

**BIOL 225 A01/A02 (CRN 10368/10369)**  
**Principles of Cell Biology**  
**Fall 2021**

**Instructors:**

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**Territorial Acknowledgement:**

We acknowledge and respect the lək'wəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

**Lecture time and location:**

A01: TWF 10:30 – 11:20, Bob Wright Centre B150  
A02: TWF 1:30 – 2:20, Bob Wright Centre A104

**Office Hours and Extra Help:** I will **NOT** be holding face-to-face meetings in my office. I will be available online via Zoom (link on Brightspace) on Mondays from 1pm – 3pm. Outside of these times I can be reached via email.

**Course Delivery:** the course will be delivered face-to-face, the lectures will be recorded and posted for asynchronous viewing (warning: if technical issues arise, recordings may not be available). Due to potentially changing conditions surrounding SARS-CoV2, situations may arise where I will not be able to deliver lectures face to face. In these instances, lectures will be held live via Zoom (see Brightspace for link) and recorded.

**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.

**Lecture notes:** here you will find the pdf notes to use during lectures

**Lecture Recordings:** live lectures will be recorded and posted here. This is the Fall 2021 version of the course.

**Zoom Links:** links for office hours and Friendly Scientist social hours can be found here.

**Textbook Chapter Problems:** practice problems from the textbook publisher.

**Quizzes and Exams:** this will be split into sections for the the Academic Integrity Quiz, Exit Competency Quiz, topic quizzes, midterms and final exam. Online quizzes and midterms will be located here. Midterm and final exam sections will also include practice problems.

**Academic Intergriy Quiz:** you must score 100% on this quiz before you will be allowed to write any Participation Quizzes or Midterms. This can be found in the Quizzes and Exams section.

**Exit Competency Quiz:** this is a short online quiz that you must complete before you will be allowed to write the final exam. It will open during the final week of class. It is not open book, and you should not study. It is just to assess the overall cell biology knowledge students have by the end of the course. These exams will not be used in any manner to assess students individually. I will use overall class data to improve my teaching methods.

**Archived Pandemic Video Lectures:** pre-recorded lectures that were used during the pandemic. You can use these for reference if you find them helpful, but they do not represent the latest iteration of the course. Schedule can be found in the course timeline

**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*, Fall 2021.

## **Topics:**

<b>topic</b>	<b>chapters</b>
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.

### **Evaluation and important dates:**

#### **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, December 03 at 4pm.

#### **Midterms:**

There are two online midterms, each worth 10% of your final grade. They will be held on Friday, October 01 and Friday October 22. Exams can be started between 8:30am – 8:30pm, and once you start you will have 50 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 will be held in person, with the time and date to be determined by the Registrar. This is a closed book exam.

<b>EVALUATION</b>	<b>Date</b>
40% laboratory ***	<b><i>based on laboratory components. See lab manual for grading details</i></b>
4% Topic Quizzes	<b><i>0.5% participation mark for each of 8 quizzes (must get at least one answer correct) due Friday, December 03 at 4pm</i></b>
10% Midterm 1 (covers to end of Topic 2a - bonds)	<b><i>via Brightspace, Fri., October 01. Learners must start between 8:30am and 8:30pm; once you start you will have 50 minutes to complete</i></b>
10% Midterm 2 (covers topic 2b (proteins) to the end of the nucleus in topic 3)	<b><i>via Brightspace, Fri., October 22. Learners must start between 8:30am and 8:30pm; once you start you will have 50 minutes to complete</i></b>
36% final exam (covers from topic 3, the mitochondria, through to the end of the course)	<b><i>in person exam, date and time TBD by the Registrar</i></b>

***\*\*\* 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:**

<b>A<sup>+</sup></b>	90 - 100	<b>B<sup>+</sup></b>	77 - 79	<b>C<sup>+</sup></b>	65 - 69	<b>F</b>	< 50
<b>A</b>	85 - 89	<b>B</b>	73 - 76	<b>C</b>	60 - 64	<b>N **</b>	< 50
<b>A<sup>-</sup></b>	80 - 84	<b>B<sup>-</sup></b>	70 - 72	<b>D</b>	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:

- ***both midterms, 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 academic integrity. 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 the purpose of connecting and engaging with the class.
3. No recordings of live lectures are permitted without permission of the instructor. However, many courses will be recorded by the instructor for accessibility for students unable to attend. If you do not wish to be recorded, contact your instructor to determine if alternative arrangements can be made.
4. Students and instructors are expected to assess their health daily and avoid campus if they are ill.
5. 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.
6. Students are expected to be available for all 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](mailto:dbriant@uvic.ca)) with the reason for their absence within 48 hours after the midterm exam. It is the responsibility of the student to ensure all required components are complete, and to arrange deferred exams/assignments with the instructor, which normally should occur within one week of the original exam date.
7. 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.

8. 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. Deferred final exams or spring term courses will be arranged through Undergraduate Records and must be written before the end of the summer term as stipulated in the University Calendar.
9. Requests for review/remark of a midterm exam must be made within one week of the exam being returned.
10. The instructor reserves the right to use plagiarism detection software or other platforms to assess the integrity of student work.
11. Supplemental exams or assignments will not be offered to students wishing to upgrade their final mark.
12. Anonymous participation in online classes is not permitted without permission of the instructor.

#### **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. Please 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 you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to us regarding the course and our teaching, as well as to help the department improve the overall program for students in the future. When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to your [CES dashboard](#). You will need to use your UVic NetLink ID to access the survey, which can be done on your laptop, tablet or mobile device. We will remind you nearer the time but please be thinking about this important activity.