

LIFE210 - Introductory Eukaryotic Cell Biology

Lecture:	Section 1: Clark A104, 12:00-12:50 PM MWF
Honors Recitation:	Section R90: MRB 123, 11:00-11:50 AM R
Instructor (1st half):	Steven Markus
Office Hours:	By appointment (phone, email, or meet after class to schedule)
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Instructor (2nd half):	Santiago Di Pietro,
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Teaching Assistants:	Alison Thurston
Office Hours:	By appointment (phone, email or see her in class to schedule)
Contact Information:	MRB 371, Phone: 491-3859 Alison.Thurston@ColoState.edu
Textbook:	Molecular Biology of the Cell, 5 th edition by Alberts et al. 2008 or 6 th edition 2015, <u>Or</u> Essential Cell Biology, 4 th edition by Alberts et al. 2013

Course Objectives

- Understand essential concepts and fundamental definitions in cell biology that are necessary to further grasp biochemistry, and broader biomedical issues.
- Learn major components and (bio)chemical reactions involved in the basic cellular processes. Cell biology is the molecular and chemical underpinnings of how and why life (cells and organisms) works. This course only explores the “tip of the iceberg” but will provide a springboard for anyone who wants to delve into cell biology in greater depth.
- Learn to apply the acquired knowledge to problems and questions through critical thinking and problem solving exercises.

How to Do Well

To help you best understand the course content, we will provide you with the following: (1) 8 unit outlines; (2) lecture slides to be posted to Canvas; (3) clicker questions that were presented in class; and (4) example exams (pending availability, and up to the instructor’s discretion). You are expected to come to class prepared (*i.e.*, know something about what we will talk about). Typical preparation involves reading the assigned textbook pages (see below), and looking over the lecture notes for each lecture. If you do not have a good understanding of the material raised by the clicker questions, ask about them at the beginning of the next class, and/or make an appointment to go over them individually with the TA. Use the quizzes, lecture notes, outlines, and clicker questions to guide your studying for the exams. Study your notes including key terms and concepts, and then take the quiz the first time without your notes. If you do not do as well as you would like, review your notes again and take the quiz a second time with your notes and book open (you get two attempts at each quiz!). Finally, we strongly suggest that you practice diagramming some of the key biochemical/cell biological processes on a white board or note paper multiple times rather than just looking them over to study. You will find that the information is retained much more readily, and you will recognize gaps in your understanding more readily. Using this approach in a study group is even more effective. Free tutoring is available in the Arts and Sciences Tutorial Hall from 5 - 10 pm, Sunday through Thursday. For more details see:

<https://tilt.colostate.edu/learning/tutoring/>

Syllabus

<u>Date</u>	<u>Period</u>	<u>Topic</u>	<u>Text Reading (page #s)</u>	
			<u>5th edition</u>	<u>6th edition</u>
Aug 21	SM1	Introduction and course overview		
Unit 1: Chemistry of Cells – An Overview				
Aug 23	SM2	Unity and diversity of cells; definition of cancer	8-14; 35-42; 1205-13; 1224-5	8-12; 31-39 1091-97; 1127-29
Aug 25	SM3	Chemical composition of cells	45-48	43-44
Quiz 1 due @ noon Monday August 28				
Aug 28	SM4	Chemical bonds, Part I	48-49; 53-54; 106 (panel 2-1)	44-45 90 (panel 2-1)
Aug 30	SM5	Chemical Bonds, Part II		
Sep 1	SM6	Molecules found in cells, Part I	51-53	45-46
Sep 4	Labor Day- NO Class			
Quiz 2 due @ noon Tuesday September 5				
Sep 6	SM7	Molecules found in cells, Part II	55-65 65; 153; 157-8	47-50 50-51; 134-35 138-89
Unit 2: Macromolecular Structure and Function: Proteins				
Sep 8	SM8	Amino acids, Peptide Bonds & Intermolecular interactions	125-127; 128-129 (panel 3-1)	109-11 112-13 (panel 3-1)
Quiz 3 due @ noon Monday September 11				
Sep 11	SM9	Protein structure and folding	130- 131; 134-135; 142-151	114-17; 122-29
Sep 13	SM10	Proteins as catalysts I	72-77; 158-161; 164-166	57-61; 140-41; 144-46
Sep 14	Review for Exam 1			
Sep 15	E1	EXAM 1 (covering lectures SM1-9)		
Sep 18	SM11	Proteins as catalysts II	(same as Sept. 16)	
Unit 3: Macromolecular Structure and Function: Lipids and Membranes				
Sep 20	SM12	Membrane composition and assembly	617-625; 626-629	565-72; 573-76
Sep 22	SM13	Membrane proteins	629-635	576-82
Quiz 4 due @ noon Monday September 25				
Sep 25	SM14	Solute diffusion and transport across membranes	651-55; 667-69; 673-75	597-601; 611-14
Sep 27	SM15	Solute diffusion and transport across membranes	654-58; 659-63	600-04; 606-08
Sep 29	SM16	Transmembrane transport in disease	663; 665-67	609-11
Quiz 5 due @ noon Monday October 2				
Unit 4: Metabolism – Flow of Matter and Energy in Cells				
Oct 2	SM17	Overview of cellular metabolism I	65-72; 77-83; 88-93; 96-100; 101-03	51-6; 63-8; 73-8; 81-5
Oct 4	SM18	Overview of cellular metabolism II	(same as Oct. 5)	

Oct 5	Review for Exam 2		
Oct 6	E2	EXAM 2 (covering lectures SM10-17)	
Oct 9	SM19	Regulation of cellular metabolism	106-08
Oct 11	SM20	Metabolic changes in cancer cells	-
			87-8
			1098-99
	Unit 5: Intracellular Compartments, Protein and Lipid Sorting		
Oct 13	SDP21	Compartmentalization of cells	26-30; 695-704
			24-28; 641-49
	Quiz 6 due @ noon Monday October 16		
Oct 16	SDP22	Protein sorting to cellular compartments I	704-20
Oct 18	SDP23	Protein sorting to cellular compartments II	723-45
Oct 20	SDP24	Protein sorting to cellular compartments III	749-79
			649-66
			669-91
			695-722
	Quiz 7 due @ noon Monday October 23		
Oct 23	SDP25	Lipid and protein sorting IV	779-809
			722-50
	Unit 6: Cellular Communication		
Oct 25	SDP26	Principles of cell signaling	879-904
Oct 26	Review for Exam 3		
Oct 27	E3	EXAM 3 (covering lectures SM18-20 & SDP21-25)	
Oct 30	SDP27	Membrane receptors/G-proteins	904-21
Nov 1	SDP28	Enzyme-linked receptors	921-45
Nov 3	SDP29	Signaling through proteolysis	946-55
			832-49
			850-67
			867-75
	Unit 7: Cell Shape and Movement		
	Quiz 8 due @ noon Monday November 6		
Nov 6	SDP30	Molecular dynamics of the cytoskeleton	965-91
Nov 8	SDP31	Regulation of cytoskeletal dynamics I	992-97
Nov 10	SDP32	Regulation of cytoskeletal dynamics II	997-1010
			889-960
			889-960
			889-960
	Quiz 9 due @ noon Monday November 13		
Nov 13	SDP33	Motor proteins	1010-25
Nov 15	SDP34	Cytoskeleton and cellular behavior	1025-50
Nov 16	Review for Exam 4		
Nov 17	E4	EXAM 4 (covering lectures SDP26-32)	
Nov 20-24	Fall Recess/Thanksgiving Break – No Classes		
	Unit 8: Cellular Growth Control		
Nov 27	SDP35	Cell cycle I: An overview	1053-60
Nov 29	SDP36	Cell cycle II: Regulation	1060-1112
Dec 1	SDP37	Programmed cell death	1115-28
			963-967
			967-1018
			1021-32
	Quiz 10 due @ noon Monday December 4		
Dec 4	SDP38	Cellular senescence	292-94; 505
Dec 6	SDP39	Cell biology of cancer I	1205-40
Dec 8	SDP40	Cell biology of cancer II	1241-65
			262-265; 442-444
			1091-1141
			1091-1141
Dec 13	E5	EXAM 5 (covering lectures SDP33-40) Wednesday 4:10 to 6:10 PM	

Last add/drop and W-drop days

Wednesday September 7 – last add/drop day; you will have taken 2 quizzes by then.

Monday October 17 – last course withdrawal day (with W grade); you will have taken 6 quizzes & 2 exams by then.

iClickers

You will want to purchase an iClicker remote for in-class participation. iClicker is a response system that allows you to respond to questions we pose during class; you will receive extra credit points for that feedback and/or participation. In order to receive this credit, you will need to register your iClicker remote by the first Friday of the semester (August 26, 2016).

For Web Registration:

To register your iClicker, go to <https://wsnet.colostate.edu/cwis262/clicker/registration.aspx> (NOT iClicker.com). Login with your eldentity eName and password. In the iClicker ID field, enter your remote ID number and select the "Register" button. The remote ID is the number found on the back of your iClicker remote. iClickers will be used every day in class, and you are responsible for bringing your remote daily.

Quizzes and Exams

1. 10 Quizzes – 50 points total

There will be 10 quizzes each worth 5 points. They will all be administered on Canvas. They will be posted every Friday (see course schedule above), except the Fridays of the four exams and will be due on the following Monday before class time (noon; except for Quiz 2, which is due on Tuesday September 6 due to Labor Day). There will be 10 quizzes and you will be given two attempts on each.

2. Exams – 500 points total

There will be five exams each worth 100 points. With the exception of the final exam, the exams will be administered during the regular class time, and in the regular classroom. They will consist of a combination of multiple choice and essay questions. The exams will cover what is discussed in class and what is emphasized in the outlines (see canvas), clicker questions and quizzes.

Grading

There are a total of 500 points from Exams, and 50 points from Quizzes. Each of the 5 exams in LIFE 210 will be worth 100 points (500 total), and the 10 weekly quizzes on Canvas are worth 5 points each (50 total), for a cumulative total of 550 points possible. This does not include any bonus points acquired from answering in-class iClicker questions (see below). If you achieve the following point totals for LIFE 210 you will be assured the **minimum** letter grade shown:

- | | |
|----------------------------|---|
| 1. 495-550 ($\geq 90\%$) | A |
| 2. 440-494 (80-90%) | B |
| 3. 385-439 (70-80%) | C |
| 4. 330-384 (60-70%) | D |
| 5. <330 (<60%) | F |

Each exam or quiz will not be curved individually, but the final total points required for a course grade might be curved depending on the averages and distribution of points. In addition, your grade for LIFE 210 will be determined based on the total 550 points (combined). Students in LIFE 210 have averaged around 80% of the total points possible over the past several years. As a result, there is usually no grading curve.

In-class iClicker questions will be worth 1 point for answering irrespective of correctness. These points will be weighted to be worth a maximum total of 20 extra credit points (in addition to the 550 total possible points) at the end of the semester.

Make-up Exams and Exam Regrading

There will be no make-up exams offered. Unexcused absences from an exam or quiz will be given a zero. If you have an excused absence (based on written or other verifiable evidence) from an exam or quiz, your final grade will be based on a percentage of the total possible points for the exams and quizzes you did take. ***Alternatively, students can schedule to take the exam early with the instructor if they know they cannot take the exam at the regularly scheduled date and time.*** If you have questions concerning the grading of any

of your exams or quizzes, the questions you want re-graded should be circled and the exam or quiz should be turned in to the instructor within a week of the date of its return to the class after grading. You must also provide a **written** explanation as to why you feel the question should be re-graded. Exams **will not be accepted for re-grading after this one-week period**, so go over your exam carefully soon after it has been returned to you.

CSU Academic Integrity Policy and LIFE 210

By registering for this class you enter into a contract between each student (you) and the instructors (us) constituting an agreement on our respective roles in gaining the knowledge and understanding of cell biology and earning the grade that you desire. As the instructors, our role is to organize and present the material and stimulate, facilitate and guide you through learning and understanding the core concepts in eukaryotic cell biology. As the student, your role is to attend class, **not to talk during class** unless you are asked to or are asking the instructor a question and to participate in class discussions and in answering iClicker questions. If you wish to do well in this course (earn an A or B), we strongly suggest that you attend every class and listen (not text or surf the Internet or watch movies, etc.), use the outlines, clicker questions and lecture notes, form study groups, attend review sessions, schedule office hours with the instructors and/or the GTA to clarify concepts, and study by *practicing* rather than merely looking over your notes (please ask us if you do not know what this means).

More specifically, in LIFE 210 the students and the instructors will abide by the Academic Integrity Policy of CSU as defined in the General Catalog (<http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/#academic-integrity>) and the Student Conduct Code (<https://resolutioncenter.colostate.edu/conduct-services/academic-integrity/>). While taking an exam, the use of any written material, phones (or similar electronic devices), or the assistance of others by looking at their exam or communicating verbally or by text, email, *etc.* is strictly prohibited. Studying in groups is encouraged. We do suggest that you attempt to complete the quizzes and clicker questions (when provided) individually first (before meeting in groups) to get the maximum benefit in your exam preparation. For answering the iClicker questions during class, discussing the possible answers is strongly encouraged (after attempting to answer them on your own the first time). However, answering these questions for other students that did not decide to attend class (using multiple iClickers) is not permitted, and is against the student conduct code.

Maintaining academic integrity is important in LIFE 210 not just to get the most out of the class, but also because conducting yourself with integrity is core to everyone's self-worth and societal worth. If you let the small stuff slide, the next step is justification of doing a poor job, then plagiarism, then cheating on exams, your homework assignments, your taxes, etc. Even if you are not caught, conducting yourself without integrity eats at your self-esteem. To learn more visit the Practicing Academic Integrity on the Learning@CSU Website (<http://learning.colostate.edu/integrity/index.cfm>).