

BIOL 225 A01 (CRN 31185)
Principles of Cell Biology
Summer 2026

Instructors:

Dr. Doug Briant (he/him)(course coordinator)

e-mail: dbriant@uvic.ca

office hours: Tues, Thurs. 11:30 – 12:30 CUN 202c

Dr. Kerry Delaney

e-mail: kdelaney@uvic.ca

office hours: TBA

Kim Curry and Dylan Ziegler

Senior Lab Instructors

email: biologylabs@uvic.ca

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 using the Lab Q&A forum on the lab Brightspace page.

Territorial Acknowledgement:

We acknowledge and respect the Ləkʷəŋən (Songhees and X̱sepsəm/Esquimalt) Peoples on whose territory the university stands, and the Ləkʷəŋən 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:

A01: TWF 12:30 – 2:20, CUN 146

Lecture Delivery: the course will be delivered mainly face-to-face, although circumstances may require one or more lectures to be delivered via recording.

Mentimeter: this is FREE polling software we will use for Q&As and in class polling and questions. Your participation is VOLUNTARY, and no grade will be assigned. To sign up for your free account, please go to [mentimeter.com](https://www.mentimeter.com)

Universal Design:

To maximize accessibility, elements of Universal Design will be applied to this course. All exams are 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 Turpin Building A104, a large room. 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).

Lecture 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, textbook link and other material that students may find useful

D. Briant Material: Dr Briant's notes and lecture material can be found here

Lecture notes: here you will find both PowerPoint and PDF versions of the notes (the two versions have the same content)

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

Mentimeter Material: screen caps of mentimeter problems, other material related to mentimeter

K. Delaney Material: Dr. Delaney's notes and lecture material can be found here

Textbook Materials: practice problems from the textbook publisher.

Quizzes and Exams: the Academic Integrity Quiz (see below) must be completed. Midterm and final exam sections will also include practice problems.

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

Laboratory Materials: these can be found on the laboratory Brightspace site. The lab schedule and learning outcomes can be found on pages 7-8 of this document.

Note: Laboratory sessions start May 14th.

Required Lecture Materials

Textbook: Fundamentals of Cell Biology, Dalton and Young. 2024. **Open Text** available for free here: <https://open.oregonstate.edu/cellbiology/>

Topics:

	topic	chapters
1	INTRODUCTION and CELL BASICS - introduction to cell biology (<i>D. Briant</i>)	in lecture material
2	POWERING the CELL – carbohydrate primer, mitochondria and chloroplasts, carbohydrate primer (<i>D. Briant</i>)	5
3	MEMBRANES and SYNAPTIC SIGNALLING – membranes structures and transport, introduction to action potentials (<i>K. Delaney</i>)(May 25 -29)	In lecture material
4	MEMBRANE SYSTEMS cytoplasmic membrane systems, protein primer (<i>D. Briant</i>)	4
5	NUCLEUS – function of the nucleus, nuclear transport, gene expression and epigenetics. Primer for nucleic acids (<i>D. Briant</i>)	5
6	CYTOSKELETON – underlying structural networks in cells (<i>D. Briant</i>)	6
7	CELL SIGNALLING (non-neuronal) – phosphorylation, signalling networks, metabolic and growth signalling (<i>D. Briant</i>)	7
8	CANCER and the CELL CYCLE (<i>D. Briant</i>)	8

Lecture Learning Objectives

Topic 1a – Discovery of Cells, 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 1d – Molecules and Bonds

LEARNING OBJECTIVES: in this topic, assembly of macromolecules from basic building blocks will be introduced. This will include analysis of the different types of chemical bonds holding molecules together.

TOPIC 2: Powering the Cell

LEARNING OBJECTIVES: In this section, students will be introduced to organelles and how they can be isolated. The focus will be on how eukaryotic cells generate power, and there will be a primer on carbohydrates.

TOPIC 3: Cell Membranes and Synaptic Signalling

LEARNING OBJECTIVES: in this section, we will describe how membranes form selectively permeable barriers. We will discuss membrane transport and students will be expected to know how the various ion channels contribute to an action potential by manipulating the permeability of ions. There will be a primer on lipids

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. This will include a primer on proteins.

TOPIC 5: Nucleus

LEARNING OBJECTIVES: the structure of the nucleus will be discussed, as well as transport in and out of this organelle. We will look at gene expression and apply this to fluorescent microscopy. We will also introduce epigenetics and there will be a primer on nucleic acids.

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: Cell Signalling (non-neuronal)

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 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 topic quizzes. You can make multiple attempts.

Topic Quizzes:

There will be four topic quizzes, worth 1% each. These are participation quizzes, and any learner getting at least one correct answer will receive the full 1%. Quizzes are open from Monday to Friday, and are due at 4pm on Fridays. Due dates are as follows:

- Quiz 1 – Friday, May 15
- Quiz 2 – Friday, May 22
- Quiz 3 – Friday, May 29
- Quiz 4 – Friday, June 19

Group Work (2 projects):

There will be two in class group work projects on Monday, June 01 and Monday June 22. Work is completed in class. Each project is worth 3% of your final grade. If you miss the first project, the grade will shift to the midterm, and if you miss the second project, the grade will shift to the final exam.

Midterm Exam:

There is one midterm, worth 25% of your final grade which will be **held in class on Thursday, June 04. It will be held in David Turpin Building A104 instead of our normal classroom to reduce distraction.** This exam is designed to be completed in 70 minutes, but everyone will have 105 minutes to complete (1.5x). You will be allowed a one sided reference sheet using a template that will be distributed prior to the exam. If you miss this exam, you must contact Doug at dbriant@uvic.ca within 48 hours. The deferred exam will be held **during class time on Thursday, June 11** (location TBD). This will be your only opportunity to write the exam, which is a requirement for completing the course. You will have access to a video of the lecture you miss.

Final Exam:

The final exam is worth 25% of your final grade. It is non-cumulative and will be **held in class on Thursday, June 25. It will be held in David Turpin Building A104 instead of our normal classroom to reduce distraction.** This exam is designed to be completed in 70 minutes, but everyone will have 105 minutes to complete (1.5x). You will be allowed a one sided reference sheet using a template that will be distributed prior to the exam. If you miss this exam, you must fill in a [Request for Academic Concession](#).

Scientific Report Lecture:

Kim Curry will give a special lecture about writing your formal reports on Thursday May 21 (during normal lecture time). Please ensure you attend this lecture.

EVALUATION	Date
40% laboratory ***	<i>based on laboratory components. See lab manual for grading details</i>
4% Topic Quizzes	<i>1% participation mark for each of 4 quizzes (must get at least one answer correct). See due dates and times above.</i>
3% Group Work Project 1	<i>This will take place in class, Monday June 01. There will be preparation work for you to do in advance. Details will follow in lecture.</i>
25% Midterm	<i>During the regularly scheduled lecture time, <u>David Turpin Building A104</u>.</i>
3% Group Work Project 2	<i>This will take place in class, Monday June 22. There will be preparation work for you to do in advance. Details will follow in lecture.</i>
25% final exam	<i>Non-cumulative. During the regularly scheduled lecture time, <u>David Turpin Building A104</u>.</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:

The total mark, calculated from the marks on all the course components including exams, weighted according to the 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 Components of this course 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 midterm, final exam and the practical laboratory exam must be completed to receive a grade other than "N".***
- ***laboratory attendance – students are required to attend all laboratories. Students can miss up to two labs maximum.***

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

Academic Integrity and Permitted Use of AI:

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. Here is a link to the policy:

<https://www.uvic.ca/students/academics/academic-integrity/index.php>

You may use AI tools for studying purposes, but it cannot be used for any material submitted for grading. Any exceptions to this rule will be clearly described in lecture (we may do a short in class AI assignment together).

LAB INFORMATION

Biology 225 Laboratory Schedule, Summer 2026

Date	Lab	Cunn Room	Topic
May 14	1	136	Introduction / Safety / Basic techniques
May 19	2	132	Cell structure: light and fluorescence microscopy
May 21	3	136	Mitochondria isolation and enzyme assay
May 21			<i>Guest lecture on how to write report</i>
May 26	4	132	Scientific report brainstorming and Excel workshop
May 28		132	<i>Office hours during reg scheduled lab (2.5 hr)</i>
Fri. May 29			<i>First part of Scientific report due on course website</i>
June 2	5	136	Cell culturing and sterile techniques – Part I
June 4	6	132	Cell culturing and sterile techniques- Part II Red blood cell fractionation by differential centrifugation – Part I
June 9	7	136	Blood cell protein quantification – Part II
June 11		136	<i>Office hours during reg scheduled lab (2.5 hr)</i>
Fri. June 12			<i>Remainder of Scientific report due on course website</i>
June 16		136	<i>Office hours during reg scheduled lab (2.5 hr)</i>
June 18	8	132	Final practical lab exam

Laboratory Evaluation Summary

In-class assignments:	5 %
Scientific Report:	20 %
Final Laboratory Exam:	15 %
Total:	40%

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

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 14. Labs are in Cunningham 132 or 136. Check that you attend the correct laboratory section.

Lab Policies

Detailed lab policies are outlined in detail on the lab Brightspace page

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. Here is a link to the policy:
<https://www.uvic.ca/students/academics/academic-integrity/index.php>
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. 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 available for all exams. If you miss an exam, please follow the directions listed above in the “Midterm Exam” and “Final Exam” sections.
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). 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. **Cell phones must be inaccessible during exams.**
7. Requests for review/remark of a midterm exam must be made within one week of the exam being returned.
8. The instructor reserves the right to use plagiarism or AI 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.

Centre for Accessible Learning

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a accessibility considerations 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>

Copyright – Fair Dealings

The materials prepared for this course are made pursuant to the Fair Dealing Guidelines of the University, library database licenses, and other university licenses and policies. The copy may only be used for the purpose of research, private study, criticism, review, news reporting, education, satire or parody. If the copy is used for the purpose of review, criticism or news reporting, the source and the name of the author must be mentioned. The use of this copy for any other purpose requires the permission of the copyright owner.

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.