

**BIMM 100 – Molecular Biology
Summer Session I 2016, 4 Units**

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

Contact information:

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Office Hours: 11:00 am – 12:30 pm Thursdays, Bonner Hall Rm 4136.

Class Lecture: 9:30 am – 10:50 pm, Monday through Thursday, 110 Peterson Hall.

Course Website: <http://tritoned.ucsd.edu>

Discussion Sections:

Mon/Wed 12:00 pm – 12:50 pm	HSS 1315
Mon/Wed 1:00 pm – 1:50 pm	HSS 1315
Tues/Thurs 2:00 pm – 2:50 pm	CENTER 218
Tues/Thurs 3:00 pm – 3:50 pm	CENTER 218
Tues/Thurs 4:00 pm – 4:50 pm	CENTER 218

Instructional Assistants (IAs):

Cindy Barrientos	cbarrien@ucsd.edu
Joseph Kim	jhk112@ucsd.edu
Andrew Mikhail	akmikhai@ucsd.edu
Paula Pham	pdp002@ucsd.edu

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

Important Dates:

Exams: Midterm, Thursday, July 14th (9:30 – 10:50; in class)
Final Exam, Friday, July 29th (TBD)

Register your iClicker by Tuesday, July 5th.

July 8th: Deadline to change grading option, change units, and drop classes without a "W" grade appearing on transcript.
July 26th: Deadline to drop with "W" on transcript.

See <http://blink.ucsd.edu/instructors/resources/enrollment-calendars.html> for other important academic dates.

Course Prerequisites: BICD100 (Genetics), BIBC100 or BIBC 102 (structural or metabolic biochemistry), and their prerequisites, including BILD1 and organic chemistry. It is strongly recommended that you read Chapters 1-3 and Chapter 5, pp171-182, of the *Lodish* textbook (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. Doing well in this class requires solid prior understanding of genetics, biochemistry and organic chemistry.

COURSE STRUCTURE:

BIMM100 is a large class with ~160 students, 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 7th edition 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. 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: To achieve extra credit, 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://acms.ucsd.edu/faculty/clickers/index.html>

To obtain as much credit for clicker use as possible, please register your iClicker ASAP, and no later than Tuesday July 5th, on the class website (<http://ted.ucsd.edu>).

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:

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

Midterm (40% of final score): The midterm exam is closed book and given during class time. It covers the material discussed up until the exam (see Schedule).

Final Exam (60% of final score): The final exam is given in finals week (see schedule). It is closed book and will cover the concepts of the entire course with focus on the specific material covered after the midterm.

- Questions on the Midterm 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 use (up to 5% of extra credit): 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 Tuesday July 5th!

- 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.

Letter grades will be assigned as follows:

90-100: A
80-90: B
70-80: C
60-70: D
Below 60: F

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.

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.

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 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. *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://disabilities.ucsd.edu/students/index.html>

Responsibilities: In a class of ~160 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
27 June	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; 14 July
28 June	DNA replication; telomeres	2	4: 145 - 151 6: 273 - 275	5: 197 - 203 8: 347 - 349		
29 June	DNA repair; PCR	3	4: 151 - 159 5: 192 - 193	5: 203 - 212 6: 239 - 241	HW2	
30 June	Genes; mobile DNA	4	6: 223 - 245	8: 301 - 323		
5 July	Chromosomes	5	6: 256 - 271	8: 327 - 345	HW3	
6 July	Transcription and Gene Expression in Prokaryotic	6	4: 124 - 127 7: 279 - 288	5: 176 - 180 9: 353 - 363		
7 July	Gene Expression in Eukaryotic Organisms	7	7: 288 - 297 7: 302 - 305	5: 180 - 182 9: 363 - 381	HW4	Exam 2; 29 July
11 July	Activation and Repression of Transcriptional Initiation	8	7: 297 - 302 7: 305 - 314 7: 315 - 322	9: 381 - 390 9: 390 - 398		
12 July	Regulation of Transcription Factor Activity	9	7: 323 - 327	9: 398 - 404	HW5	
13 July	mRNA Processing and Export	10	8: 345 - 370	10: 417 - 445		
18 July	RNA Polymerase I and Polymerase III and Maturation	11	8: 336 - 338 8: 384 - 392	9: 412 - 414 10: 461 - 470	HW6	
19 July	Translation	12	4: 131 - 145	5: 183 - 197		
20 July	Post-Transcriptional Regulation	13	8: 364 - 365 8: 384 - 392	10: 435 - 440 10: 451 - 461	HW7	
21 July	Non-coding RNAs	14	5: 216 - 218 8: 370 - 374	6: 264 - 268 10: 445 - 451		
25 July	Recombinant DNA Methods	15	5: 182 - 192 5: 195 - 198 5: 201 - 202	6: 234 - 239 6: 241 - 246 6: 249 - 253	HW8	
26 July	Genomics	16	6: 252 - 256 5: 200 - 201	6: 243 - 249 8: 323 - 327		
27 July	Cancer	17	24: 1113 - 1150	24: 1135 - 1168		

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