

BIMM 100 – Molecular Biology Summer Session I 2019, 4 Units

Instructor: Steven W. Miller, Ph.D, Bonner Hall Rm 4121

Contact information:

Email: swmiller@ucsd.edu (please use subject header "BIMM 100")

Phone: 858-534-6473

Twitter: @NaturallySteve

Office Hours: 4:00 pm – 6:00 pm Wednesdays, Bonner Hall Rm 4146.

***July 24th OH will be held in Bonner Hall Rm 3146.

Class Lecture: 9:30 am – 10:50 am, Monday through Thursday, 105 Center Hall.

Course Website: <https://coursefinder.ucsd.edu> We're using Canvas!

Discussion Sections:

A01	MW	12:00p-12:50p	CENTR 203
A02	MW	1:00p-1:50p	CENTR 203
A03	MW	2:00p-2:50p	CENTR 203

Instructional Assistants (IAs):

Anqi Yang
Diya Basrai

any010@ucsd.edu
dbasrai@ucsd.edu

Recommended text: Molecular Cell Biology, Lodish et al. W. H. Freeman.
Either 7th (2013) or 8th (2016) Editions.

Important Dates:

Exams: Exam 1, Thursday, July 11th (9:30 am – 10:50 am; in class)
Exam 2, Thursday, July 25th (9:30 am – 10:50 am; in class)
Final Exam, Friday, Aug 2nd (TBD)

Register your iClicker by Monday, July 8th on the course website.

July 5th: Deadline to change grading option, change units, add classes, and drop classes without a "W" grade appearing on transcript.

July 19th: Deadline to drop with "W" on transcript.

See <http://summersession.ucsd.edu/calendar/> for other important academic dates.

Course Prerequisites: BILD 1 or equivalent; organic chemistry (CHEM 40A and B or equivalent); and a lab class involving molecular biology (BILD 4 or BIMM 101 or BIBC 103). It is strongly recommended that you read Chapters 1-3 and Chapter 6, pp224-234, of the Lodish textbook (8th ed; 172-182 if 7th ed), which review 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 replication, transcription, RNA processing, translation and RNA turnover, and 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.

COURSE STRUCTURE:

BIMM100 is a large class, which all have different ways of learning. 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' is optional, but highly recommended. There are copies of the text 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.

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), and 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 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 them.

Clickers: For a portion of the course points, you will need an iClicker. New and used i-clickers are available at the Price Center bookstore. Make sure to get an iClicker and not a different system (such as H-ITT or PRS). iClickers 1 and 2 are both okay.

Clickers will be used for rapid feedback to foster interactive learning in a large classroom setting. Clicker questions will be used during class time to make students think about, and discuss with each other, how the newly discussed material fit within the bigger picture of molecular biology, and how experimental observation and experimental design can address questions in molecular biology. For more information about why we use iClickers visit: <http://clickers.ucsd.edu>

To obtain as much credit for clicker use as possible, please register your iClicker ASAP, and no later than Monday July 8th, on the class website (<http://coursefinder.ucsd.edu>).

Practice Problem Assignments: Class assignments will be posted on the class website throughout the quarter, with each assignment corresponding to a set of 2-3 lecture topics as indicated on the class schedule. Assignments are used as a tool to promote understanding of the discussed topics through problem solving. It is optional to work through the assignments and they are not handed in. However, it is very strongly recommended to work through the assignments either alone or in study groups. Assignments will be reviewed during discussion sections.

Discussion Sections: Discussion sections will be held by IAs twice a week during the condensed summer session. The discussions will be based primarily on the posted Assignments. The IAs will lead a discussion based on the Assignments to make participating students arrive at the correct answers. The IAs will not provide the answers themselves. To get the most out of Discussion sections, it is therefore critical to have first worked through the Assignments alone or in study groups and then to participate in the discussion during the Discussion sections. Discussion sections are optional, but very strongly recommended.

Discussion Board: (On the course website) The purpose of the Discussion Board is to organize discussions and provide an area for students to ask questions, discuss specific class topics, and reply to each other's posts. This forum aims at providing an additional tool to address specific questions and will be supervised by the professor and IAs. Keep in mind that the discussion board does not replace lectures.

Office hours (Instructor and IAs)

Weekly office hours provide an additional option to discuss the material being presented in class 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.

EXAMS & GRADING:

GRADING -- BIMM100 has three grading components: participation & professionalism (2%), assignments (9%), quizzes (14%), exams (74%). The following grading scheme will be used.

A+	97-100%	B+	87-90%	C+	77-80%	D+	67-70%	F	0-60%
A	93-97%	B	83-87%	C	73-77%	D	63-67%		
A-	90-93%	B-	80-83%	C-	70-73%	D-	60-63%		

The course is not graded on a curve (i.e. 20% of students getting A, B, C, and such). Thus, the ability to do well in this course is not dependent on others doing poorly.

There are no opportunities for extra credit beyond what is assigned as part of the course by the instructor.

PARTICIPATION AND PROFESSIONALISM (2%) – Success in this course depends upon the willingness of student to engage in both individual and team-oriented activities that foster the mindset of scientific research environments. The classroom environment is a collegial, collaborative, professional community and student behavior toward their peers and instructors is expected to reflect as much. This portion of the grade reflects upon both the actions of the student as an individual and the class as a whole. As such 1% accounts for the initial assumption of each student as dedicated, collaborative professionals, and chronic deviations of individual students will result in points being deducted. The remaining 1% reflects upon the class community and refers to surveys and evaluations. If 90% of the class responds to such material designed to provide feedback for the improvement of the course and the instructors and assistants, all students will earn these points.

HOMEWORK (9% total) – Will consist of file submissions or discussion posts to be submitted on Canvas. See Calendar.

QUIZZES (14%; 10 points each) – These will consist of short quizzes on Canvas to be completed each week.

IN-CLASS EXAMS (34% of final score; Exam 1 – 50 pts; Exam 2 – 80 pts): The midterm exam is closed book and given during class time. It covers the material discussed up until the exam (see Schedule).

FINAL EXAM (40% of final score; 150 pts): The final exam is given during the finals session (see schedule). It is closed book and will cover the concepts of the entire course.

About Exams....

- Questions on the Midterms and Final will be in short answer format and must be answered in ink.
- Pens and ID card (student or driver's license) are the only personal items you may have with you during the exam; any other items you bring (backpacks, phones turned OFF, etc) must be placed entirely under your seat and are subject to being moved at the IAs' and professor's discretion.
- Because of the shortened Summer Session, 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.
- Requests to reconsider any grading must be submitted in writing along with your original exam to the instructor during class or office hours. The full request must be received within one week of the exam return date. A regrade request will cause the entire exam to be regraded. If anything on the exam submitted for regrade is found to be altered, it will be considered a breach in academic honesty and will be grounds for failure of the course as well as any additional disciplinary actions as indicated by the University policy to maintain academic honesty.

Note: regrade requests on the final exam will only be taken in person by the instructor during business hours on the Monday following the exam, prior to the submission of grades to the registrar. Afterward, exams will be distributed through the Exam Depot.

Graded Exam pick up: exams will be distributed through the Biological Sciences Exam Depot, the Division's graded exams distribution center. Students will receive an email when exams are ready for pick up (photo ID is required in order to pick up exams at the depot). Exams will be retained for a full academic quarter, after which they will be destroyed.

Location: Pacific Hall Room 1227 (1st floor, across from the vending machines outside the north entrance)

Hours: Monday – Friday, 10:00 am to 4:00 pm (Closed on weekends, university holidays and other official closures).

Clicker Bonus Points (up to 5% bonus): This is based entirely on clicker use, not on whether you get the answers right. To get credit for the whole semester, make sure that your clicker is registered with the class at the beginning of the quarter, no later than Monday July 8th! You earn credit for each session by participating in at least 50% of the clicker questions for that day. You earn full clicker points for the course by participating in at least 80% of the sessions. Below 80%, bonus points are prorated.

- 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:

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 20 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 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, clicker questions.
4. Read the textbook – preferably before class (planned topics and corresponding textbook pages are indicated in the schedule).
5. Work through assignments alone or in groups - always before Discussion Sections. These (along with clicker questions and practice exams) will give you the best idea of how exam questions are formulated.
6. Actively participate in discussions of the assignments during Discussion sections.
7. Constantly reflect and evaluate yourself and how well you really understand each topic.

In addition, the “Solved Problems” at the end of each Lodish Chapter are often useful.

Since your grade will be decided entirely from your final score and not based on how you do compared to other students in the class, it will never hurt you to help fellow students. In fact, 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 discussion of clicker questions is therefore highly recommended.

Since your own grade is not influenced in any way by how your classmates do, working together with your classmates will only help everyone involved. Studying in groups is highly recommended.

A note of caution: Memorizing slides and texts is not an efficient method of learning concepts. 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 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 in class and during Discussion sections is optional, but very strongly encouraged. Your attendance effort will be rewarded with the points earned from lecture activities. You simply will not do well in the class if you do not put in significant effort.

Classroom etiquette: Please refrain from eating, reading newspapers, surfing the web, texting and engaging in conversations (except when prompted during iClicker 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: Cheating will not be tolerated and will be subjected to disciplinary actions as discussed above under exams and clickers and as indicated by the policy to maintain academic honesty. All cheating will be reported to the University. Please review UCSD's Policy on Academic Integrity, which can be found on this website: <http://academicintegrity.ucsd.edu/process/policy.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. If you are struggling or overwhelmed, that is OK! Seek help from your IAs, instructor, and your classmates; working through your difficulties will help you prepare for and be able to manage the next challenge you will face, whereas cheating will only put you further behind.

Disabilities: If you qualify for accommodations because of a disability, please submit to me a letter from the Office for Students with Disabilities (OSD) as soon as possible so that your needs may be addressed. The OSD determines accommodations based on documented disabilities. Please see guidelines at: <https://osd.ucsd.edu>

TECHNOLOGY POLICY: Laptop computer policy: Students are welcome to bring laptops to lecture for note-taking purposes. Please see this research study that shows "multi-tasking" on computers is likely to decrease your grade, but it also decreases the grades of people around you who can see your screen¹! For this reason, we ask that you do not flip between lectures notes and the internet. The use of cell phones, computers, or any other electronic devices is not permitted during exams. Use of a cell phone or other similar electronic devices during an exam or quiz is grounds for receiving a failing grade.

¹Sana et al. 2013. <http://www.sciencedirect.com/science/article/pii/S0360131512002254>

Responsibilities: In a class with a large number students it is impossible to teach directly to everyone's needs. It is my (and the IAs) responsibility to come to class well prepared and to provide students with multiple pathways to learning the topics, including lecture slides, explanations on the board, clicker questions, assignments, and discussion sections. 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 clicker 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!

BIMM 100 Summer Session I Tentative Schedule

Date	Topic	Lecture	7th ed* (Chapter: pages)	8th ed* (Chapter: pages)	Related Homework	Exam content
1 July	Introduction; DNA structure	1	1: 1 - 10 2: 36 - 37 4: 115 - 121 4: 123	1: 1 - 15 2: 45 - 46 5: 167 - 176 5: 177	HW1	Exam 1; 11 July
2 July	DNA replication; telomeres	2	4: 145 - 151 6: 273 - 275	5: 197 - 203 8: 347 - 349		
3 July	DNA repair; PCR	3	4: 151 - 159 5: 192 - 193	5: 203 - 212 6: 239 - 241		
8 July	Genes; mobile DNA	4	6: 223 - 245	8: 301 - 323	HW2	
9 July	Chromosomes	5	6: 256 - 271	8: 327 - 345		
10 July	Transcription and Gene Expression in Prokaryotic Organisms	6	4: 124 - 127 7: 279 - 288	5: 176 - 180 9: 353 - 363	HW3	
15 July	Gene Expression in Eukaryotic Organisms	7	7: 288 - 297 7: 302 - 305	5: 180 - 182 9: 363 - 381		
16 July	Activation and Repression of Transcriptional Initiation	8	7: 297 - 302 7: 305 - 314 7: 315 - 322	9: 381 - 390 9: 390 - 398	HW4	Exam 2; 25 July
17 July	Regulation of Transcription Factor Activity	9	7: 323 - 327	9: 398 - 404		
18 July	mRNA Processing and Export	10	8: 345 - 370	10: 417 - 445	HW5	
22 July	RNA Polymerase I and Polymerase III and Maturation	11	8: 336 - 338 8: 384 - 392	9: 412 - 414 10: 461 - 470		
23 July	Translation	12	4: 131 - 145	5: 183 - 197	HW6	
24 July	Post-Transcriptional Regulation	13	8: 364 - 365 8: 384 - 392	10: 435 - 440 10: 451 - 461		
29 July	Non-coding RNAs	14	5: 216 - 218 8: 370 - 374	6: 264 - 268 10: 445 - 451	HW7	
30 July	Recombinant DNA Methods	15	5: 182 - 192 5: 195 - 198 5: 201 - 202	6: 234 - 239 6: 241 - 246 6: 249 - 253		
31 July	Genomics	16	6: 252 - 256 5: 200 - 201	6: 243 - 249 8: 323 - 327	HW8	
1 August	Cancer	17	24: 1113 - 1150	24: 1135 - 1168		
2 August	Final Exam					Final Exam; 2 August; 8am - 11am

*Recommended Text: Molecular Cell Biology, Lodish et al. MacMillan Learning. 7th or 8th edition.