CELL AND MOLECULAR BIOLOGY (BIOL 3310-002)

Spring 2015

Hours: M,W,F 9-9:50am Naraghi 104 (N104)
Instructor: Dr. Jason Baumsteiger
Office: N-251 **Office Hours:**
Contact Information: my office (*best*) or jbaumsteiger@csustan.edu (*good*)
Textbook: Essential Cell Biology (4th edition) by Alberts et al.
Pre-requisites: BIOL 1050 **and** 1150; CHEM 1100 **and** 1110

TENTATIVE SCHEDULE

WEEK	DATES	TOPICS	Chp.	Pages
1	Jan 28 Jan 30	Syllabus; Introduction; Microscopes Prokaryotes vs. Eukaryotes; Model Organisms	1	All
2	Feb 2 Feb 4 Feb 6	Chemical Bonds Sugars/Fats Proteins/Nucleotides	2	All
3	Feb 9 Feb 11 Feb 13	Energy Uses / ΔG ΔG/ Catalysts Electron Carriers	3	All
4	Feb 16 Feb 18 Feb 20	Protein shape/structure How proteins work How proteins are controlled/studied	4	All
5	**Feb 23**	**Midterm I**	**1 - 4**	**Quiz 1 due**
	Feb 25 Feb 27	Structure of DNA Chromosomes	5	All
6	Mar2 Mar4 Mar6	DNA Replication DNA Replication/Repair DNA Repair	6	All
7	Mar9 Mar11 Mar13	DNA-RNA (Transcription) DNA-RNA-Protein RNA-Protein (Translation)	7	All
8	Mar16 Mar18 Mar20	Transcriptional Control Cell Specialization Post-Transcriptional Control	8	All
9	Mar23 Mar25 Mar27	Genetic Variation Transposons/Viruses Human Genome	9	All
10	**Mar30**	**Midterm II**	**5 - 9**	**Quiz 2 due**
	Apr1 Apr3	Lipid Bilayer Membrane Proteins	11	All
11	**Apr6-10**	**SPRING BREAK**		
12	Apr13 Apr15 Apr17 Apr20	Transmembrane Transportation Transporters Ion Channels- Membrane Potential Ion Channels- Nerve Cell Signaling	12	All
13	Apr22 Apr24	Breakdown of Fats/Sugars Metabolism	13	All
14	Apr27 Apr29 May1	Mitochondria/Oxidative Phosphorylation Electron Transport Chloroplasts/Photosynthesis	14	All
15	**May4**	**Midterm III**		**Quiz 3 due**
	May6	General Principles of Cell Signaling	16	pgs. 526-538
16	May8 May11 May13	Cell Cycle - Overview Cell Cycle – G/S/M/Cyto Cell Cycle – Mitosis/Cyto	18	
	May15	Cell Cycle - Meiosis	19	pgs. 646-657
17	**May18-22**	**Finals Week** **Wednesday May 20th 8:30 – 10:30am**	**Any listed above**	**Quiz 4 due**

COURSE DESCRIPTION

Cellular and molecular biology represent the fundamental core of the study of biology. Like understanding the foundation, framing, plumbing, and electrical systems of a house, cell and molecular biology represents the essential components of life. Understanding these processes, in detail, allows us to understand our bigger world and sets the stage for other fields of study such as physiology, genetics, evolution, ecology, and conservation biology. No mastery of biology can come without a thorough understanding of cellular and molecular biology.

Though still taught at a basic level, this class seeks to build upon the introductory understanding presented in BIOL 1050. Here we will add more detail and vocabulary, diving a bit deeper into what these systems are, how they work, and how they go together. Most of the material will come directly from the textbook and the supplementary information provided by the publisher online. However students are STRONGLY encouraged to seek out additional resources and examples using sources like youtube, google scholar, etc. Not everyone understands things from the same source material so finding what resource works best for you is the sign of a scholarly student.

This is a difficult class for most students. There is a great deal of information that must be learned as well as a strong understanding of the step by step processes associated with each component. Don't let the relatively light homework load cause you to slack off in this class. If you think you will just read the book and come take the exam, you will struggle mightily. Come to class, get involved, and take responsibility for your learning. This way you maximize your return on your education.

ASSESSMENT METHODS, GRADES and GRADING:

As an upper division course for the Biology major, it is important for students in this class to demonstrate both mastery of factual content and the ability to synthesize ideas based on the theories discussed in the class. This course also provides training in science communication through written assignments. Your grade will be based on a small writing assignment, textbook quizzes, clicker participation, mixed-format lecture exams, and a final examination. I do not use a curve. Some extra credit is available.

A (>92.4%), A- (90.0-92.4%),
B+ (87.5-89.9%), B (82.5-87.4%), B- (80.0-82.4%),
C+ (77.5-79.9%), C (72.5-77.4%), C- (70.0-72.4%),
D+ (67.5-69.9%), D (62.5-67.4%), D- (60.0-62.4%),
F (<60.0%)

ASSIGNMENT	ANTICIPATED DUE DATE	POSSIBLE POINTS	% OF GRADE
Textbook Online Quizzes	Feb 23	40	6%
	March 30	50	8%
	May 4	40	6%
Chp 20 Cancer Summary	Any time before May18	20	3%
Lecture Participation Quiz	One per week (5pts)	50	8%
3 Midterms (100pts each)	Feb 23,March 30,May 4	300	46%
Final Exam	May 18	150	23%
Extra Credit Summaries (10pts each)	**One per section**	**30**	

TOTAL POSSIBLE POINTS 650

Notes on Grades and Assignments

- In general, any quiz or extra credit assignment should be turned in no later than the day and time it is due. No exceptions.
- Exams must be taken as scheduled, unless you have made a prior arrangement with me.
- Following the return of any graded assignment, you have seven days in which to dispute any grade discrepancies. To dispute the scoring of an assignment, bring the assignment and supporting information showing why you deserved a different grade to my office, where we can discuss the issue privately.

Exams

There will be three midterms and a comprehensive final. If you don't have a good grasp of the material, you will be unable to complete the exam in the time allotted. Each midterm exam will consist of multiple choice, matching, fill in the blank, true/false, and some short answer. The comprehensive final will consist of approximately the same format, with 75 points coming from material following the third midterm and the remaining points coming from a comprehensive review of the remaining material. Exams can be taken in pencil but will not be open to re-grading.

Lecture Participation using Weekly Quiz
Questions will appear anywhere from the beginning through the end of class any day of the week. Your participation with your quiz will help me to gauge the level at which I need to cover topics and help to keep you awake and engaged! You will have anywhere from 5-10 minutes to complete the quiz on a piece of paper you provide and turn it in.

Textbook Online Quizzes
These quizzes are available online through the publisher of your textbook (Garland). Access is free but you must register. What you will find is simple multiple choice questions. Simply write down the correct letter for each question from each chapter (1.1 = A; 1.2 = C, and so on) on a sheet of paper (preferably just one sheet if possible). However you must do this for each chapter that appears on a particular midterm. So, for example, you would need to take the quizzes for chapters 1 -4 and right down all the answers and submit it by the date specified in the schedule attached to this syllabus.
(http://www.garlandscience.com/garlandscience_student/student_home.jsf?landing=student&conversationId=452538)

Chapter 20 Summary
Because of the large volume of material presented in this class, we will be unable to get to chapter 20. However this chapter concerns Cancer and is extremely interesting to most students. So, other than the quizzes, this is your only other assignment. You are to read this chapter and write a 1 page summary of the MAJOR points in the chapter. Obviously you will not be able to cover everything so do not worry about being completely comprehensive. What I want is a CONCISE write-up of the major points using a paragraph structure. Please use 1 sheet of paper with 1 inch margins, 11 font in Times New Roman. You are to print out the assignment and hand in the summary. Poor spelling and grammar will result in a lower score, as will not following any of the guidelines outlined. You may submit this summary at any time during the semester, although waiting till later on will probably help you understand the material better.

Extra Credit
As mentioned above, this class is too short to cover everything in the book, though much of it is both interesting and important. To that end, if you wish to earn extra credit, you can complete a summary similar to your Chp 20 assignment for any chapter not covered on the syllabus (Chapters 10, 15, most of 16, 17, and most of 19). You are allowed one chapter summary per Midterm section (so up to 3). The same guidelines apply as listed above. You are welcome to choose whichever chapters you want to read and do not have to go in order.

Student Learning Outcomes
Successful students will be able to:

- ☐ Observe and properly label a standard Eukaryotic and Prokaryotic cell, including understanding what each component does.
- ☐ List potential chemical bonds between various elements and molecules and use them to build larger molecular structures
- ☐ Explain the four primary building blocks of life, from their simplest form to their most complex structure, and how an organism uses these building blocks to create/maintain life
- ☐ Identify how energy works within a system and the many forms it takes as part of that system.
- ☐ Recognize the incredible diversity of proteins in life, their many roles, and how folding/proximity/charge can all alter its purpose.
- ☐ Identify how DNA is the information source for a cell, including its structure, location, and various repair mechanisms.
- ☐ Explain the central dogma of Cell and Molecular biology: essentially how information in DNA is read, how that information is transported (Transcription) and how that information is converted to a useful product (Translation)
- ☐ Provide ways of how cells control transcription, both before and after it has occurred
- ☐ List specific ways that genetic variation is created
- ☐ Explain ways that these systems/processes are modified/interfered with (Viruses, transposons, etc.)
- ☐ Discuss how the human genome works and how it relates to other organisms or systems.
- ☐ Identify specific examples of how these processes work, such as ion channels and transmembrane transportation.
- ☐ Comprehensively recognize how cells replicate (autosomal or sex) and the factors and principles that apply in order for this to occur.

Student Expectations

- **Be respectful of others** by arriving on time, giving your attention to whoever is presenting, listening to the ideas of your classmates, turning off cell phones, and generally being polite. This also means no text-messaging (yes, the person at the front of the room *can* tell what you are doing) and no internet surfing (it's distracting to those sitting around you).
- **Engage the course material** through participation in class, reading the text, outside group work, and thinking about ideas outside of class.
- Students are expected to **take exams** on days and times scheduled. If you have a legitimate excuse to miss, I need to know the reason, in writing, at least one week before the exam date. If you have an emergency, you must let me know of the emergency as soon as you can. I will determine the appropriateness of taking the missed exam.
- **Maintain your academic integrity**. *Your integrity is your most valuable asset as a student* and in your future career as an educated person. In line with this, it is the policy of the Department of Biological Sciences that anyone caught *cheating* or *plagiarizing* will receive a grade of F for the course. I reserve the right to request any student suspected of cheating to take a second, different exam on the material. Please protect yourself by making your integrity obvious.

Instructor Expectations

- Same as those for students, in terms of respect for participants and engagement in the course. *Protecting your privacy and maintaining an environment in which you can learn are my top priorities.*

- Be **open to feedback** on the course and be flexible in order to make appropriate changes to meet student needs.
- Be **fair and consistent in assessment** of student learning and provide appropriate feedback to facilitate improvement.
- Be **available to students** outside of class time to answer questions and discuss class material.

Special circumstances: I understand that unusual circumstances can temporarily alter your availability for our class. If you know ahead of time that you will have a conflict on an important day, please get in touch with me as soon as possible. If an unforeseen incident causes you to miss an exam or due date, get in touch with me *as soon as your circumstances allow*. If you miss a regular class day, please get the notes from a friend, review the posted lecture notes, and come to my office hours with any questions you may have.

Learning styles and needs: As an instructor, I believe that part of my job is to intentionally facilitate the success of students with different learning styles and needs, and I do my best to incorporate multiple ways of learning into my courses and assignments. Please meet with me privately *as soon as possible* if there are particular accommodations that will foster your individual success in this course.

TUTORING ON CAMPUS – Free tutoring services are available to assist you in most disciplines, including in biology! Library 112; Phone (209) 667-3642; Web http://www.csustan.edu/Tutoring

CAMPUS COUNSELING SERVICES – Overwhelmed by the stress of juggling classes and your home life? Our campus offers **excellent** counseling services to help support you! MSR 210; Phone (209) 667-3381; Web http://www.csustan.edu/Counseling/

STUDENT HEALTH CENTER – You have already paid for access to health care on campus. Services include: birth control, flu shots, immunizations, pharmacy, check-ups, HIV testing, TB tests, and *doctor's notes for when you are sick*! Phone (209) 667-3396; Web http://healthcenter.csustan.edu

LIBRARY – Our reference librarians enjoy helping you to find resources! You can get help in person at the Reference Desk, or by phone or chat (scan left side of library main webpage). Phone (209) 667-3233; Web http://library.csustan.edu