

COURSE SYLLABUS



COURSE TITLE: BIOL-231: Principles of Cell Biology

CLASS SECTION: 001

TERM: Winter 2023

COURSE CREDITS: 3

DELIVERY METHOD(S): In Person

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.

Learn more about Camosun's [Territorial Acknowledgement](#).

For COVID-19 information please visit <https://legacy.camosun.ca/covid19/index.html>.

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.

INSTRUCTOR DETAILS

NAME: Dr. Kate Pettem

EMAIL: pettemk@camosun.ca

OFFICE: Fisher 250B

HOURS: Tues. 11:00am – 11:50pm; Wed. 9:30 – 10:50am

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

This course is an introduction to the cellular and molecular biology of eukaryotic cells. Course content includes cytoplasmic and endomembrane structure, function and transport, structural and functional interactions between cells and their environments and other cells, mechanisms of intercellular communication, cellular and intracellular movement mechanism, principles of cancer biology and laboratory techniques in cell biology.

PREREQUISITE(S):

All of:

- C in BIOL 126

CO-REQUISITE(S):

Not Applicable

EXCLUSION(S):

Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course a student will be able to:

1. Describe the properties of the four groups of macromolecules, including how polymers are synthesized from monomeric units.
2. Describe the structure and functions of the subcellular compartments, organelles and structural molecules.
3. Describe the molecular structure of cellular membranes and explain how membrane structure facilitates membrane function.
4. Explain the molecular mechanisms underlying diffusion, facilitated diffusion and active transport across cytoplasmic membranes.
5. Describe how cells interact with their environment through the extracellular matrix and with other cells through intercellular junctions.
6. Describe the structure and functions of the intracellular membrane systems. Explain the cellular and molecular mechanisms underlying the flow of molecules through the endomembrane system.
7. Explain how secretion, endocytosis and exocytosis facilitate the bulk movement of molecules into and out of the cell.
8. Explain the cellular and molecular mechanisms underlying communication between neurons.
9. Explain the cellular and molecular mechanisms through which cells communicate with one another by chemical messengers.
10. Describe the structures of the cytoskeleton. Explain how the cytoskeletal components are used in movement of intracellular components and in cell motility in the environment.
11. Describe the cellular and molecular mechanisms underlying control of the cell cycle and programmed cell death. Apply these principles in the dysregulated environment of cancer cells.
12. Conduct complex experiments and use a variety of current molecular and analytical techniques to assess various aspects of cellular biology. Critically evaluate data and present written laboratory reports.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Recommended Text:	Recommended Text: Hardin & Bertoni (2021) <i>Becker's World of the Cell</i> , 10 th Edition (Pearson). The textbook may be purchased online from the Camosun Bookstore. Alternatively, the publisher has made an online e-text available for purchase. The 9 th edition is also acceptable. E-text code if needed: pettem17052
Lab Manual:	Biology 231 lab outlines will be posted on the Biology 231 D2L website several days prior to the lab times. You will be responsible for reading the outline (and any associated worksheet materials) before the lab session, and printing select pages. You will also be responsible for following any pre-lab instructions that may be indicated in the lab. We will have one online lab/tutorial for Lab 10 that will require a paid subscription of ~\$10. Details will be posted on the D2L site later in the term.
Lab Coat:	Lab coats are required for laboratory work. Please see below.
Lecture Outlines:	Lectures will be delivered in a PowerPoint format. Copies of slides will be made available on the Biology 231 D2L website. These may be used at the student's discretion.

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Lectures: Tues. 9:30am – 10:50pm Fisher 268
Wed. 11:00am – 12:20am Fisher 100

Labs: Thurs. Section B: 9:30am – 12:20pm Fisher 222
Section A: 1:30pm – 4:20pm Fisher 222

WEEK #	START DATE	DUE DATE	LECTURE UNIT	TEXTBOOK CHAPTER(S)	LAB
1	Jan. 9	Jan. 16	1: Biological Molecules	2/3	Course Intro & Lab Safety (online)
2	Jan. 16	Jan. 23	2: Cellular Structure	4	1: Microscopy
3	Jan. 23	Jan. 30	3: Membrane Functional Anatomy	7	2: Histology
4	Jan. 30	Feb. 6	4: Membrane Transport Mechanisms	8	3A: Cell Culture – Part 1
5	Feb. 6	Feb. 13	5: Cytoskeleton Structure & Function	13	4: Leukocyte Isolation
6	Feb. 13	Feb. 20	6: Microtubule-Based Intracellular Motility; Propulsive Motility; Myosin & Muscle Cell Motility	14	5: Phagocytosis in Tetrahymena
Week 7: Feb. 20 – Feb. 24: Reading Week (No Classes)					
8	Feb. 27	Mar. 6	Catch-up/Review MIDTERM LECTURE EXAM – WED. MAR. 1ST		6: Quantifying Diffusion 3B: Cell Culture – Part 2
9	Mar. 6	Mar. 13	7: Cell Adhesions; Intercellular Junctions; Extracellular Matrix	15	LAB EXAM 1 – THURS. MAR. 9TH
10	Mar. 13	Mar. 20	8: Chemical Signal Transduction	23	7: RBC Protein Isolation & Assay
11	Mar. 20	Mar. 27	9: Cell Cycle Control; Cell Death, Cancer	24/26	8: Insulin Signalling and CamSTAR Activity
12	Mar. 27	Apr. 3	10: Electrical Signaling: Resting Membrane Potential, Action Potential	22	9: Protein SDS-PAGE Analysis
13	Apr. 3	Apr. 10	10: Electrical Signaling: Resting Membrane Potential, Action Potential	22	10: SimBio Action Potentials
14	Apr. 10	Apr. 17	11: Endomembrane (SER, RER, Golgi)	12	LAB EXAM 2 – THURS. APR. 13TH
	Apr. 17 – Apr. 25		FINAL LECTURE EXAM – (Exam Date TBA)		

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced noticed is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Pre-labs and Lecture Assignments	22%
Lab Assignments	22%
Lecture Midterm	12%
Lab Exam 1	12%
Lab Exam 2	12%
Final Lecture Exam	20%
TOTAL	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the [Grade Review and Appeals](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

COURSE GUIDELINES & EXPECTATIONS

A. Lecture Content

- The “lecture” portion of the course is divided into 11 modules. The content for each module consists of a course notes package (in PowerPoint format). In the section for each module, you will also see a “Study Objectives” document; these are the essential points and skills you are expected to acquire and that you will be tested on.
- Each module has an accompanying review assignment to complete individually. These assignments are open for the week that we cover the module. You have 2 attempts for each assignment. If you make only 1 attempt, this is what will reflect as your mark for that assignment within D2L. If you make 2 attempts, D2L will instead calculate the average of both those attempts. Once the deadline passes, submissions can no longer be made through D2L and **will automatically be marked as zero. NO LATE SUBMISSIONS ARE ACCEPTED** as the assignments are intended to keep you on track with the course material.
- Lecture Assignments are always due on Monday’s at 11:59pm.
- Copies of all lecture review assignments can be found in the “Practice” section under Quizzes. These are only for review purposes and not for marks. You are allowed unlimited attempts. Each becomes available after the due date of the marked assignment.
- The PowerPoint notes are available once the course starts. However, the assignments only become available the week we cover that specific module.

B. Laboratory Content

- There is no 'lab manual' for BIOL-231. All labs will be posted several days before the scheduled lab. It is your responsibility to print the lab outline and bring it to the lab. If you want to save on printing costs, you may choose to print only the procedure and data tables parts of the lab outlines.
- Do not attempt to print several pages of drawings on one page. Print at 100% scaling.
- Use of laptops/tablets/phones to refer to lab materials (or for any other reason) is NOT permitted in the BIOL-231 laboratory room for safety reasons.
- Every week there will be a short pre-lab assignment to complete individually. These are always due at 11:59pm on the evening before your lab (Wednesday's). Similar to the Lecture Assignments, you have two (averaged) attempts and **NO LATE SUBMISSIONS ARE ACCEPTED.**
- Each lab consists of Lab Assignments and/or Data sheets. These will be completed in your lab group and are submitted electronically via D2L. Only a single submission is required for the entire group.
- Lab Assignments and Data Sheets are always due on Monday's at 11:59pm. Please see the schedule above for labs (subject to change). **NO LATE SUBMISSIONS ARE ACCEPTED.**
- **GROUP WORK IS REQUIRED FOR THIS COURSE.** Should you not contribute sufficiently to your lab group assignments, your group is expected to omit your name from the group submission. In this case, you will receive a zero on the lab. You cannot complete group assignments alone.
- Written assignments will need to be prepared using Microsoft Word, and data processing is to be submitted using Microsoft Excel. As a Camosun student, you have full access to these programs. See D2L for individual lab instructions.

C. Exams

- The lab exams and midterm dates are in the schedule above.
- Should an emergency or issue arise that prevents you from completing an exam at the scheduled time, you are required to contact your instructor ASAP and **before** the noted scheduled time for approval to arrange for a deferred exam date or re-weighting of your final exam. Failure to obtain prior approval will result in the exam being automatically marked zero. No re-writes are allowed once an exam has been started or attempted.
- Study guides for each exam will be available on D2L closer to the exam dates.

D. Course Schedule

- Note on Dates: New lecture and lab assignments start each Monday at 11:59pm and are available until the following Monday at 11:59pm, unless otherwise posted. Pre-Lab Assignments are available Wed. – Wed. at 11:59pm. All deadlines for electronic submissions also appear in the D2L Calendar tool.

E. Lab Safety and Attendance

NOTHING is more important to the instructor than students enjoying a safe class and lab environment. In Principles of Cell Biology, we will NOT be working with organisms capable of causing infection. However, the cell biology labs are within the Camosun Biological Safety Containment Zone (CZ), where other classes will be using infectious organisms. Therefore, our work in the CZ is mandated by federal and provincial legislation and regulations to conform to strict safety standards. Consider the following issues:

Lab footwear	<ul style="list-style-type: none">• For safety reasons, WorkSafeBC mandates, and federal regulations require, that students are required to wear closed shoes in all lab times. Flip flops, sandals or shoes with holes are not acceptable. Other footwear posing an instability risk (e.g. high heels or bicycle shoes) are prohibited.
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Lab coats	<ul style="list-style-type: none"> • For regulatory, safety and professional reasons, it is mandatory to wear a lab coat during all lab sessions. Because the 231 lab is within the CZ lab coats must remain in the lab for the duration of the semester. Personal lab coats are not permitted; lab coats must be rented for the semester from the Biology Department by purchasing a lab coat rental chit from the Lansdowne Bookstore. Presenting this chit to the instructor will ensure you access to a clean lab coat (a variety of sizes available) for your use throughout the semester. If it needs to be cleaned during the semester, then we will do so at no additional cost to you. • Failure to wear proper lab attire will result in the inability to enter the lab and the subsequent loss of credit for that lab, including any lab assessment credit. • While in the lab the lab coat must be completely buttoned. • The lab coat must NEVER be worn outside of the lab. If you must leave the lab for any reason you must remove your lab coat.
Eating & drinking	<ul style="list-style-type: none"> • Eating or drinking anything in the lab is a violation of federal regulations, so absolutely NOTHING may be ingested while in the lab. Chewing gum and applying makeup or lip balm are similarly prohibited. NO EXCEPTIONS will be made, even for medications. • If something must be consumed, then it may be taken out of the lab.
Hair	<ul style="list-style-type: none"> • It is recommended that long hair be tied securely to prevent it from being exposed to lab equipment.
Handwashing	<ul style="list-style-type: none"> • Hands should be thoroughly washed AFTER removing lab coats and BEFORE leaving the lab.

Lab work is critical to the course objectives and much effort has been expended to ensure the lab experience is interesting and educational, both from academic and practical points of view. Therefore, attendance throughout the entire laboratory session is mandatory and will be noted each lab period. Labs will start promptly (after a five-minute grace period) because information necessary for performing the laboratory correctly and safely is given at the beginning of the lab. Late attendance may result in inability to attend the lab and subsequent loss of credit for any assignments. Lateness in arriving, unexcused failure to attend the lab or unexcused departure from the lab before its scheduled finish time will result in forfeiting credit for that lab, including any written assignments. If a lab session is missed, another student's data **may not** be used to complete a lab assignment for credit. Exceptions can be made **at the instructor's discretion** in legitimate cases of emergency (e.g. illness); in such cases the instructor must receive **advance notification** and grant approval for any accommodation. In cases when a lab is done over two weeks, missing one of the weeks without instructor approval will result in a 50% reduction in the grade for any assignment associated with that lab.

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit <http://camosun.ca/students/>.

Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the [Centre for Accessible Learning](http://camosun.ca/services/accessible-learning/) (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started:

<http://camosun.ca/services/accessible-learning/>

Academic Integrity

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf> for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

Academic Progress

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf> for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <http://camosun.ca/learn/fees/#deadlines>.

Grading Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf> for further details about grading.

Grade Review and Appeals

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the "Attendance" section under "Registration Policies and Procedures" (<http://camosun.ca/learn/calendar/current/procedures.html>) and the Grading Policy at <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf>.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf> to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized Violence and Misconduct Policy: <http://camosun.ca/about/policies/education-academic/e-2-student-services->

and-support/e-2.9.pdf and camosun.ca/sexual-violence. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-3703841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

Changes to this syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.