

BIOL 225
CRN 31125
Principles of Cell Biology
Summer 2020

Class time and location:

The course will be delivered online in both an archived and live format. Details about times you need to be available for live discussions can be found below under “*Important Dates and Evaluation*”.

Instructors:

Dr. Doug Briant

e-mail: dbriant@uvic.ca

extra office hours will be arranged prior to the final exam

Kim Curry

laboratory coordinator

contact information and hours to be announced in laboratory

Required Materials

Textbook: Becker’s World of the Cell, Ninth Edition, Hardin, and Bertoni. *Pearson*, Boston, 2016. You can purchase an e-book version at:
<https://www.pearson.com/store/p/becker-s-world-of-the-cell/P100000199282/9780134146621>

MasteringBiology course ID: MBBRIANT2916055

** This resource is optional. If you purchased a new textbook, it will include an access code for MasteringBiology. A separate access code to the website can be purchased through the book store.**

•

Lab manual: *Biology 225 Principles of Cell Biology, Laboratory Manual, Summer 2020.*

Calculator: Some classes, most laboratory exercises, the midterm test, and the final course exam require the use of a basic scientific calculator that has the following function keys: log, 10x, ln, ex, yx and exp. This type of calculator typically costs about \$10-20 and is available in the UVic bookstore and from many local retailers. Please note the section entitled “*Calculator Restriction*” below. Please bring such a calculator to your classes and laboratories, in addition to the tests and final course examination. It is your responsibility to have a calculator when needed.

<p><u>Calculator Restriction:</u>• A basic scientific calculator is required (please see details in “Required Materials”, above) but please note that during both course tests and the final course examination you are not allowed to use a calculator or other device that is programmable or capable of</p> <ul style="list-style-type: none">• storing or retrieving text, formulas, sounds, or images,• plotting graphs,• communicating with another person or device,• performing calculus operations.

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
Final Exam – online Thursday June 25	

Important dates and evaluation:

Tutorials:

There will be a **mandatory** introduction and orientation session online via Zoom from 12:30 – 2:20 on Monday, May 11.

Weekly Thursday tutorials will be held online via Zoom from 12:30 – 2:20 (May 14, May 21, May 28, June 04, June 11, June 18). **Participation is mandatory. You may miss one tutorial without penalty, but after that you will be penalized 1% on your final grade.** You are required watch video lectures prior to the tutorials. Coverage for each tutorial will be found on CourseSpaces.

Quizzes:

There will be five Monday quizzes (5% of your final grade each, 25% total) delivered via CourseSpaces (May 18, May 25, June 01, June 08, June 15). These will be open book exams and will cover material from the previous Thursday's tutorial. Quizzes are open from 8:30 – 2:30. There is not time limit on the quizzes.

Group Work:

There will be three group work projects, worth 5% each, of your final grade (15% total). These will be live via Zoom on Tuesday May 19, June 02 and June 16 from 12:30 – 2:20. Each project will cover a journal article posted prior to the project that you will be required to read. Groups will be randomly assigned and each group will submit their project at the end of the Zoom session.

Final Exam:

The final (20% of the course total) is a cumulative, open book exam on CourseSpaces. It will be held on Thursday, June 25. The exam will be open from 8:30AM – 4:30PM and will take approximately 2 hours to complete (although there will not be a time limit on the exam).

EVALUATION	Date
40% laboratory ***	<i>based on laboratory components. See lab manual for grading details</i>
25% online quizzes (five quizzes total, 5% each)	<i>quizzes available on CourseSpaces Monday, May 18, May 25, June 01, June 08, June 15</i>
15% Group Work	<i>Groups meet online via Zoom from 12:30 – 2:20 Tuesday, May 19, June 02, June 16. Assignment due at end of the session.</i>
20% final exam	<i>cumulative, online, Thursday, June 25</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.***

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.

•

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.

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 unless being used for a purpose relevant to the class. Students having a cell phone, tablet, or computer on their person during an exam will be assumed to have it for the purpose of cheating.
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, and students must provide appropriate documentation 48 hours after the midterm exam. The deferred exam must be written within five business days of the original exam. 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 a deferred examination are considered to be in violation of the University of Victoria policy on academic integrity (see current University Calendar). 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 for 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.
6. Multiple choice scan sheets for machine scoring (bubble sheets) are considered the authentic exam answer paper and will be retained by the department for 1 year.
7. Professors may refuse to review/remark exams not written in indelible ink. In addition, 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 office hours after marking has been completed.
8. Examination papers that have pages removed, or are mutilated will not be marked.

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 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.