Biol101 Molecular Biology, 2016 Summer Session 1 Course Information:

Lectures:
Tues & Thurs; 9:00 am- 12:00 pm, PhysSciences 110

Instructor: **Prof. Tisha Bohr**

Office: Sinshimer 201 (only during office hours, otherwise I'm in Sinsheimer 112, the Bhalla Lab)

Lab Phone: (831)459-1823

Email: **Use the discussion forum on eCommons for questions about the class**

(For personal issues use tbohr@ucsc.edu. I will reply within two days of your message. Put "Bio101" in the subject line or the message may get lost in my inbox.)

Office Hours: Prof. Bohr office hours (201 Sinsheimer Labs)

Wednesday (6/22) 2-4 pm

Wednesday (6/29) 2-4pm

Wednesday (6/6) 2-4pm

Tuesday (7/12) 1-2pm

Wednesday (7/13) 2-3pm

Tuesday (7/19) 1-2pm

Wednesday (7/20) 2-3pm

With the large number of students in this course, there is no way for me to hold office hours that fit everyone's schedule. However, The TA will also hold office hours that you can use, and I will be checking the eCommons discussion forum every week day evening for questions.

TA's:

Hossein Amiri **Office Hours:** Thu 12:45pm to 2:45pm, Thimann 329

Course Website:
The course website is hosted on eCommons. I will post announcements, lecture notes, problem sets, etc., so check it regularly. There is also a discussion forum for questions about the course and lecture material.

Course Description:
Molecular biology deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development. This course will cover the basic molecular mechanisms of DNA replication, transcription, protein synthesis, and gene regulation in both bacterial and eukaryotic organisms. How experimentation employing molecular techniques is used discern these mechanisms will be also emphasized. Students are strongly encouraged to concurrently enroll in BIOL 101L.

Learning Objectives:

- Understand and use the scientific vocabulary for in communicating information in molecular biology.
- Apply general concepts of molecular biology to relevant, specific problems.
- Represent and illustrate the structural organization of genomes and genes.
- Describe the steps of gene expression and mechanisms of gene regulation.
- Discuss how genomes are maintained as well as changing.

- Distinguish between different molecular biology techniques that are used to isolate, separate, and probe for specific proteins, nucleic acids, and their interactions. Identify limitations of these techniques.
- Given a particular biological question, identify which experimental techniques are best used to answer that question.

Textbook:

Molecular Biology Principles of Genome Function 2nd edition by Craig et al: This is the textbook that I am recommending for Biol101. It does a good job of explaining the basic concepts and experimental strategies that we will focus on in Molecular Biology. The book is available in the UCSC bookstore. A less expensive paperback or used version is also available for sale on websites like Amazon.

I will provide page numbers for readings in the 2nd edition of this book. You can substitute the 1st edition for almost all the material, but you will need to figure out the page numbers on your own based on the topics covered. Two of these books are on reserve at the Science Library.

You can also use **Molecular Biology of the Cell by Alberts et al:** It is the textbook used in Biol110 Cell Biology, hopefully saving you some money and provides the basic concepts and experimental strategies that we will focus on in Molecular Biology. The book is available in the UCSC bookstore. A less expensive electronic version is also available for sale or rent on websites like Amazon.
I will provide page numbers for readings in the 6th edition of this book. You can substitute the 4th edition for almost all the material, but you will need to figure out the page numbers on your own based on the topics covered. Readings from this book will be posted on the ecommons website.

Lecture notes:

I will be posting notes for lectures- usually a day before the lecture in the Discussion Forums under "Lecture Resources".

The notes and all other documents for this course are considered private content for this class only. Do not upload them to websites that collect course materials (e.g. Course Hero, etc.)

Webcasts:

Webcasts will be recorded for lectures. You can find them at: https://webcast.ucsc.edu/. Contact Media Services if you experience any difficulty: webcast@ucsc.edu

Good ways to use the webcasts:

- Going back to specific points for which you did not take adequate notes.
- Going back to specific points that went to fast for you.
- Reviewing material while you are commuting.
- Making up for a missed lecture.

Bad way to use the webcasts:

- Passively listening in the hopes of absorbing the material by osmosis.

The lecture webcasts are considered private content for this class only. Do not repost them.

Discussion Sections:

Discussion sections will be an opportunity for students to solve problems in smaller groups and practice presenting and evaluating answers. The TA will facilitate sections by facilitating work on problem sets in groups and answering questions. Attendance is not required, but discussion participation will be rewarded (see **Assessment Policy** for more information).

Section	Day	Time	TA	Location
01A	Th	3-4:10 pm	Hossein Amiri	Physical Sciences 114
01B	Th	4:20-5:30 pm	Hossein Amiri	Physical Sciences 114

Discussions sections meet starting the **2nd week** of class

We will be using iClickers starting 2nd week of class:
Bring your new, used, or shared iClicker to all the lectures.

You can register your iClicker through eCommons (use link in the left menu). Alternatively, you can register through the company's website. However, if you have obtained a used iClicker, there may be a fee to register through the company.

Assesment Policy

Course Grades in Biol 101 will be based on three short midterm exams and a cumulative final along with class participation and discussion participation with the following weights:

25%	**Exam 1 (take home)**	**250 pts**
25%	**Exam 2**	**250 pts**
40%	**Final (cumulative)**	**400 pts**
3%	**Lecture participation**	**30 pts** (4 pts / lecture attended- up to 30 pts)
3%	**Activity participation**	**30 pts** (4pts / activity session- up to 30 pts)
4%	**Discussion participation**	**40 pts** (10 pts / session or problem posted- up to 40 pts total)
		1000 total

Class participation will be measured by iClicker use. Full credit will be given for clicking on 90% of the questions asked in lectures. (i.e. you will not be penalized if you miss class 1 time. if you miss class a second time you will only be penalized 2 points. However, for every class you miss after 2 classes you will be penalized 4 points per class missed). If you forget your clicker I have two loaners that will go to first come first serve.

Activity participation will be based on attendance, preparation and participation. Full credit will be given for attending **at least 8** activity sessions (i.e. you will not be penalized for missing activities up to **1 times** if you miss class a second time you will only be penalized 2 points. However, for every class you miss after 2 classes you will be penalized 4 points per class missed)

Discussion participation will be based on section attendance, problem set preparation and/or discussion forum participation. 10pts will be given for each section attended with evidence of attempting problem sets **OR** showing I or the that you've attempted problems sets during office hours **OR** for posting to the class discussion forum a **sample exam problem & correct answer** that you have written **prior to each exam**. Keep in mind that you can post up to the day the exam is given, but I will not be able to give you feedback on your problem prior to the test if you wait until the night before.

There will be no extra-credit assignments. However, in cases of final course scores near a grade cut-off, participation in online discussion forum and office hours may be considered as a reason for raising a grade.

Regrading exams

If you believe there is a problem in your grade calculation in the form of an accounting error (e.g. the number of points is not added correctly) please forward the information to me by email.

If, after comparing with the answer key, you believe that your score is incorrect because of a correct response which was not recognized as such, write out your argument on a separate piece of paper , attach it to your test, and turn it in to the Bhalla Lab mailbox in Sinsheimer Labs within one week from the day the exams were handed back. In regrading, I will not reconsider allocation of partial credit (how points were awarded). Each exam problem is graded by a single person for the entire class, and the allocation of credit is applied uniformly to all students. Therefore, I will only consider situations in which:

(1) an answer was present on the paper but not interpreted by the grader, or

(2) an original answer which differs from the key but is a well-reasoned alternative answer (e.g. different approach for an experimental design question)

I reserve the right to regrade the entire exam.

Note: In most cases, I will not look at regrades until the end of the quarter. Typically, I will first check to see if the points in question will make a difference in the overall course grade. Please make a photocopy of your exam if you wish to use it for studying later.

Missed exams

It is inevitable that there will be students who, for legitimate reasons beyond their control, are unable to take scheduled examinations. However, written make-up tests will not be given. In the case that you must miss one of the exams due to a legitimate excuse (see below), your grade will be based on the average of the other exam scores. Approval to miss an exam must be obtained before the regularly scheduled exam is given, if possible. If you miss a second exam, it can only be made up with an oral exam with Professor Bohr, lasting the same amount of time.

Legitimate excuses include: demonstrable sickness or injury on the day of, or immediately prior to, the scheduled exam; death, serious illness or other catastrophic event in the immediate family; jury duty; days of religious observance as set forth in campus policy; other conflicts beyond the control of the student, at the discretion of the instructor.

Final Exam: The deadline for submission of final grade reports may preclude offering an alternate sitting of the final exam. Therefore, students who are unable to take the final exam for legitimate reasons beyond their control, as described above, AND who are in passing based on midterm exams, may request a grade notation of "Incomplete". Arrangements for an incomplete must be made directly with the instructor no later than 24 hours after the scheduled final exam.

In all other cases, a missed exam will be scored as a 0.

Academic Integrity:

Cheating is taken very seriously in this course. All transgressions will be fully prosecuted and result in no credit for the work in question. Cheating includes, but is not limited to, copying from other students' exams, looking at other students' exams, showing your exam to other students, having someone do your iClicker for you or doing someone else's iClicker for them.

Exam dates

Exam 1 (Take Home):	Given Thursday, June 30th, posted on eCommons at 5:30pm
	Due Tuesday July 5th, beginning of class at 10am
Exam 2 (Take Home):	Thursday, July 7th, posted on eCommons at 5:30pm
	Due Tuesday July 12th, beginning of class at 9am
FINAL:	Thursday, July 21 **9-12pm**

Questions about the course:

If you have questions about course materials and course policies, post your question on one of the "Discussion Forums" on the course website there. Many students have the same questions and concerns. When the course begins, the instructor will check this site daily during the week days and post replies. It is also a great opportunity to discuss class material with each other.

Accommodation for students with disabilities:

If you qualify for classroom accommodations because of a disability, please get an Accommodation Authorization from the Disability Resource Center (DRC) and submit it to me in person outside of class (e.g., office hours) within the first week of the quarter. Contact the DRC at 459-2089 (voice), 459-4806 (TTY), dra@ucsc.edu or http://drc.ucsc.edu for more information on the requirements and/or process.

Syllabus

(The order and length of topics may shift during the quarter- updated versions will be announced on the eCommons website for the course).

Interspersed in lectures will be learning activities such as group problem solving, experimental data interpretation, paper discussions and games. Bring index cards, paper and pencils, laptops, etc. and be ready to participate.

Readings are given as chapter sections in " Molecular Biology Principles of Genome Function", 2nd edition. Some preparation (reading, video) may be required before class activities, and will be posted on the class website. Material that is not covered in lecture/activities will not be included on exams.

DATE	DAY	Event	Topic	Reading in MBPGF 2nd ed.
6/21	T	Lecture 1 Activity 1 Lecture 2	Molecules Interpreting gels/ blots Sequence and Genomes	Ch 2.1-2.7; 2.9-2.12 Ch19.6-19.7 Ch 18.1-18.8; 19.4; 19.8
6/23	Th	Lecture 3 Activity 2 Lecture 4	DNA replication machinery Primer extension DNA replication regulation	Ch 6.1-6.12, 19.8, 19.15 Ch 6.8; 19.3, 19.8 Ch 6.13-6.14
6/28	T	Lectures 5 Activity 4 Lecture 6	Recombinant DNA PCR tricks Transcription basics	Ch. 19.4-19.5 Ch. 19.3 Ch 8.1-8.6
6/30	Th	Lecture 7 Activity 5 Lecture 8 Take Home Exam 1	Transcription regulation- bacteria Lac Operon mutations Transcription regulation- eukaryotes Exam 1: Covers L1-6, A1-4	Ch 9.1-9.5 Ch. 9.3 Ch. 4.1-4.9,8.3, 9.6- 9.9, 18.3, 19.12
7/5	T	Exam 1 Due Activity 6	**Class Starts 10am** Guest Lecture: Dr. Tonio Schuetze Y2H	 Ch. 19.12
7/7	Th	Lecture 9 Lecture 10 Activity 8	Transcription Factors Pre-mRNA processing Alternative Splicing	Ch. 3.3, 9.2 Ch. 1.5, 8.2, 10.4-10.7 Ch. 10.1, 10.7
7/8	F	Extra Credit Take Home Exam 2	12:30-1:30 Biomed 300 Exam 2: Covers L7-10, A5-8	
7/12	T	Extra Credit Due Lecture 11 Activity 9 Lecture 12	 Translation Translation Post-transcriptional gene regulation	 Ch. 11.1-11.7, 11.10-11.11 10.9-10.10, 13.1-13.6
7/14	Th	Exam 2 Due Lecture 13 Activity 10 Lecture 14	 Transposons & Retroviruses Transposon / Retrovirus Tools Genome modification	 Ch. 17.1-17.9 19.5
7/19	T	Activity 11	Extra Credit: Student Run Review	
7/21	Th	Final	Final Exam- 9:00 a.m.-12:00 p.m. Cumulative- Open Note	

Study Guide for Biol 101:

Biol101 is a challenging course. We cover a lot of material that brings together what you have learned in your previous classes, especially Bio20A and Biochemistry (Bio100). Building from that foundation, you will be asked to remember facts about molecular biology and, more importantly,

apply those facts and the scientific method to solve problems. If you are sitting in class, reading the textbook or listening to the podcast and thinking "This all makes sense. I understand it." you have only taken the first step of "taking in" the material. In order to perform well on exams, you need to practice putting that information "back out". This is a good website that describes active study habits that are what will take you to the next level. The website is aimed at medical school courses that cover larges amounts of complex material, and much of it applicable for Bio101.

Answers to some common questions about the course:

Q: What will the form of the test be?
A: A mix of short answer and problem solving that emphasizes on experimental approaches. My goal is to assess how well you understand concepts and can use your knowledge to solve problems.

Q: What material will tests emphasize?
A: Emphasis will be on the lecture material, activities and problem sets. Use the textbook to interpret complex concepts from lecture or in the notes. Unless I state otherwise, you are not responsible for material in the text that is not covered in the notes or in lecture.

Q: How much of the details will we need to know?
A: Our goal together is to define which things in molecular biology are 1) core concepts, 2) key details and 3) less pertinent details. I will test mainly on types 1 and 2, and not much on 3.

Organizing your time: At UC, 1 credit hour is considered to require about 3 hours of time per week. That means you should budget 18 hours a week for 3 credits of Biol101. Below is my suggestion for using your time each week to your best advantage:

Lecture / activities:	6 hours / week
Discussion section:	2 hour / week
Reading / homework:	6 hours / week
Office hours /group study:	4 hours / week

"New research shows: a better way to study is to take a test"
Recent research shows that studying by answering test questions will give the best results. One thing that resonates with me is the idea that studying should make you feel like you don't know everything. If you are studying and thinking "that all makes sense. I have it down." then you are lulling your mind into a false sense of security. Just like with building muscle, it takes working out with some pain and exhaustion to grow your brainpower.

There are also several videos discussing good studying techniques. I think that this series, which is based on principles of human psychology, has some good points (even if the speaker uses a little too much jargon and the music is cheesy):

Search YouTube for: How to Get the Most Out of Studying: Part 1 of 5, "Beliefs That Make You Fail...

Other study strategies:

1> Look over the lecture notes and on a new piece of paper start list the big concepts. AFTER you have done this, check on the website for the basic concepts page. You are trying to see if you finding the same thing and not getting caught up in the details.

2> Work problem sets on your own. Make yourself spend at least 15 minutes trying to solve the problems. If you have troubles, first start by listing what concepts from above this problem is concerned with. Then, diagram what you think is going on with the problem. If it's a question about transcription at a promoter, draw some DNA and mark a place for a gene with its promoter and add in molecules like RNA polymerase. Only after you have done this work, go to section or office hours and watch someone else work the problem. Only this kind of practice will let you gain skills with problem solving.

3> Work with a study group and practice teaching each other the basic concepts. It will force you to talk about them in your own words and let you get used to using all the "jargon".

4> Make diagrams, pictures, summary charts, concept maps, etc. See how far you can draw through a concept and how many details you can label it with. Concept maps (diagrams that connect the information you get in class) are also very useful. A guide to concept mapping is outlined below. Also, here is a link to a student-recommended program (free download) to help you create concept maps on your computer.

Steps in Making A Concept Map

1. Make a list of the concepts from the lecture.
2. Rank the concepts from most general to most specific.
3. Start each map at the center of the top of the page with the most general concept, which will generally be the chief topic of a particular lecture. Below it, place the second-most general concept(s), etc...
4. Circle these two concepts and link them with a solid line.
5. Label the line with a linking phrase.
6. Work your way down the page, adding increasingly specific concepts and looking for crosslinks, which should be drawn with dashed lines.
7. Add details (examples).
8. Do a second version of the map with the goal being to add formerly unnoticed crosslinks and to organize the map so that it flows as logically and as clearly as possible.

Guidelines for the Most Helpful Maps

1. A typical 50-minute lecture should contain at least 20 (and not more than 45) concepts. Concepts are usually nouns.
2. Label ALL links and crosslinks with linking phrases. Links generally consist of verbs, but other words may be used where appropriate.
3. Circle the concepts, leave examples uncircled.
4. Each concept should only appear once in a given map. Redundancy of concepts usually indicates that you missed an important conceptual relationship.