

BIOL/CHEM 360 Cell and Molecular Biology

Spring 2019

3 Credits

Prerequisites: BIOL 115/116 and CHEM 105/106

BIOL 260 (Genetics)

T, TH 11:30-1:00 pm, Murie Auditorium

Professor: Dr. Kristin O'Brien

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323E Margaret Murie Building

office hrs: T 3-4 pm & TH 4-5 pm

Required items: *Essential Cell Biology* (4th edition) by Alberts *et al.* Garland Science; a Turningpoint Clicker

Course description: This is an introduction to cell and molecular biology that will cover the following topics: cell chemistry, cell architecture, metabolism, signal transduction pathways, cell division, the cell cycle, and cells in their social context.

Student learning outcomes:

- (1). Students will be able to identify and describe the structure and function of the components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles.
- (2). Students will understand the flow of information in cells from DNA to RNA to protein.
- (3). Students will understand how cells obtain and use energy.
- (4). Students will understand how cells replicate themselves through the process of mitosis and meiosis.
- (5). Students will understand how cells communicate with each other in multicellular organisms.
- (6). Students will gain experience in communicating science through written homework Assignments, exams and in-class discussions.

Instructional methods: This course will be taught through a combination of lectures, problem solving, and discussions.

Policies: Students are expected to attend class and come prepared to discuss the topic of the day. Students are expected to read the chapter listed in the syllabus prior to coming to class in preparation for group discussions and/or activities.

Exams: Exams will be based on content covered in the lecture. If you anticipate missing an exam for family or work commitments, please let me know in advance so that we can make other arrangements. If you must miss an exam because of unexpected, extenuating circumstances (ie; family death, medical excuse) then you must contact me as soon as possible and within 24 hours of the exam.

Blackboard: Slides used in lecture will be posted on Blackboard the evening prior to the lecture. Please do not use these as a substitute for taking notes. Slides contain mostly figures, illustrating many of the complex processes we will be discussing during class. I use minimal text on slides and strongly encourage you take notes to enhance your understanding and learning of the material. Note taking is a skill that requires practice to master and is essential for learning.

I use Blackboard (BB) to post announcements, exam, and homework keys, and any other interesting information. Please check the BB site on a regular basis. I also use UAF email accounts to contact students. Please check your UAF account on a regular basis. If you use an alternate account, please have your UAF mail forwarded to that account.

Grading: Your final grades will be based on the following:

- 1. Exams (450 pts; 70.3%):** There will be three exams during the semester and one final exam (4 total). The first three exams will each be worth 100 points. The final exam, which will cover the last section of material and cumulative material, will be worth 150 points. The purpose of these exams is to assess your understanding of the material and to develop your written communication skills and critical thinking skills. The exams will be a combination of multiple choice and short answer questions.
- 2. Homework assignments (150 pts; 23.4%):** Homework will be posted on Blackboard one week before it is due. Each assignment is worth 15 points and your lowest homework grade will be dropped. A hard copy of the assignment is due at the start of class on the date indicated on the syllabus. **No late assignments will be accepted nor will assignments be accepted via email unless you are participating in a university-sponsored event.** The homework assignments will include multiple choice questions, short answer questions, and summaries of reading materials provided for class discussions. You are welcome to work through problems with others but you must provide answers written in your own words. **Answers to short-answer questions must be written in complete sentences.** The homework may be downloaded and answers typed if you have poor penmanship. Please do not turn in a piece of paper with your answers alone.
- 3. Class participation (40 points; 6.3%):** Each lecture will include one or more clicker questions and/or group activities **beginning on Tues Jan 22**. Responses will counted as class participation. Each lecture is worth 2 points. 3 classes may be missed without being penalized. If you are ill, bring a doctor's note and you will be excused for the lecture. Students participating in university-sanctioned events will also be excused but a letter from the appropriate coach or director must be provided.

Grades will not be curved and final grades will be determined as follows:

Grade	% of Total Points
A+	97-100
A	90-96
A-	88-89
B+	86-87

B	80-85
B-	78-79
C+	76-77
C	70-75
D	60-69
F	0-59

Tips for succeeding in cell biology: We will cover a large amount of material during this semester. Some of it may be familiar to you but many topics will be new. Here are some suggestions for doing well in this course.

(1). Read the book before coming to lecture. This allows you to familiarize yourself with the material before we cover it in lecture. Also, if you have questions about what you have read, you can ask during the lecture. Please, never be reluctant to ask a question! Undoubtedly there is someone else in the room wondering the same thing, and it will help everyone if I have an opportunity to explain something in a slightly different way, or clarify a concept.

(2). Take notes during class. This is an excellent way to reinforce your learning of the material. Although I will post slides on Blackboard before the lecture, I will discuss the material in much more detail than the slide content and you will be responsible for this material on the exam.

(3). Review your notes shortly after lecture, and ask me again if something is unclear, and/or fill in gaps with information from the text.

(4). Quiz yourself**.** Use the questions at the end of each chapter to test your understanding of the material. These questions are a GREAT way to study!!!!

(5). Ask questions. Please always feel free to visit me during office hours or schedule an appointment if you are unable to attend office hours. Ask questions before, during, or after lecture. My job is to ensure that you ALL succeed in this class.

(6). Keep up with the material. You will not do well on exams if you postpone all of your studying until the night before the exam; there is simply too much material to review in one night. I encourage you to form study groups that meet each week to review the material (and do homework). The material you will learn in this course will form a foundation for much of your advanced course work in biology. If you put in the effort now, you will do better in your future courses and they will be more enjoyable.

Email etiquette: I will do my best to respond to your email inquiries within 24 hr. Please be considerate in your letters and use proper English grammar. Think before you send and never write anything you would be uncomfortable saying to me in person. Lastly, please sign your letter; addresses don't always reveal your identity.

Disabilities: I will work with the Office of Disabilities Service (203 WHIT, 474-7043) to provide accommodations in both the classroom and laboratory to provide equal access to all materials in this course to all students.

Plagiarism: Plagiarism (as defined by the Merriam Webster dictionary) is to steal and pass off the ideas and words of another as one's own. You must properly cite your sources. Plagiarized assignments will receive a grade of 0.

LECTURE SCHEDULE (subject to change)

Lecture #	DATE	TOPIC	Homework (due date)	READING IN TEXT OR ARTICLE
1	Tues Jan 15	Cells		Ch. 1
2	Thurs Jan 17	Chemical Foundations		Ch. 2
3	Tues Jan 22	Protein Structure and Function I	#1	Ch. 4
4	Thurs Jan 24	Protein Structure and Function II		Ch. 4
5	Tues Jan 29	Control of gene expression	#2	Ch. 8
6	Thurs Jan 31	How genes and genomes evolve		Ch. 9
7	Tues Feb 5	Discussion on epigenetics	#3	<i>Same but different</i> by S. Mukherjee
	Thurs Feb 7	EXAM 1 (lectures 1-6)		
8	Tues Feb 12	Cell membranes		Ch. 11
9	Thurs Feb 14	Membrane transport I		Ch. 12
10	Tues Feb 19	Membrane transport II	#4	Ch. 12
11	Thurs Feb 21	Metabolism		Ch. 13
12	Tues Feb 26	Oxidative phosphorylation	#5	Ch. 14
13	Thurs Feb 28	Photosynthesis		Ch. 14
14	Tues Mar 5	Review	#6	
	Thurs Mar 7	EXAM 2 (lectures 8-13)		
	Tues Mar 12 & Mar 14	SPRING BREAK		
15	Tues Mar 19	Protein sorting I		Ch. 15
16	Thurs Mar 21	Protein sorting II		Ch. 15
17	Tues Mar 26	Cell signaling I	#7	Ch. 16

18	Thurs Mar 28	Cell signaling II		Ch. 16
19	Tues Apr 2	Cytoskeleton I	#8	Ch. 17
20	Thurs Apr 4	Cytoskeleton II		Ch. 17
21	Tues Apr 9	Cell division I	#9	Ch. 18
	Thurs Apr 11	EXAM 3 (lectures 15-20)		
22	Tues Apr 16	Cell division II		Ch. 18 & 19
23	Thurs Apr 18	Cell communities		Ch. 20
24	Tues Apr 23	Cancer	#10	<i>Cancer's Invasion Equation</i> by S. Mukherjee
25	Thurs Apr 25	Catch-up/ review		
	Tues Apr 30	FINAL EXAM 10:15 am - 12:15 pm		