

LIFE210 - Introductory Eukaryotic Cell Biology

This syllabus is for sections 1 (general) and 231 (honors)

Lecture:	Recorded lectures will be posted to the Canvas class page <i>no later than 2 hours prior to normal class time</i> : 12:00-12:50 PM MWF
In-person recitation:	<i>Optional</i> in-person recitations will be held in Clark A104 during normal class time (12:00-12:50 PM MWF). The class has been divided into 5 sections (sections A through E; see the Canvas class page to determine to which section you have been assigned, and for the schedule), and each group has the option of attending one recitation approximately every two weeks. Given limitations in classroom occupancy, you are only permitted to attend recitation during your designated time.
Honors Recitation (Life 211):	Section R90: 11:00-11:50 AM R (for more information on this course, see the Life 211 Canvas class page)
Instructor (1st half):	Steven Markus
Office Hours:	By appointment (phone, email, or meet after class to schedule)
Contact Information:	Office: 245 MRB, Phone: 491-5979 Steven.Markus@ColoState.edu
Instructor (2nd half):	Santiago Di Pietro,
Office Hours:	By appointment (phone, email, or meet after class to schedule)
Contact Information:	Office: 281 MRB, Phone: 491-5302 Santiago.DiPietro@ColoState.edu
Teaching Assistants:	Meghan Stettler Meghan.Stettler@rams.colostate.edu Nicholas Flint Nick.Flint@colostate.edu Gaia Bublitz Gaia.Rachel.Bublitz@colostate.edu Pablo Maldonado Jr. P.Maldonado@colostate.edu
Virtual Office Hours:	4:00-5:00 pm R; will take place with the instructors via Zoom (link will be posted on Canvas) *To meet your TAs outside this time, contact them for an appointment.*
Textbook:	Molecular Biology of the Cell , 5 th edition by Alberts et al. 2008 or 6 th edition (2015), OR Essential Cell Biology , 5 th edition by Alberts et al. (2019).
<u>Important information:</u>	All students should fill out a student-specific symptom checker each day before coming to class (https://covidrecovery.colostate.edu/daily-symptom-checker/). In addition, please utilize the symptom checker to report symptoms, if you have a positive test, or exposed to a known COVID contact. If you know or believe you have been exposed or are symptomatic, it is important for the health of yourself and others that you report it through this checker. You will not be in trouble or penalized in any way for reporting. If you report symptoms or a positive test, you will receive immediate instructions on what to do and CSU's Public Health Office will be notified. Once notified, that office will contact you and most likely conduct contact tracing, initiate any necessary public health requirements and/or recommendations and notify you if you need to take any steps. For the latest information about the University's response, please visit the CSU COVID-19 site (https://covidrecovery.colostate.edu/).

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) in-class questions that were posed in class; and (4) example exams (pending availability, and up to the instructor’s discretion). You are expected to attend 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 in-class questions, ask about them at the next review session, and/or make an appointment to go over them individually with a TA. Use the quizzes, lecture notes, outlines, and in-class 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>
Unit 1: Chemistry of Cells – An Overview				
Aug 24	SM1	Introduction and course overview & 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 26	SM2	Chemical composition of cells	45-48	43-44
Aug 28	SM3	Chemical bonds, Part I	48-49; 53-54;	44-45
Quiz 1 due @ noon Monday, August 31				
Aug 31	SM4	Chemical Bonds, Part II	106 (panel 2-1)	90 (panel 2-1)
Sep 2	SM5	Molecules found in cells, Part I	51-53	45-46
Sep 4	SM6	Molecules found in cells, Part II	55-65 65; 153; 157-8	47-50 50-51; 134-35 138-89
Quiz 2 due @ noon <u>**Tuesday, September 8**</u>				
Sep 7	**Labor Day - NO Class**			
Unit 2: Macromolecular Structure and Function: Proteins				
Sep 9	SM7	Amino acids, Peptide Bonds & Intermolecular interactions	125-127; 128-129 (panel 3-1)	109-11 112-13 (panel 3-1)
Sep 11	SM8	Protein structure and folding	130- 131; 134-135; 142-151	114-17; 122-29
Quiz 3 due @ noon Monday, September 14				

Sep 14	SM9	Proteins as catalysts I	72-77; 158-161; 164-166	57-61; 140-41; 144-46
Sep 16		Catch up/review of material		
Sep 18	E1	EXAM 1 (covering lectures SM1-9)		
Sep 21	SM10	Proteins as catalysts II		(same as Sept. 16)
Unit 3: Macromolecular Structure and Function: Lipids and Membranes				
Sep 23	SM11	Membrane composition and assembly	617-625; 626-629	565-72; 573-76
Sep 25	SM12	Membrane proteins	629-635	576-82
Quiz 4 due @ noon Monday September 28				
Sep 28	SM13	Solute diffusion and transport across membranes	651-55; 667-69; 673-75	597-601; 611-14
Sep 30	SM14	Solute diffusion and transport across membranes	654-58; 659-63	600-04; 606-08
Oct 2	SM15	Transmembrane transport in disease	663; 665-67	609-11
Quiz 5 due @ noon Monday October 5				
Unit 4: Metabolism – Flow of Matter and Energy in Cells				
Oct 5	SM16	Overview of cellular metabolism I	65-72; 77-83; 88-93; 96-100; 101-03	51-6; 63-8; 73-8; 81-5
Oct 7	SM17	Overview of cellular metabolism II		(same as lecture SM16)
Oct 8	**Review for Exam 2** On Thursday evening via zoom!			
Oct 9	E2	EXAM 2 (covering lectures SM10-16)		
Oct 12	SM18	Regulation of cellular metabolism	106-08	87-8
Oct 14	SM19	Metabolic changes in cancer cells	-	1098-99
Unit 5: Intracellular Compartments, Protein and Lipid Sorting				
Oct 16	SDP20	Compartmentalization of cells	26-30; 695-704	24-28; 641-49
Quiz 6 due @ noon Monday October 19				
Oct 19	SDP21	Protein sorting to cellular compartments I	704-20	649-66
Oct 21	SDP22	Protein sorting to cellular compartments II	723-45	669-91
Oct 23	SDP23	Protein sorting to cellular compartments III	749-79	695-722
Quiz 7 due @ noon Monday October 26				
Oct 26	SDP24	Lipid and protein sorting IV	779-809	722-50
Unit 6: Cellular Communication				
Oct 28	SDP25	Principles of cell signaling	879-904	813-831; 874-76
Oct 29	**Review for Exam 3** On Thursday evening via zoom!			
Oct 30	E3	EXAM 3 (covering lectures SM17-19 & SDP20-24)		
Nov 2	SDP26	Membrane receptors/G-proteins	904-21	832-49
Nov 4	SDP27	Enzyme-linked receptors	921-45	850-67
Nov 6	SDP28	Signaling through proteolysis	946-55	867-75
Unit 7: Cell Shape and Movement				
Quiz 8 due @ noon Monday November 9				
Nov 9	SDP29	Molecular dynamics of the cytoskeleton	965-91	889-960
Nov 11	SDP30	Regulation of cytoskeletal dynamics I	992-97	889-960
Nov 13	SDP31	Regulation of cytoskeletal dynamics II	997-1010	889-960
Quiz 9 due @ noon Monday November 16				

Nov 16	SDP32	Motor proteins	1010-25	889-960
Nov 18	SDP33	Cytoskeleton and cellular behavior	1025-50	889-960
Nov 19	**Review for Exam 4** On Thursday evening via zoom!			
Nov 20	E4	EXAM 4 (covering lectures SDP25-31)		
Nov 23 - 27	**Fall Recess/Thanksgiving Break – NO Classes**			
Unit 8: Cellular Growth Control				
Nov 30	SDP34	Cell cycle I: An overview	1053-60	963-967
Dec 2	SDP35	Cell cycle II: Regulation	1060-1112	967-1018
Dec 4	SDP36	Programmed cell death	1115-28	1021-32
Quiz 10 due @ noon Monday December 7				
Dec 7	SDP37	Cellular senescence	292-94; 505	262-265; 442-444
Dec 9	SDP38	Cell biology of cancer I	1205-40	1091-1141
Dec 11	SDP39	Cell biology of cancer II	1241-65	1091-1141
Dec 16 (Wed)	E5	4:10-6:10 pm, EXAM 5 (covering lectures SDP32-39)		

Last add/drop and W-drop days

Wednesday September 9 – last add/drop day; you will have taken 2 quizzes by then.

Monday October 19 – last course withdrawal day (with W grade); you will have taken 6 quizzes & 2 exams by then.

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 8 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. As with the quizzes, they will all be administered on Canvas. With the exception of the final exam, the exams will be administered during the regular class time. 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), in-class 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. 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.

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 emailed 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. 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, in-class questions, and lecture notes, form study groups, attend virtual office hours with the instructors and/or schedule office hours with the teaching assistants (TAs) 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 in-class questions (when provided) individually first (before meeting in groups) to get the maximum benefit in your exam preparation.

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>).