers will not be used; interactive questions are built into the lectures

Professor: Jill Wildonger

Contact (email): jwildonger@ucsd.edu *Please include "BIMM100" in the subject line.
For general questions about the course and material, please use Piazza.

Office Hours: Fridays, 2-3 PM, held via zoom: https://ucsd.zoom.us/j/92411227977

Course Canvas Website: https://canvas.ucsd.edu/courses/44939

Piazza: https://piazza.com/ucsd/spring2023/bimm100_sp23_b00

Important Dates & Deadlines:
Midterm Exam 1 (30% of final grade): April 25 (in-person during class time)
Midterm Exam 2 (30% of final grade): May 25 (in-person during class time)
Final exam (20% of final grade): June 12 (in-person, 3-6 PM)
For additional important dates and deadlines, please see the Class Schedule

Purpose of the Course: Molecular Biology is the study of the molecules (DNA, RNA, proteins) that are essential to all known life. The course describes fundamental mechanisms that enable genes and genomes to replicate and generate products that function in cells. Errors in these mechanisms are the source of both evolution and disease. You will be introduced to our current understanding of molecular biology by exploring key experiments, observations, and deductions made by scientists that shape our knowledge of how these molecules are produced and function. As you will learn, this is a field of intense research with new, exciting discoveries.

Learning Objectives: You will learn the key concepts of the "central dogma" of molecular biology, including gene structure and the basic mechanisms of replication, transcription, RNA processing, and mRNA translation. You will learn how molecular complexes that perform these activities identify their targets, carry out their function, and are regulated to meet cellular needs. In addition, you will acquire an understanding of the experimental approaches and deductions that underlie our understanding of these concepts. Doing well in this class requires solid understanding of biology, biochemistry and organic chemistry.

Course 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

Course Structure

The course offers multiple tools to facilitate student learning in complementary ways:

Book: Lodish et al. 'Molecular Cell Biology' 9th edition, Freeman, 2021 is optional (earlier editions are fine, but the pages will not correspond exactly). There are copies on reserve in the Biomedical Library. It will give you another view of the material covered in lectures.

Lectures: Lectures cover topics as indicated in the schedule. Any variation in this schedule will be announced both in class and on the course Canvas site. Note that the lectures cover the material in a different order than the textbook and will include material not included in the textbook. The lectures are divided into three units: (1) DNA Essentials, (2) Gene Expression and RNA Products, and (3) Current Molecular Biology: Epigenetics and Gene Editing. At least a day before each lecture, a copy of the lecture slides will be uploaded onto the course website. It is recommended that you have a copy of the slides during the lecture in order to take notes directly on the slides. Regardless of whether you use a copy of slides, **it is essential to take your own notes**. The slides contain the key points, but they are not comprehensive: it is important to write down the additional information and explanation that is provided in the lecture. **Study tip: Re-write your notes after lecture and write out the questions that you have on the material.**

Problem Sets: Problem sets will be posted on the class Canvas site on Fridays (see schedule for the specific dates). Problem sets are used as a tool to promote understanding of the discussed topics through problem solving.

Discussion Sections: Discussion sections will be held once a week most weeks of the quarter (see Discussion Section schedule on the course website). The discussions will be based primarily on the problem sets posted the previous week. Discussion leaders will make sure that participating students arrive at the correct answers and will work through any of the questions that were challenging. **Please attend the Discussion section to which you are assigned.**

Piazza: Please post questions on Piazza (you can opt to post so that you will be anonymous to your classmates). Prof. Wildonger will also post questions received by email on Piazza and the answers (the sender's name will not be revealed).

Course Points, Grades, Exams, and Assignments

Points will be awarded as described below:

60 points….Two midterm exams, 30 points each
20 points….Final exam
14 points….Seven problem sets, 2 points each
6 points…...Discussion Section Attendance, 2 points per meeting attended
*Extra Credit: See below (any additional extra credit point opportunities will be announced).

Letter grades will be assigned as follows based on the points achieved:

>100: A+
87-100: A (A- or A)
77-86: B (B-, B, or B+)
67-76: C (C-, C, or C+)
57-66: D
Below 57: F

Midterm exams (2 exams, 30 points each; 60 points total): Each of the two midterm exams will cover material from one unit of the course. For example, the first exam will cover material from Lectures 1-6; the second exam will cover material from Lectures 7-14. The exams are closed book and will be held in-person during class time. The midterm exams are comprised of multiple-choice and short-answer questions.

Final exam (1 exam, 20 points): An in-person written exam comprised of short-answer questions covering Lectures 15-18 to be held on June 12 (3-6 PM).

Problem sets (7 problem sets, 2 points each; 14 points total): Problem sets will be posted on Fridays and due the following Tuesday evening at midnight, before Discussion sections meet. There will be a total of 7 required problem sets (any optional problem sets will be clearly marked as optional). Two points are awarded for the completion of each required problem set. You do not need to answer questions correctly. You are allowed to work together in small groups (fewer than ~5-8 people) to work through questions *together* (you are not allowed to divide up problem sets and copy answers from each other; no copying-and-pasting); if you work in a small group, please list the names of the group members on your problem set and the days/times that you met. Answer keys will be available at Discussion section meetings and posted on Canvas.

Discussion Section attendance (6 points): Regular attendance at Discussion Sections is encouraged; two points will be awarded for each Discussion Section attended, a maximum of six points can be achieved. **Please attend the Discussion section to which you are assigned.**

Extra credit reports (up to 6 points): Identify a story in the current news (within the past year) that relates to class material (e.g., telomerase). Write a one-paragraph (250 words max) summary report of the connection between the news story and class material that describes the new scientific finding reported in the article (e.g., that telomerase affects chromosome length) and the significance of the finding (e.g., chromosome length may affect tumor cell survival and division). Be sure to cite the news story and provide a copy or link. A total of three extra credit reports can be submitted at three different intervals during the quarter: one report can be submitted April 3 - April 20, one report can be submitted April 21 - May 18, and one report can be submitted May 19 - June 1. You cannot submit more than one report per interval. Each report can achieve up to 2 points; a maximum of six extra credit points can be achieved.

How to do well in the course: Tips for Success!

BIMM100 covers a broad spectrum of molecular biology, both fundamentals and advanced studies. Success in the course requires regular, active engagement with the class and material.

1. Attend all the lectures when they occur (in person and/or view the recording), attend and participate in your Discussion Section, and complete the problem sets on time (before the answer key is posted). Since lectures build on each other, it is essential to attend lectures as they occur and to keep up.

2. Take notes during lecture. Many students find it helpful to take notes directly on a copy of the slides (printed out on paper or an electronic version) or to have a copy of the slides next to them when taking notes. **Taking your own notes is essential** because additional information and explanation are provided during lecture. It is helpful to re-write notes after lecture.

3. Ask questions. You will have questions! Write down your questions and ask them during class, before or after class, during office hours, via Piazza on Canvas (you can post anonymously so that your name will only appear to Prof. Wildonger; your name does not have to be visible to your classmates), during Discussion Section, or via email.

4. Form a study group with your classmates. It is helpful to talk about the material with your classmates so that you feel comfortable using new words and discussing new topics. Remember, you can work together on the problem sets in small groups.

5. **You've got this!** We are here to support your learning. Attend the lectures and Discussion sections, take notes, do the problem sets, ask questions –**you will learn the material & do well**.

Class Policies

Lecture Attendance: It is expected that you will attend each lecture either in-person or by viewing the recorded lecture (note: **in-person attendance is mandatory for midterm exams, which are held during class time**). Often students find it helpful to both attend in-person and then re-watch sections of the recorded lecture.

Discussion Section attendance: Attendance at Discussion Sections is both encouraged and expected. Points are awarded for attending (up to a maximum of six points). **Please attend the Discussion section to which you are assigned.**

Exams: Exams must be taken at the designated time and place. A missed exam will receive zero points. If you will be prevented from taking an exam (due an exemption allowed by the university), you must submit the request in writing with the necessary documentation at the beginning of the quarter to Prof. Wildonger. In the rare event of a make-up exam, the make-up

exam will be a one-on-one oral question-and-answer exam given by Prof. Wildonger. Any mistake made in grading short-answer exam questions should be brought to the attention of Prof. Wildonger within a week of the exam results being posted. The grading mistake should be obvious, and you should clearly and briefly describe the mistake. Note that any multiple-choice question that is answered incorrectly by a majority of the class will be re-graded.

Assignments: Assignments not received by the scheduled due date will receive zero points.

Academic Integrity: Academic dishonesty will not be tolerated in this course. According to UCSD policy, academic dishonesty includes:

- completing assignments or exams for another student
- allowing another student to complete an assignment or exam for you
- copying another student's work on an assignment or exam
- allowing another student to copy your work on an assignment or exam
- incorporating plagiarized material into an assignment or exam

Any issues with academic dishonesty will be reported to the UCSD Academic Integrity Coordinator and the Dean of the student's college. Confirmed cases of academic dishonesty will result in the student receiving an F as their final grade and other disciplinary actions determined appropriate by the Academic Integrity Coordinator.

Week - Date	Lecture	Topic & Exams	Assignments
Unit 1: DNA Essentials			
Week 1 – April 4	1	Molecular Basis of Heredity	
Week 1 – April 6	2	DNA Structure	
Week 2 – April 11	3	DNA Replication & Telomerase	Problem Set 1 due April 11
Week 2 – April 13	4	Mutagenesis & Repair – Part I	
Week 3 – April 18	5	Mutagenesis & Repair – Part II	Problem Set 2 due April 18
Week 3 – April 20	6	Genes & Mobile DNA	1st Extra Credit due April 20
Week 4 – **April 25**		**Unit 1 Midterm Exam (30 points)**	(Optional Problem Set)
Unit 2: Gene Expression and RNA Products			
Week 4 – April 27	7	Introduction to Gene Expression	
Week 5 – May 2	8	Prokaryotic Transcription	Problem Set 3 due May 2
Week 5 – May 4	9	Eukaryotic Genome: Chromatin	
Week 6 – May 9	10	Eukaryotic Transcription	Problem Set 4 due May 9
Week 6 – May 11	11	Regulation of Gene Expression	
Week 7 – May 16	12	mRNA processing and export	Problem Set 5 due May 16
Week 7 – May 18	13	Translation	2nd Extra Credit due May 18
Week 8 – May 23	14	Non-coding RNAs	Problem Set 6 due May 23
Week 8 – **May 25**		**Unit 2 Midterm Exam (30 points)**	
Unit 3: Current Molecular Biology: Epigenetics and Gene Editing			
Week 9 – May 30	15	Epigenetics	
Week 9 – June 1	16	Introduction to CRISPR	3rd Extra Credit due June 1
Week 10 – June 6*	17	CRISPR Applications – Part I	Problem Set 7 due June 6
Week 10 – June 8*	18	CRISPR Applications – Part II	
June 12, 3-6 PM	**Unit 3 Final Exam (20 points)**		

*Asynchronous classes; recorded lectures will be posted on Canvas.