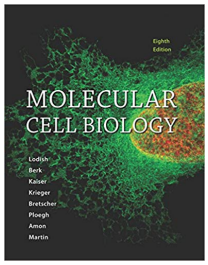

MOLECULAR BIOLOGY – BIMM 100
Winter 2020, 4 UNITS, SECTION A00

PROFESSOR: Dr. Omar S. Akbari, 5101 Tata Hall (Office)
E-mail: oakbari@ucsd.edu (please use the Subject line: BIMM100)
Phone: 858-246-0640 (please identify yourself as a student in BIMM100)

OFFICE HOURS: Fridays, 7:00-7:50AM, 5101 Tata Hall, starting 2nd week

TEXTBOOK:

"Molecular Cell Biology, 8th Edition," Lodish et al., 2016, which will be referred to as MCB. There are copies on reserve in the Biomedical Library. The other editions cover mostly the same topics although the page numbers may be different than those listed on the Syllabus.

LECTURES: Class Time - Tuesdays and Thursdays, 8:00-9:20AM
Location - Faustina Solis Lect Hall Bldg 107
Podcast: http://podcast.ucsd.edu/

DISCUSSIONS:
A01 – Monday, 11:00-11:50AM, Location -Warren Lecture Hall 2112
A02 – Monday, 12:00-12:50PM, Location -Warren Lecture Hall 2112
A03 – Monday, 1:00-1:50PM, Location -Warren Lecture Hall 2112
A04 – Monday, 2:00-2:50PM, Location -Warren Lecture Hall 2112
A05 – Monday, 3:00-3:50PM, Location -Warren Lecture Hall 2112
A06 – Friday, 12:00-12:50PM, Location -Warren Lecture Hall 2112
A07 – Friday, 1:00-1:50PM, Location -Warren Lecture Hall 2112
A08 – Friday, 2:00-2:50PM, Location -Warren Lecture Hall 2112
A09 – Friday, 3:00-3:50PM, Location -Warren Lecture Hall 2112

EXAM 1: January 28th, Tuesday, 8:00-9:20AM, Location - In Class

EXAM 2: February 20th, Thursday, 8:00-9:20AM, Location - In Class

FINAL EXAM: March 19th, Thursday, 8:00-10:59AM, Loc. TBA

WEBSITE:

On Ted: http://canvas.ucsd.edu UCSD students should use their email username and password. Concurrent enrollment (Extension) students are not added automatically. Extension students should obtain a registration token from Extension's student services or the ACMS Help Desk and register for an account. More information is at: http://sdacs.ucsd.edu/~icc/ce.php

Late Adds, Waitlisted Students, Drops:

- **Students** are added to Canvas within one business day after officially enrolling in the course in Canvas.
- **Waitlisted students** are automatically given access (you can opt out by emailing its@ucsd.edu).

- **Students who remain on the waitlist** and other drops are removed from the course after the end of third week (or 30% through the quarter for summer session).

BIMM 100. MOLECULAR BIOLOGY (4):
Molecular basis of biological processes, emphasizing gene action in context of entire genome. Chromosomes and DNA metabolism: chromatin, DNA replication, repair, mutation, recombination, transposition. Transcription, protein synthesis, regulation of gene activity. Prokaryotes and eukaryotes.

COURSE GOALS:
Molecular biology is the study of gene structure and function at the molecular level. It fuses knowledge and discoveries from various disciplines, including Genetics, Biochemistry, Basic Biology and Organic Chemistry. You should enter this class with a solid understanding of general biology and chemistry and finish this course with a sophisticated understanding of genes and the molecules that regulate their expression and function. You will be introduced to the scientists and their amazing experimental deductions that shaped molecular biology and appreciate that this is an evolving field with frequent novel discoveries and even upheavals in dogma. If you are curious to understand how life functions at the molecular level and how scientists tackle this daunting problem, then welcome to the class and I expect you will do well in this challenging course!

LEARNING OUTCOMES:
1. Know the key concepts of the central dogma of molecular biology
2. Understand the basic levels of gene organization and control of gene expression
3. Understand some of the basic scientific techniques used to study genes, gene expression, and genetic manipulation.
4. Be able to apply molecular biology concepts to human disease and the development of therapeutics.
5. Understand the concepts of genomics, proteomics, and other-omics being used to further understand the relationship between genetic patterns and normal and abnormal functions.

PREREQUISITES:
You should have successfully completed the prerequisites to register for this course: Prerequisites: BIBC 100 or BIBC 102, BICD 100. (Note: Students may not receive credit for both BIMM 100 and Chem. 114C.)

PARTICIPATION
Attendance to class lectures and sections are **not required** but will ensure your success in the class. Exams will be based upon material in class, assigned science articles; Class attendance will be important for success.

IA DISCUSSION SECTIONS:
Discussion sections are a valuable part of this course and you are expected to take part in them. A team of dedicated students who have recently aced this course or who are in graduate studies in this field will each lead 1 hour sections/ week. The discussions will be based on homework assignments, which will be posted on the website after class on the indicated dates on the syllabus. You should attempt the problem sets yourselves, or with friends in the class, and be prepared to go over your answers in the discussion sections. Undoubtedly, you will get the most out of the discussions if you

participate in them instead of just attending to hear the answers to the problems (see tips below). Importantly, the answers to these questions will not be posted.

There will be no sections the first full week of class. Sections will begin the following week of Jan 14, 2020. IAs will announce their personal office hours and contact information at the first meeting of the sections. The time and location of discussion sections and office hours will also be posted on the Canvas class website.

ASSIGNMENTS:
Homework assignments will be posted on the class website at Canvas on most Tuesdays during the quarter (as indicated on your syllabus). Assignments are used as a tool to promote understanding of the discussed topics through problem solving. While the assignments will not be handed in for grading, it is very strongly recommended that you work through the assignments either alone or in study groups. Exam questions will reflect the homework assignments. Importantly, the answers to these questions will not be posted.

CLICKERS:
To achieve extra credit (up to 5% points added to your final average), you will need an i>clicker (iClicker1 or iClicker2). New and used i>clickers are available at the Price Center bookstore. Make sure to get an i>clicker and not a different system (such as H-ITT or PRS).

We will use clickers for rapid feedback and to foster interactive learning in a large classroom setting. Clicker questions will be used during class time to help students think about and discuss with each other how the newly presented material fits within the bigger picture of molecular biology, and how experimental observation and experimental design can address questions in molecular biology. To obtain as much credit for clicker use as possible, please register your clicker ASAP at the class website on Canvas under "Tools".

The extra credit is based entirely on clicker use, not on whether you get the answers right. To get credit for the whole quarter, make sure that your clicker is registered with the class at the beginning of the quarter. 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. It is your responsibility to remember to bring your clicker to class with a charged battery. If we use clickers in 18 classes and you participate in all 18, you will receive 5%; if you participate in 9, you will receive 2.5%, etc.

EXAMS AND GRADING:
Your performance in the class will be determined by your scores on the midterm (2 exams) and final exam.

Exam and grading policies are as follows:

There will be two midterms and a comprehensive final exam. You have the choice of the following grading scheme (max 1000 points)

Midterm 1	**300pts (30%)**
Midterm 2	**300pts (30%)**
Final exam, cumulative	**400pts (40%)**

Alternatively, you can drop one of the midterms and redistribute the points according to the following scheme:

One midterm (highest grade out of two)	**400pts (40%)**
Final exam, cumulative	**600 pts (60%)**

This means that there are **NO MAKE UP EXAMS** and, if for ANY reason you miss a midterm exam, the second scheme will automatically be applied.

In order to ensure that everyone has a chance at getting a grade that reflects the effort that they put into the class, the grading will be based on a standard curve.

That score will be used distribution:

A	100-91.5%
A-	91.5-87.5%
B+	87.5-83%
B	83-79%
B-	79-75%
C+	75-70.5%
C	70.5-66.5%
C-	66.5-62.5%
D	62.5%-50%
F	50-0%

*You may earn up to 5% extra credit clicker points (See clicker section).

Regrade Policy: The purpose of regrades is to protect you from potential mistakes made by overworked and underappreciated IAs. Requests for regrades must be submitted in writing with a description of the grading error along with your original exam within one week of the exam return date. Please be advised that exams will be photocopied before they are returned to you. Thus, do not alter ANYTHING on an exam for which you are submitting for re-grading. Any inconsistencies will be considered a breach in academic honesty and will be grounds for failure of the course. You can personally deliver these documents to Prof. Villa during her office hours.

Email etiquette: Before e-mailing the instructors, consider carefully whether your question might be already answered in the syllabus, or whether it is best to ask your question in person during office hours. For example, it is difficult to e-mail about concepts that require drawings or demos. If you send an e-mail, make sure to **include BIMM100**. You must send your email from your UCSD address;

please make clear who you are. As always, a well-written and professional e- mail greatly increases the likelihood that you will get a response in a timely manner.

Adds/Drops/Withdrawals: Use Canvas to add into open sections, to waitlist a full section, or to drop the course.

Special Circumstances: You must communicate special needs, including those based on medical conditions or religious beliefs, prior to January 18 . These needs will be taken into account only after they have been discussed with the professor. Students with disabilities are given my full support as long as you work through the Office for Students with Disabilities. Excusal from an exam will be granted by the professor only if proper documentation is provided (e.g., from medical/law-enforcement professionals). ***No rescheduling or make-up exams are allowed***, except as noted in: http://www.ucsd.edu/catalog/front/AcadRegu.html

Students with disabilities: If you have been given an Authorization for Accommodation (AFA) letter from the Office of Students with Disabilities (OSD), you must provide the instructor, and the OSD Liaison Lindsay Ward with a copy of the letter before any accommodations will be provided. All exam scheduling will be coordinated by you and the instructor, with involvement from the OSD Liaison as needed. In order to guarantee accommodations, you must follow the guidelines established by the Instructor and/or Liaison. OSD exams will run concurrently with the scheduled exam.

Aid &Collaboration: You are encouraged to work together and form discussion groups to learn all aspects of cryo-EM. However, all submitted assignments must clearly demonstrate independent effort. Collaboration or aid on exams is strictly prohibited unless told otherwise.

Academic Integrity: DO NOT CHEAT. All submitted work must be your own. This includes all exams and in-class assignments. Please read the UCSD Policy on Integrity of Scholarship, at: http://senate.ucsd.edu/manual/Appendices/Appendix2.pdf

See page 5 of this syllabus for excerpts. All violations of academic integrity that are noticed by me will be sent to the Office of Academic Integrity without exception. ***If you cheat, you can expect an F for the entire quarter, not just the exam/assignment in question***.

Classroom etiquette in lectures and discussions: The following rules are aimed to keep our classroom environment focused on the task at hand for you and your peers. You know these basics already:

- Please arrive on time to lecture and discussion.
- Reading newspapers etc., is not allowed.
- All phones must be off during lectures, discussions, and exams.
- Phones/tablets/computers/ must be out of sight during exam periods.

The bottom line is that we will be considerate of one another at all times in lectures and in the discussions.

TIPS FOR SUCCESS:

- Read the assigned pages in MCB before class to prepare yourself for the subject material to be covered. Pay particular attention to the "Key Concepts" at the end of each section.
- Attend the lectures. Lecture notes will be posted on the website ~24 hrs prior to each class. These serve as a guide, but not a substitute, for class and often the presentation in class will contain additional slides and more detail than the posted version. Everything presented in class is subject for examination. This will include topics and details not necessarily covered in your text or on the posted lecture notes.
- Participate in class. I prefer interactive lectures and will often ask questions. If you offer answers, not only will your attention be engaged, but the question and correct answer will also more likely become embedded in your mind. This is true even if you get the answer wrong - just the act of participating improves your memory much better than a night of cramming.
- Do the assignments. The exam questions will directly reflect the homework problems. I encourage you to work with friends and discuss the problems.
- Attend discussion sections. If you attempt the problem sets before your discussion section meets, you will have a good idea of topics that need further explanation and you can take advantage of a small class setting with an expert to help you fill in the gaps.
- Embrace the opportunity to understand the basics of molecular biology and, perhaps, one day you will contribute to this rapidly expanding and exciting field.

GOOD LUCK!

BIMM100 WINTER 2020 – TENTATIVE SYLLABUS						
Week	**DAY**	**DATE***	**LECTURE**	**TOPIC**	**ASSIGNMENT**	**PAGES#**
1	Tu.	7-Jan	1	An Overview & DNA Structure		1-9, 41-46, 168-176
	Th.	9-Jan	2	Genes & Mobile DNA		301-323
2	Tu.	14-Jan	3	Chromosomes	1	327-349
	Th.	16-Jan	4	DNA replication & telomerase		197-203, 347-349
3	Tu.	21-Jan	5	DNA Repair & PCR	2	203-212, 239-241
	Th.	23-Jan	6	Basic Transcription & Control of Gene Expression in Prok		176-180, 356-363
4	Tu.	28-Jan	**EXAM 1 (Location – In Class)**			
	Th.	30-Jan	7	Control of Gene Expression in Euk (Pol II)		363-373, 378-380
5	Tu.	4-Feb	8	Activators, Repressors & Transcription Initiation (Pol II)	3	373-377, 380-383, 373-374
	Th.	6-Feb	9	Regulation of Transcription Factor Activity (Pol II)		381-390, 390-397, 398-404, 404-412
6	Tu.	11-Feb	10	mRNA processing & export	4	180-183, 417-439, 440-445
	Th.	13-Feb	11	Transcription by Pol I & Pol III; Translation		367, 412-414, 461-470, 183-197
7	Tu.	18-Feb	12	Transcription by Pol I & Pol III; Translation	5	367, 412-414, 461-470, 183-197
	Th.	20-Feb	**EXAM 2 (Location – In Class)**			
8	Tu.	25-Feb	13	Post-transcriptional control of gene expression	6	439-440, 445-447, 451-461
	Th.	27-Feb	14	Non-coding RNAs		447-451, 264-266, 266-268
9	Tu.	3-Mar	15	Recombinant DNA methods	7	234-237, 243-246, 249-251
	Th.	5-Mar	16	Genomics		323-327, 247-250
10	Tu.	10-Mar	17	Viruses	8	212-218, 1152
	Th.	12-Mar	18	Review		
	Th	19-Mar	**FINAL EXAM,** 8-10:59AM (Location - TBA)			

*DATE - Classes are on Monday and Wednesday from 8:00-9:20AM in Faustina Solis Lect Hall Bldg 107

#PAGES - In the text "Molecular Cell Biology, 8th Edition," Lodish et al., 2016

Academic Integrity at UCSD

Excerpts from http://senate.ucsd.edu/Operating-Procedures/Senate-Manual/Appendices/2

"Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be upheld."

Instructors' Responsibility.
"The Instructor shall state in writing how graded assignments and exams will contribute to the final grade in the course. If there are any course-specific rules required by the Instructor for maintaining academic integrity, the instructor shall also inform students of these in writing."

Students' Responsibility. "Students are expected to complete the course in compliance with the instructor's standards. No student shall engage in an activity that involves attempting to receive a grade by means other than honest effort; for example:

- No student shall knowingly procure, provide, or accept any unauthorized material that contains questions or answers to any examination or assignment that is being, or will be, administered.

- No student shall complete, in part or in total, any examination or assignment for another person.
- No student shall knowingly allow any examination or assignment to be completed, in part or in whole, for himself or herself by another person.

- No student shall plagiarize or copy the work of another person and submit it as his or her own work.

- No student shall employ aids excluded by the instructor in undertaking course work or in completing any exam or assignment.

- No student shall alter graded class assignments or examinations and then resubmit them for regrading.
- No student shall submit substantially the same material in more than one course without prior authorization."

Instructional Assistant's (IA) Responsibilities
"A student acting in the capacity of an Instructional Assistant (IA), a category including but not limited to teaching assistants, readers, and tutors, has a special responsibility to safeguard integrity of scholarship. In this role the student functions as an apprentice instructor, under the tutelage of the responsible instructor. An IA shall equitably grade student work in the manner agreed upon with the course instructor. An IA shall not provide a student with any information or collaboration that would aid the student in completing the course in a dishonest manner (e.g., providing access to unauthorized material related to tests, exams, and homework)."