

BIOL 225 A01 (CRN 31188)
Principles of Cell Biology
Summer 2024

Instructors:

Dr. Doug Briant (he/him)

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Office Hours: hybrid zoom and in person (Petch 182), Monday and Thursday
2:30 – 3:30. Outside of these times I can be reached via email.

Kim Curry

Senior Lab Instructor and Laboratory Coordinator

email: see contact information below (under Laboratory Information)

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.

Inclusivity Statement:

We consider our classroom and office hours to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability- and other visible and non-visible differences. All members of this class are expected to a respectful, welcoming and inclusive environment for every other member of the class. We will gladly honour your request to address you by an alternate name or gender pronoun. Please advise us of this early in the semester, if applicable to you, so that we may make appropriate changes to our records.

Lecture time and location:

Mon., Tues., Thurs., 12:30 – 2:20, Cornett Building B107

Course Delivery: the course will be delivered face-to-face.

Universal Design:

To maximize accessibility, elements of Universal Design will be applied to this course. Both midterm exams are designed to be completed in 60 minutes, but all learners will be given 90 minutes to complete. The final exam is designed to be completed in 70 minutes, but all learners will be given 105 minutes (1 hour, 45 minutes) to complete. All exams will be held in David Strong Building C103. This format will provide a distraction-reduced environment and 1.5x extended time for all learners. You may choose to wear ear plugs or other non-electronic forms of noise reduction. Learners with accommodations that are not met with by this delivery will make exam arrangements with the Centre for Accessible Learning (CAL).

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 Including Zoom links: course outline, course timeline, discussion forum, contact information and other course administration material. You will also find the Zoom link for office hours.

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

Lecture Recordings: audio recordings will be available for most lectures.

Textbook Chapter Problems: practice problems from the textbook publisher.

Practice Quizzes and Exam Information: Practice problems will be available here, as well as other material related to the exams including “cheat sheet” templates.

Required Materials

Textbook: Becker's World of the Cell, Tenth Edition, Hardin and Lodolce. *Pearson*, Boston, 2022.

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	12
5 CELL SIGNALLING	22, 23
6 CYTOSKELETON	13, 14, 15
7 CANCER	24, 26

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. Learners will understand the concepts of permeability and different types of membrane transport.

TOPIC 5: Cell 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 6: 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 7: 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, deferrals and important dates:

Group Work (2.5% each):**

Thursday, May 23 in class

Thursday, June 06 in class

**There are two Group Work projects, each worth 2.5% of your final grade. If you miss the group work exercise, the grade will be reweighed. For Group Work 1, the 2.5% will move to Midterm 1, and for Group Work 2, the 2.5% will shift to Midterm 2

Midterms (15% each):

Thursday, May 30

Tuesday, June 13

There are two midterms, each worth 15% of your final grade. These will be held in class, The exams are designed to be completed in 60 minutes, but everyone will have 90 minutes to complete (1.5x). Grade for missed exams will shifted to the final exam.

Final Exam (23%):

Thursday, June 27 in class

this exam will be 70 minutes in length, but all learners will be given 105 minutes to complete (1.5x)

this is the last day of class

Course Schedule

EVALUATION	Date
40% laboratory ***	based on laboratory components. See lab manual for grading details
2.5% Group Work 1	Thursday, May 23. In class Marks will be moved to Midterm 1 for any learners unable to attend.
15% Midterm 1	In DSB C103 from 12:30 – 2:00, Thursday May 30. The exam is designed to be completed in 60 minutes, but learners will be given 90 minutes to complete. A cheat sheet will be allowed (details in lecture).
2% Microscopy Assignment	Via Brightspace. Due at 4:00pm. Late assignments will be docked 0.5% each day.
2.5% Group Work 2	Thursday, June 06. In class Marks will be moved to Midterm 2 for any learners unable to attend.
15% Midterm 2	Not cumulative. In DSB C103 from 12:30 – 2:00, Thursday June 13. The exam is designed to be completed in 60 minutes, but learners will be given 90 minutes to complete. A cheat sheet will be allowed (details in lecture). A cheat sheet will be allowed (details in lecture).
23% final exam	Cumulative exam, Thursday, June 27 in DSB C103 from 12:30 – 2:15, Thursday June 27. The exam is designed to be completed in 60 minutes, but learners will be given 90 minutes to complete. A cheat sheet will be allowed (details in lecture). A cheat sheet will be allowed (details in lecture).

***** 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:

The total mark, calculated from the marks on all of the exams according to the weighting scheme above, will be converted to a percentage and then to a letter grade in the following way:

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		

Required Course Elements and 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

Laboratory Information:

Laboratory Materials: these can be found on the laboratory Brightspace site

Note: Laboratory sessions start Thursday, May 16.

Intended Lab Learning Outcomes

We have carefully selected lab activities for two purposes: 1) to provide a hands-on opportunity for you to grasp cell biology theories through practice, and 2) to provide opportunities to successively expand on your newly obtained laboratory skills.

Following a lab experiment, special lecture, and interactive lab workshop, you will be able to write a scientific report. You will correctly distinguish the components of precise and clear scientific communication through writing.

Upon completion of the lab course, it is expected that you will be proficient at the timely use of several lab techniques and equipment.

Lab techniques – cell culturing, cell plating, enzyme assays, standard curves, protein electrophoresis, fluorescence microscopy sample prep, isolation of cellular components

Lab equipment – such as micropipettes, centrifuges, light and fluorescent microscopes, spectrophotometers, hemocytometers

General Lab Information

Welcome to Cell Biology labs at the University of Victoria. This is the laboratory component of Biology 225 and is a requirement in completing the course. Each of the exercises outlined in the lab are to be completed at weekly intervals (bi-weekly in the summer) and are meant to introduce you to the laboratory protocols and techniques commonly used in research labs around the world. I hope you will enjoy!

The laboratory work in Biology 225 frequently requires the use of plant or animal cells and tissues. Students for whom this is an ethical or religious concern should consider a B.Sc. general degree, for which this course is not necessary. Detailed information can be found in the UVic Calendar under program requirements for Biology.

Senior Lab Instructor

Kimberley Curry

email: biologylabs@uvic.ca (for questions related to lab content).

Office: Cunningham 134

If you send an email, please put “Biology 225” and your lab section number (e.g. B03) in the subject line. Due to expected high volumes of email, please expect a

1-2 day delay in email response. If you need a quicker response, I recommend visiting one of the TAs during daily office hours.

Required Readings and Materials

The laboratory manual will be posted weekly on the lab Brightspace website. You are expected to read the lab manual and watch any supplementary videos posted on the course website prior to arriving to the lab.

Lab safety

You are expected to wear closed-toe shoes, a lab coat, and lab safety glasses and follow all lab safety protocols.

Lab schedule

You must enrol in and attend a lab section in this course.

Labs will begin May 16. Labs will switch between Cunningham 132 or 136.

Check BRS for information on location (they are side-by-side).

Lab Policies

Detailed lab policies are outlined in detail on the lab Brightspace page. Here is a summary:

Grade challenges – you have one week to request a remark of lab work.

Late assignments – are not accepted and there will be no deferrals for any missed lab work or summative assessments. See lab concession and accommodation procedures on the course website. Details and instructions for assignments will be discussed in lab and will be posted on our BRS site.

*Assignments that are late will receive a mark of 0.0 (Please refer to UVic Policies and Procedures). e.g., there are no extensions or late marks.

Plagiarism – zero tolerance for plagiarism in any form. Any words or ideas that are not your own MUST be acknowledged. Plagiarism includes “recycling” work from other classes, and it includes copying from online sources, including artificial intelligence sources (e.g. ChatGPT)

Lab Evaluation Summary (see lab introduction for details)

In-lab assignments	5%	
Scientific report	20%	due June 8
Practical Lab Exam*	15%	June 20
Total	40%	

*course requirement

You will receive an F in the course in either of these cases:

- you miss two or fewer labs but do not pass the lab (<20/40)
- you pass the lab but have an aggregate course grade (rounded to the nearest whole number) less than 50%

You will receive an N in the course in either of these cases:

- you miss three or more labs; you will not be allowed to make up these labs and you will not be allowed to write the final exam
- you do not submit a required lab component (see lab evaluation on the course website)
- if you miss the final exam and do not write a deferred final exam by the date specified on your Request for Academic Concession form.

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. Attendance and engagement in the classroom are integral parts of the learning process and cannot be substituted with recordings. It is at the instructor's sole discretion whether they provide a recording or give permission to students to record a lecture. There is no obligation to do so nor is there any expectations about the quality of the recordings. Nor should students assume a lecture will be recorded as instructors may withdraw access to recordings or permission to record. It is the responsibility of students who miss lectures to catch up on the material through extra readings, and obtaining notes from fellow students. Students who miss several lectures due to illness should contact their instructors to discuss options.
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 midterm exams. If you are unable to write a midterm, the grade weight will be automatically shifted on to the final exam. Information about deferral of the final exam is listed below in section 8.
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.

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.