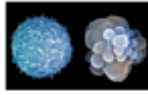


BIOL 3400 / CBIO 3400 – Cell Biology Spring 2021



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The instructors want to talk with you as needed to promote your success in this class. Please contact us by email to make an appointment. We will make time for you!

Credit Hours: 4

Lecture times: Mon, Wed, Fri, 10:20 am – 11:10, Synchronous online

Breakout times: Thursdays 2:15-3:30 pm or 4:00-5:15 pm, Synchronous online; please check your schedule for your assigned time.

Pre- / co-requisites: Biochemistry (BCMB/BIOL 3100) is a pre-requisite for this course, Genetics (GENE/BIOL 3200) is a pre- or co-requisite.

Course material

Textbook: "Molecular Biology of the Cell" by Alberts *et al*, 6th edition, Garland Publishing, 2015

Additional material will be posted on the courses eLC page: <https://uga.view.usg.edu/>

We will make every effort place updated lecture handouts on eLC two hours prior to class time. Reading the relevant textbook sections (as indicated in the schedule) before each class is highly recommended.

Course description

The course objective is to learn about how cells live, differentiate and reproduce. Modern cell biology is an integrative science based on the knowledge derived from diverse fields including microscopy, biochemistry, genetics, physiology and even bioinformatics. Our understanding of cellular mechanisms is based primarily on observations made in the course of experiments. Thus, we will attempt to cover both our current models of cellular functions as well as the experimental basis for their formulation. The course activities are designed to enhance development of skills that will be essential for success in future degree programs.

Course goals

- To learn about key cellular structures, processes and mechanisms, as foundational knowledge required for understanding current research in cell biology.
- To appreciate that cell biology is a dynamic discipline, in which knowledge is based on experimental findings and concepts are changed or refined in light of new information.
- To learn how new information is obtained in cell biology and to survey methods for answering open questions about cells.

Grading

Over the semester, you will accumulate points through participation in breakout sessions, in-class activities, and four written exams. The total number of accumulated points will be used to determine your grade. If the point average is below 390 (83%), the instructors may adjust the average final GPA of the class up to 2.9 ("curving"). You can view your accumulated points at any time on eLC (<https://uga.view.usg.edu/>).

Overview of point allocation:

<i>4 exams (100 points each):</i>	<i>400 points</i>
<i>Breakout sessions:</i>	<i>50 points</i>
<i>In-class activities:</i>	<i>20 points</i>
Total:	470 points

Breakout sessions (50 points)

Our schedule includes 10 breakout sessions meant to provide you with an opportunity for enhancing your understanding of the material covered in class. Students will work in small groups on problem sets, review difficult concepts, practice problem solving, and engage in other learning activities. Breakouts are mandatory, and active participation is valued at 50 points total. Up to 5 points can be earned per breakout session.

Online quizzes: For some of the breakout sessions, you may be asked to complete an online quiz or questionnaire. These quizzes are not mandatory and won't be graded (although you may receive comments on eLC); they serve to prepare you for the breakout material and as an assessment tool for the instructors.

In-class activities / participation (20 points)

You will have an opportunity to earn points by participating in activities related to the lecture material, such as written answers to a questionnaire or group activities. Points are awarded for an honest effort, not for correct answers. These activities also serve to help the instructors spot and address any difficulties the class may have with the material early (that is, before the exam).

Exams (100 points each, 400 points total)

Exams will focus on concepts and mechanisms highlighted in lecture and covered in the accompanying textbook readings for the respective section, but can also include material from the breakout sessions. Students are expected not only to recall important facts about the covered material, but to also to synthesize, apply and evaluate the information. **All exams will be online and open book**; however, sharing the answers to these exams via messaging apps is not acceptable.

Format: Quizzes will consist largely of short answer or essay questions.

Dates: See schedule.

Make-up exams: Should a medical emergency or other pressing obligation prevent you from participating in one of the exams, you will have the opportunity of completing a make-up exam. In case of pressing obligations, such as a scientific meeting, a UGA-sponsored field trip, or an interview at a professional / graduate school, please make sure you **obtain written consent by the instructor in advance of the exam** you want to miss (email is fine). In case of medical emergencies, please provide the instructor with **written documentation by the physician's office or a qualified health care professional**.

Honors option

Students may sign up for the Honors option in this class using the forms available at the Honors office. The Honors assignment is to write two paper reviews in the format outlined below; please make sure to adhere to the deadlines!

1. **Select a recent research paper** related to the course material from these Journals:

Journal of Cell Biology, Nature Cell Biology, Molecular Biology of the Cell

Contact the instructor handling your paper to get approval for your selection.

The instructors will be happy to help you selecting a paper upon request.

2. **Write a two-page report** (1.5 line space) that should include:

- 1) title, authors, source, and digital object identifier (doi) of the research article
- 2) main questions or hypotheses addressed in the paper
- 3) experimental approach(es) utilized, and salient results
- 4) major conclusions of the study (take-home message)
- 5) your comments on the experimental design and conclusions

Clear reasoning, concise writing, and a **statement of your own judgment** are required. The following questions may serve as a guide: Why is the study significant? Are the approaches suited to answering the question posed? Are important control experiments in place? Do the results support the conclusions?

2. **Deadlines and handling instructors:**

February 12th: draft of first paper due to DK, handling instructor.

April 15th: draft of second paper due to CS, handling instructor.

Please **email an electronic copy** of your draft by these deadlines. Instructors may accept the paper as is or ask for revisions, for example in case of factual errors.

Revisions need to be completed within two weeks of the submission deadline.

Academic Honesty

It is expected that all students in this course will work in accordance with University guidelines regarding academic honesty, and the Student Honor Code: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." Issues related to academic honesty will be handled *strictly* according to policies and procedures available at: <http://ovpi.uga.edu/academic-honesty/academic-honesty-policy>. Accessing notes of any kind and/or ANY use of **unauthorized assistance** during tests are violations that will be reported. The Honor Code states that students must report cheating by other students on any assignment, quiz, or exam in this course.

Coronavirus Information for Students

Face Coverings:

Effective July 15, 2020, the University of Georgia—along with all University System of Georgia (USG) institutions—requires all faculty, staff, students and visitors to wear an appropriate face covering while inside campus facilities/buildings where six feet social distancing may not always be possible. Face covering use is in addition to and is not a substitute for social distancing. Anyone not using a face covering when required will be asked to wear one or must leave the area. Reasonable accommodations may be made for those who are unable to wear a face covering for documented health reasons.

Students seeking an accommodation related to face coverings should contact Disability Services at <https://drc.uga.edu/>.

DawgCheck:

Please perform a quick symptom check each weekday on DawgCheck—on the UGA app or website—whether you feel sick or not. It will help health providers monitor the health situation on campus: <https://dawgcheck.uga.edu/>

What do I do if I have symptoms?

Students showing symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5 p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see <https://www.uhs.uga.edu/info/emergencies>.

What do I do if I am notified that I have been exposed?

Students who learn they have been directly exposed to COVID-19 but are not showing symptoms should self-quarantine for 14 days consistent with Department of Public Health (DPH) and Centers for Disease Control and Prevention (CDC) guidelines. Please correspond with your instructor via email, with a cc: to Student Care & Outreach at sco@uga.edu, to coordinate continuing your coursework while self-quarantined. If you develop symptoms, you should contact the University Health Center to make an appointment to be tested. You should continue to monitor your symptoms daily on DawgCheck.

How do I get a test?

Students who are demonstrating symptoms of COVID-19 should call the University Health Center. UHC is offering testing by appointment for students; appointments may be booked by calling 706-542-1162.

UGA will also be recruiting asymptomatic students to participate in surveillance tests (<https://clia.vetview.vet.uga.edu>). Students living in residence halls, Greek housing and off-campus apartment complexes are encouraged to participate.

What do I do if I test positive?

Any student with a positive COVID-19 test is **required** to report the test in DawgCheck and should self-isolate immediately. Students should not attend classes in-person until the isolation period is completed. Once you report the positive test through DawgCheck, UGA Student Care and Outreach will follow up with you.

Schedule

1	W F	13 Jan	Introduction: A short history of cells	DK	1:8-32, 2:43-55
		15 Jan	Energy, Organelles and Compartments	DK	2:51-73, 3:109-134
2	M W T F	18 Jan	MLK Holiday, no class		
		20 Jan	Lipids and Membranes	DK	10:565-582
		21 Jan	Breakout: Techniques for studying proteins	DK	
		22 Jan	Transport and Transporters	DK	11:597-618
3		25 Jan	Channels and Membrane potential	DK	11:609-613, 14:774-779, 14:794-795
		27 Jan	Channels and Neural activity	DK	11:617-638
		28 Jan	Breakout: Transport across membranes	DK	
		29 Jan	Nucleus	DK	12:646-652
4		1 Feb	Nucleocytoplasmic transport 1	DK	12:652-655
		3 Feb	Nucleocytoplasmic transport 2	DK	12:652-655
		4 Feb	Breakout: Analysis of nuclear import	DK	
		5 Feb	Chromatin and Genome organization	DK	4:185-193, 208-216
5		8 Feb	Review Session	DK	
		10 Feb	Exam 1	DK	
		11 Feb	No Breakout		
		12 Feb	Overview: Protein trafficking	CS	Chapter 12
6		15 Feb	ER-protein folding	CS	Chapter 12
		17 Feb	No class		
		18 Feb	No Breakout		
		19 Feb	Golgi structure and function	CS	Chapter 13
7		22 Feb	Traffic: ER to Golgi and Golgi to ER	CS	Chapter 13
		24 Feb	Traffic: Golgi and beyond, lysosomes	CS	Chapter 13
		25 Feb	ER import assay	CS	
		26 Feb	Overview: Endo- and exocytosis	CS	Chapter 12
8		1 Mar	Receptor mediated endocytosis	CS	Chapter 12
		3 Mar	The cytoskeleton	CS	Chapter 16
		4 Mar	Analysis of vesicular transport	CS	
		5 Mar	Assembly and dynamics of actin	CS	Chapter 16
9		8 Mar	Accessory proteins for actin	CS	Chapter 16
		10 Mar	Assembly and dynamics of tubulin	CS	Chapter 16
		11 Mar	Actin and Tubulin	CS	
		12 Mar	No class		
10		15 Mar	Exam 2	CS	
		17 Mar	Mitosis and Meiosis	CS	Chapter 17
		18 Mar	No Breakout		
		19 Mar	Overview of the Cell Cycle	CS	Chapter 17
11		22 Mar	Cell cycle 1	CS	Chapter 17

		24 Mar	Cell cycle 2	CS	Chapter 17
		25 Mar	Techniques to study the cell cycle 2	CS	
		26 Mar	Cell cycle 3	CS	Chapter 17
12		29 Mar	Cell cycle and Cancer	CS	Chapters 17, 20
		31 Mar	Cancer	CS	Chapter 20
		1 Apr	Techniques to study cancer	CS	
		2 Apr	Multi-cellularity and Stem Cells	CS	Chapter 22
13		5 Apr	Stem Cells & Cancer	CS	Chapter 22
		7 Apr	TBD or Review Session	CS	
		8 Apr	No class		
		9 Apr	Exam 3	CS	
14		12 Apr	Cell junctions, Extracellular matrix	DK	19:1035-1063 16:915-925
		14 Apr	Muscle structure and function	DK	22:1232-1235
		15 Apr	Breakout: Cell junctions/Muscle	DK	
		16 Apr	Overview: signaling	DK	15:813-817
15		19 Apr	Classical signaling pathways	DK	876, 11:630-632
		21 Apr	G protein coupled receptors 1	DK	15:832-836, 843-849
		22 Apr	Breakout: GPCR	DK	
		23 Apr	Receptor tyrosine kinase (Part 1)	DK	15:836-838, 850-854
16		26 Apr	Receptor tyrosine kinase (Part 2)	DK	15:863-867, 854-858, 9:543-546
		28 Apr	Cell death	DK	18:1021-1032
		29 Apr	No Breakout		
		30 Apr	Review Session	DK	
		3 May	Exam 4	DK	
17		5 May	Reading Day		