

BIOL 225 A01 (CRN 32643)
Principles of Cell Biology
Summer 2021

Instructors:

Dr. Doug Briant (he/him)

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Mondays, 11-12 via Zoom (these may be adjusted to maximize availability)

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Senior Lab Instructor and Laboratory Coordinator

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Course Delivery: the course will be delivered online in a mix of pre-recorded video lectures and live tutorials.

Video Lectures: These are posted on Brightspace. While these are available to students at all times, they are strongly advised to follow the schedule provided in the course timeline.

Live Tutorials: **Online tutorial sessions will be held every Thursday via Zoom.** Each tutorial will cover a set of video lectures outlined in the course timeline. While you are strongly encouraged to attend all live tutorial sessions, they will be posted on Brightspace as videos.

Brightspace site: a Brightspace site will be maintained for this course. Some, but not all, lecture notes will be made available. It contains the following sections:

General Information: course outline, course timeline, discussion forum, contact information and other course administration material

Lecture Materials: this section has everything you will need for the lecture component of the course

Zoom Links: link for lecture tutorials and office hours can be found here. NOTE: labs will have separate Zoom links

Academic Integrity Quiz: you must score 100% on this quiz before you will be allowed to write any Participation Quizzes, Midterms or the Final Exam.

Video Lectures: pre-recorded lectures. Schedule can be found in the course timeline

Lecture notes: here you will find the pdf notes to use while watching the video lectures

Textbook Chapter Problems: practice problems from the textbook publisher

Quizzes and Exams: this will be split into sections for the topic quizzes, midterms and final exam. Midterm and final exam sections will also include practice problems

Laboratory Materials: this section has everything you will need for the laboratory component of the course

Required Materials

Textbook: Becker's World of the Cell, Ninth Edition, Hardin, and Bertoni. *Pearson*, Boston, 2016.

Lab manual: *Biology 225 Principles of Cell Biology, Laboratory Manual*, Summer 2021.

Course Timeline

Date	Event	covers video lectures	Where on Brightspace
Thurs, May 13 live from 12:30pm – 2:20pm	Tutorial 1	introduction video, 1, 2, 2b	Zoom Links > Zoom Tutorials
Thurs, May 20 live from 12:30pm – 2:20pm	Tutorial 2	3 – 7	Zoom Links > Zoom Tutorials
Tues, May 25 open from 8:30am – 8:30pm	Midterm 1 (15%) 90 minutes	1-7 + 2b	Exams > Midterm 1, on video lectures 1-7 + 2b
Thurs, May 27 live from 12:30pm – 2:20pm	Tutorial 3	8 – 12	Zoom Links > Zoom Tutorials
Thurs, June 03 live from 12:30pm – 2:20pm	Tutorial 4	13 – 18	Zoom Links > Zoom Tutorials
Tues, June 08 open from 8:30am – 8:30pm	Midterm 2 (15%) 90 minutes	8 – 16	Exams > Midterm 2, on video lectures 8-16
Thurs, June 10 live from 12:30pm – 2:20pm	Tutorial 5	19 – 24	Zoom Links > Zoom Tutorials
Thurs, June 17 live from 12:30pm – 2:20pm	Tutorial 6	25 – 29	Zoom Links > Zoom Tutorials
Tues, June 22 open from 8:30am – 8:30pm	Final Exam (26%) 2 hours	cumulative	Exams > Final Exam
Friday, June 25, 4pm – all topic quizzes due (0.5% participation grade each)			

Topics:

topic	chapters
1 INTRODUCTION - introduction to cell biology	1, 4
2 BIOMOLECULES - cell chemistry and biomolecules	2, 3, 7, 8
3 ORGANELLES - cells and organelles	4,10,11
4 MEMBRANE SYSTEMS cytoplasmic membrane systems	12
5 SYNAPTIC SIGNALLING	13
6 CELL SIGNALLING (non-neuronal)	14
7 CYTOSKELETON	15,16,17
8 CANCER	19,24

Learning Objectives

Topic 1a – Discovery of Cell, a history

LEARNING OBJECTIVES: early experiments surrounding the discovery of cells are introduced. Students will learn about the basic properties of cells.

Topic 1b – Basic properties and strategies of cells

LEARNING OBJECTIVES: the issues surrounding visualization of cells, which are generally smaller than the naked eye can observe, will be introduced. Students will be taught about various microscopic techniques and they will be able to apply this knowledge to decide which type of microscopy will be best suited to a particular application.

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Topic 1c - Cell Culture

LEARNING OBJECTIVES: students will be introduced to the historical figures and early experiments performed in the development of cell culture techniques. They will have an understanding of challenges surrounding the culturing of animal cells. Students will also learn to recognize the advantages and disadvantages of working with animal cells in culture.

TOPIC 2: Cell Chemistry and Biomolecules

LEARNING OBJECTIVES: in this topic, the building blocks of the cells will be introduced. Students will be expected to how these blocks are assembled into functional macromolecules. This will include analysis of the different types of chemical bonds holding molecules together. Membrane composition and function will be explored, and students will be expected to understand how membranes serve as permeability barriers that demarcate the cell. They will also understand the energetic forces associated with concentration gradients that form across a membrane. Finally, transport of impermeable molecules across a membrane will be discussed, and students will be expected to understand the basic mechanism of these transporters as well as their energetic requirements.

TOPIC 3: Cells and Organelles

LEARNING OBJECTIVES: In this section, students will be introduced to the main functions of the organelles. Students will be expected to know the major functions of each organelle, and understand the adaptations each organelle has gained to maximize their ability to carry out these functions.

TOPIC 4: Membrane Systems

LEARNING OBJECTIVES: movement between organelles, or between organelles and the exterior of the cell, is often mediated by vesicles. The importance and significance of vesicular trafficking, as well as the mechanism, will be described in this section.

TOPIC 5: Signalling 1 – Synaptic Signalling

LEARNING OBJECTIVES: in this section, we will describe how impermeability of the cell membrane to ions allows membrane potential to be established. Students will be expected to know how the various ion channels contribute to an action potential by manipulating the permeability of ions.

TOPIC 6: Signalling II – Non-neuronal Signalling

LEARNING OBJECTIVES: students will be expected to understand the basic eukaryotic signalling pathways. The importance of regulation, and the complexity of combining signalling pathways will be outlined.

TOPIC 7: Cytoskeleton

LEARNING OBJECTIVES: students should understand the structure and importance of the three main cytoskeletal elements. The dynamic nature of the cytoskeleton will be explored and a simple model of motility presented. Finally, the significance of cell-cell and cell-extracellular matrix will be described, and the important signalling pathways underlying these will be introduced.

TOPIC 8: Cancer

LEARNING OBJECTIVES: the epidemiology of cancer was introduced. Students will be expected to form hypotheses about cancer based on this epidemiology. Finally, the underlying causes of cancer will be introduced. Students should be able to correlate the underlying causes with events in the cell cycle of apoptosis.

Important dates and evaluation:

Tutorials:

Weekly tutorials will be held **every Thursday** online via Zoom from 12:30 – 2:20. You are required watch video lectures prior to the tutorials. Coverage for each tutorial will be found on the course timeline. While not mandatory, you are highly encouraged to attend. Recorded tutorials will be posted within 48 hours on Brightspace

Academic Integrity Quiz:

You must score 100% on this quiz before you can complete any subsequent quizzes. You can make multiple attempts.

Topic Quizzes:

There will be eight topic quizzes, worth 0.5% each. These are participation quizzes, and any learner getting at least one correct answer will receive the full 0.5%. Quizzes must be completed by Friday, June 25 at 4pm.

Midterms:

There are two midterms, each worth 15% of your final grade. They will be held on Tuesday, May 25 and Tuesday June 08. Exams can be started between 8:30am – 8:30pm, and once you start you will have 90 minutes to complete the exam. Midterm exams are non-cumulative. You may use materials posted on the course Brightspace site, your textbook and your notes. You may NOT work with other students or use additional resources, including internet resources.

Final Exam:

The final (22% of the course total) will be held on Tuesday June 22. Exams can be started between 8:30am – 8:30pm, and once you start you will have 2 hours to complete the exam. You may use materials posted on the course Brightspace site, your textbook and your notes. You may NOT work with other students or use additional resources, including internet resources.

EVALUATION	Date
40% laboratory ***	<i>based on laboratory components. See lab manual for grading details</i>
4% Topic Quizzes	<i>0.5% participation mark for each of 8 quizzes (must get at least one answer correct) due Friday, June 25 at 4pm</i>
15% Midterm 1 (covers video lectures 1-7 + 2b)	<i>via Brightspace, Tues., May 25. Learners must start between 8:30am and 8:30pm; once you start you will have 90 minutes to complete</i>
15% Midterm 2 (covers video lectures 8-16)	<i>via Brightspace, Tues., June 08. Learners must start between 8:30am and 8:30pm; once you start you will have 90 minutes to complete</i>
26% final exam (cumulative)	<i>via Brightspace, Tues., June 22. Learners must start between 8:30am and 8:30pm; once you start you will have 2 hours to complete</i>

***** since the course includes lab work, you are required to achieve satisfactory standing in both parts of the course and thus • you will not be permitted to write the final exam and will not receive credit for the course if you fail the laboratory component of the course.**

Conversion of marks to final letter grades:

A⁺	90 -100	B⁺	77 - 79	C⁺	65 - 69	F	< 50
A	85 - 89	B	73 - 76	C	60 - 64	N **	< 50
A⁻	80 - 84	B⁻	70 - 72	D	50 - 59		

**** N grades**

Students who have completed the following elements will be considered to have completed the course and will be assigned a final grade:

- ***the final exam and the laboratory component must be completed to receive a grade other than “N”.***

Failure to complete one or more of these elements will result in a grade of “N” regardless of the cumulative percentage on other elements of the course. An N is a failing grade, and it factors into a student’s GPA as 0. The maximum percentage that can accompany an N on a student’s transcript is 49

COURSE INFORMATION AND POLICIES

1. The Department of Biology upholds and enforces the University’s policies on plagiarism and cheating. These policies are described in the current University Calendar. All students are advised to read this section.
2. Cell phones, computers, and other electronic devices must be turned off at all times during live class sessions unless being used for a purpose relevant to the class.
3. Any recordings of lectures may only be performed with written permission of the instructor, and are for personal use only. The instructor retains copyright to such recordings and all lecture materials provided for the class (electronic and otherwise); these materials must not be shared or reposted on the Internet.
4. Course materials, such as notes, problem sheets, quizzes, examinations, example sheets, or review sheets, may not be redistributed without the explicit written permission of the instructor.
5. Students are expected to be present for the midterm and final exams. Instructors may grant deferrals for midterm examinations for illness, accident, or family affliction. Although students do not require documentation, students must contact their instructor (dbriant@uvic.ca) with the reason for their absence within 48 hours after the midterm exam. The instructor will keep a record of the absences. The deferred exam must be written within five business days of the original exam. Deferral of a final exam must be requested with an Academic Concession form and submitted directly to Undergraduate Records. Deferred final exams for fall term courses will be arranged by the instructor.

6. The Department of Biology considers it a breach of academic integrity for a student taking a deferred examination to discuss the exam with classmates. Similarly, students who reveal the contents of an examination to students taking an examination are considered to be in violation of the University of Victoria policy on academic integrity (see current University Calendar). Students must abide by UVic academic regulations and observe standards of scholarly integrity (no plagiarism or cheating). Online exams must be taken individually and not with a friend, classmate, or group, nor can you access notes, course materials, the internet, or other resources without the permission of the instructor. You are prohibited from sharing any information about the exam with others. Use of unauthorized electronic devices and accessing the internet and class material during exams is prohibited unless permission is granted by the instructor. Instructors may use Browser Lockdown Software to block access during classes and exams.
7. Requests for review/remark of a midterm exam must be made within one week of the exam being returned. Students are expected to promptly review midterm exams during scheduled review hours after marking has been completed.
8. The instructor reserves the right to use plagiarism detection software or other platforms to assess the integrity of student work.
9. Supplemental exams or assignments will not be offered to students wishing to upgrade their final mark.
10. Anonymous participation in online classes is not permitted without written permission of the instructor.

Online conduct statement: The University of Victoria is committed to promoting critical academic discourse while providing a respectful and supportive learning environment. All members of the university community have the right to this experience, and the responsibility to help create, such an environment. The University will not tolerate racism, sexualized violence, or any form of discrimination, bullying or harassment.

Please be advised that by logging into UVic's learning systems and interacting with online resources you are engaging in a university activity. All interactions within this environment are subject to the university expectations and policies. Any concerns about student conduct, may be reviewed and responded to in accordance with the appropriate university policy. To report concerns about online student conduct: onlineconduct@uvic.ca

Important note about COVID-related stress

The current pandemic is placing added stressors- financial, mental, and physical- on everyone. Your wellbeing is of foremost importance. If you are experiencing difficulties coping, the University has resources to help. Reach out to Counselling Services, the Centre for Academic Communication, or Learning Assistance Program for assistance.

Centre for Accessible Learning

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, approach the Centre for Accessible Learning (CAL) as soon as possible in order to assess your specific needs.

<https://www.uvic.ca/services/cal/index.php>

Course Experience Survey (CES)

We value your feedback on this course. Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. The survey is accessed via MyPage and can be done on your laptop, tablet, or mobile device. We will remind you and provide you with more detailed information nearer the time but please be thinking about this important activity during the course.