

# COURSE SYLLABUS



COURSE TITLE: BIOL-231-Principles of Cell Biology

CLASS SECTION: 001

TERM: 2025W

COURSE CREDITS: 3

DELIVERY METHOD(S): In Person

Camosun College respectfully acknowledges that our campuses are situated on the territories of the Ləkʷəŋən (Songhees and Kosapsum) and WSÁNEĆ peoples. We honour their knowledge and welcome to all students who seek education here.

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## INSTRUCTOR DETAILS

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NAME: Dr. Kate Pettem

EMAIL: [pettemk@camosun.ca](mailto:pettemk@camosun.ca)

OFFICE: Fisher 250B

HOURS: Tues. 9:00 – 11:00am or by appointment

*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

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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):

EQUIVALENCIES:

BIOL 230

#### COURSE LEARNING OUTCOMES / OBJECTIVES

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Upon successful 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

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**Recommended Text:** Recommended Text: Hardin & Bertoni (2021) *Becker's World of the Cell*, 10<sup>th</sup> Edition (Pearson). Online e-text available for purchase at the Camosun Bookstore. The 9<sup>th</sup> edition is also acceptable. Note that this is a RECOMMENDED text only; please visit first class before purchasing. Copies also available on reserve from the Camosun library.

- 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.
- SiimBio Lab:** We will have one online lab/tutorial that will require a paid subscription to access the site, called SimBio. This can be purchased through the Camosun Bookstore, and is a required component of the course. More details about how to complete this lab will be posted on the D2L site later in the term. You can purchase the link to the SimBio lab in-person at the bookstore, or through this link: [BIOL 231 Materials](#). Note this link has both the SimBio lab (required) and the textbook (optional) listed; you can adjust your cart if you do not wish to purchase the textbook.
- Lab Coat:** Lab coats are required for laboratory work, and a Lab Coat Chit is available for purchase at the Camosun Bookstore. Please see below for more details under the “Lab Safety” section.
- 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.
- In summary, all you NEED to purchase for this class is a Lab Coat Chit and SimBio access code, both available from the Camosun Bookstore.**

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

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

<b>Lectures:</b>	Mon.	3:00 – 4:20pm	Ewing 201
	Tues.	11:00am – 12:20pm	Fisher 212
<b>Labs:</b>	Fri.	Section A: 9:30am – 12:20pm	Fisher 222
		Section B: 1:30pm – 4:20pm	Fisher 222

WEEK #	START DATE	DUE DATE	LECTURE UNIT	TEXTBOOK CHAPTER(S)	LAB
1	Jan. 6	Jan. 13	1: Biological Molecules	2/3	Course Intro & Lab Safety (online)
2	Jan. 13	Jan. 20	2: Cellular Structure	4	1: Microscopy 2: Histology
3	Jan. 20	Jan. 27	3: Membrane Functional Anatomy	7	3A: Cell Culture – Part 1
4	Jan. 27	Feb. 3	4: Membrane Transport Mechanisms	8	4: Leukocyte Isolation
5	Feb. 3	Feb. 10	5: Cytoskeleton Structure & Function	13	5: Membrane Integrity 3B: Cell Culture – Part 2 Group Project Intro CamSTAR Intro
6	Feb. 10	Feb. 17	6: Microtubule-Based Intracellular Motility; Propulsive Motility; Myosin & Muscle Cell Motility	14	<b>LAB EXAM 1 – FRI. FEB. 14<sup>TH</sup> (Labs 1 – 5)</b>
7	<b>Feb. 17 – 21: Reading Break – No Classes</b>				
8	Feb. 24	Mar. 3	Catch-up/Review <b>LECTURE EXAM #1 – TUES. FEB. 25<sup>TH</sup></b>		6: RBC Protein Isolation & Assay
9	Mar. 3	Mar. 10	7: Cell Adhesions; Intercellular Junctions; Extracellular Matrix	15	7: Protein SDS-PAGE Analysis
10	Mar. 10	Mar. 17	8: Chemical Signal Transduction	23	8: Insulin Signalling and CamSTAR Activity
11	Mar. 17	Mar. 24	9: Cell Cycle Control; Cell Death, Cancer	24/26	Group Project Presentations
12	Mar. 24	Mar. 31	10: Electrical Signaling: Resting Membrane Potential, Action Potential	22	9: SimBio Action Potentials (online)
13	Mar. 31	Apr. 7	10: Electrical Signaling: Resting Membrane Potential, Action Potential 11: Endomembrane (SER, RER, Golgi)	22 12	<b>LAB EXAM 2 – FRI. APR. 4<sup>TH</sup> (Labs 6 – 9)</b>
14	Apr. 7	Apr. 14	Catch up/Review		<b>LECTURE EXAM #2 FRI. APR. 11<sup>TH</sup></b>

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](https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams).

<https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams>

## EVALUATION OF LEARNING

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DESCRIPTION	WEIGHTING
Pre-labs and Lecture Assignments <ul style="list-style-type: none"><li>• 12 Lecture Assignments</li><li>• 10 Pre-Labs</li></ul>	22%
Lab Assignments <ul style="list-style-type: none"><li>• 9 Assignments (Group)</li></ul>	22%
Group Presentation Assignment	4%
Lab Exam 1	12%
Lab Exam 2	12%
Lecture Exam 1	12%
Lecture Exam 2	16%
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 <a href="#">Grade Review and Appeals</a> policy for more information.	<b>TOTAL</b> 100%

<https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf>

## COURSE GUIDELINES & EXPECTATIONS

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### 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 (although collaboration is encouraged). 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. Group Presentation Assignment**

- The Group Presentation Assignment will be completed in your lab group (see below). It consists of a prepared PowerPoint file and a 10-minute oral presentation during your lab time. Your group will choose a topic of your own interest related to course content.
- Detailed guidelines and marking criteria for this project are posted on D2L.

## **C. Laboratory Assessment**

- There is no 'lab manual' for BIOL-231. All lab outlines are posted on D2L. 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; at least one group member needs to have a printed copy. There is no printer available in the lab.
- 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. Similar to the Lecture Assignments, you have two (averaged) attempts and **NO LATE SUBMISSIONS ARE ACCEPTED**. Once Pre-Labs close for marks, open practice copies are available on D2L.
- After each lab, there is an associated Lab Assignment. These will be completed in your lab group and are submitted electronically via D2L. Only a single submission is required for the entire group, which will receive the same grade.
- 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**.
  - If your group is experiencing technical difficulties in submitting an assignment before the due date, email a copy to [pettemk@camosun.ca](mailto:pettemk@camosun.ca) to ensure it is received before the deadline.
- **GROUP WORK IS REQUIRED FOR THIS COURSE.** Should you not contribute equally 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.
  - If you are unable to contribute exactly equally for a given assignment, your group may decide to re-allocate the work so that you can contribute more on an upcoming assignment.
  - If you are having issues in your group with equal sharing of the workload, please talk to your instructor early in the term.
  - If you are sick for a single lab, please do not attend the lab. You can still complete the Pre-Lab and aid your group in completing the Lab Assignment, contributing extra to account for your absence.
  - If you are so ill that you cannot contribute to a Lab Assignment, please contact your instructor ASAP.
- Lab Assignments are to be submitted using Microsoft Excel. As a Camosun student, you have full access to these programs (do not use Google Sheet or other software). See D2L for individual lab instructions.
- Written answers are expected to be authored by group members. Copy and pasted Google answers or answers from AI software (ie. ChatGPT) will receive a zero. You are welcome to use these sources for information, but ensure you synthesize the information and present the answer in your own words. As an additional tip, most, if not all, of the written answers can be found by carefully reviewing the provided Lab Outline.

#### D. Exams

- The lab exam and lecture exam 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 (via the Assessment Center, or CAL if you are a CAL student) 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. Documentation (ie. Doctor's note) may be requested to qualify for a deferred exam.
- Study guides for each exam will be available on D2L closer to the exam dates.

#### E. 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 Tues. – Tues. at 11:59pm. All deadlines for electronic submissions also appear in the D2L Calendar tool.

#### F. Lab Safety

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:

<b>Lab footwear</b>	<ul style="list-style-type: none"><li>• For safety reasons, <b>WorkSafeBC</b> mandates, and federal regulations require, that students are <b>required</b> 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.</li></ul>
<b>Lab coats</b>	<ul style="list-style-type: none"><li>• For regulatory, safety and professional reasons, it is <b>mandatory to wear a lab coat</b> 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.</li><li>• Failure to wear proper lab attire will result in the <b>inability to enter</b> the lab and the subsequent <b>loss of credit</b> for that lab, including any lab assessment credit.</li><li>• While in the lab the lab coat must be completely buttoned.</li><li>• The lab coat must <b>NEVER</b> be worn outside of the lab. If you must leave the lab for any reason you must remove your lab coat.</li></ul>
<b>Eating &amp; drinking</b>	<ul style="list-style-type: none"><li>• Eating or drinking anything in the lab is a violation of federal regulations, so absolutely <b>NOTHING</b> may be ingested while in the lab. Chewing gum and applying makeup or lip balm are similarly prohibited. <b>NO EXCEPTIONS</b> will be made, even for medications.</li><li>• If something must be consumed, then it may be taken out of the lab.</li></ul>

<b>Hair</b>	<ul style="list-style-type: none"> <li>It is recommended that long hair be tied securely to prevent it from being exposed to lab equipment.</li> </ul>
<b>Handwashing</b>	<ul style="list-style-type: none"> <li>Hands should be thoroughly washed <b>AFTER</b> removing lab coats and <b>BEFORE</b> leaving the lab.</li> </ul>

Further training and information on Lab Safety will be provided on D2L and in class during the first two weeks of class. Please see D2L for more details.

## SCHOOL OR DEPARTMENTAL INFORMATION

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### Laboratory Attendance

**In order to pass the course, students are required to meet the minimum lab attendance, participation and completion requirements.**

- Laboratory activities involve practical applications of your knowledge and manual skills development. Development of these skills is a requirement to meet the Course Learning Outcomes.
- Meeting Course Learning Outcomes is a requirement for gaining credit in the course, as well as ensuring articulation, pre-requisite and transferability standards are met.
- Laboratory activities are in-person activities; attendance and participation are required. Online alternatives are not available.
- Laboratory attendance will be monitored by a sign-in/sign-out binder in the lab. It is your responsibility to record your attendance using this binder.
- Attendance from the sign-in/sign-out binder will be transferred to your D2L gradebook by your instructor. If you notice any discrepancies, please contact your instructor ASAP.
- If you arrive significantly late to the lab, you may miss the opportunity to sign-in and will be recorded as absent.

### Missed Labs Guidelines:

- Students who will miss a laboratory session have an obligation to seek out concessions directly from their instructor in a timely manner, BEFORE the lab period occurs.
- If notification is provided AFTER the lab has occurred, concessions may not be available.
- If you miss up to three (3) laboratory sessions, you are still eligible to meet the Learning Outcomes for the course.
- Concessions offered for the first three (3) missed laboratory sessions will depend on the reason for laboratory absence and is up to instructor discretion. Concessions may include writing up the laboratory report with provided data, omitting the lab, or other concessions.
- If you miss a **total of four (4) or more labs for any reason** (including, but not limited to: life circumstances, legitimate illness or family/pet emergency, planned vacations, milestone family events, work commitments, childcare or eldercare commitments, competitive athletic events), you will be unable to meet the learning outcomes for the class and will receive a **failing grade (F) in the entire course**, regardless of marks received on graded lab and lecture components. . Exceptions will only be considered through an academic concession granted by the instructor or Dean/Associate Dean.



- This guideline applies to in-person laboratory activities only; for missed Lab Exams, please see the section in this outline on Exams below.
- Please note that if you are suffering from a serious medical illness that prevents you from participating in this course, Camosun College has a Compassionate Medical Withdrawl Policy (<https://camosun.ca/services/forms#medical> )

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## 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.

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## 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 [camosun.ca/services](https://camosun.ca/services).

Support Service	Website
Academic Advising	<a href="https://camosun.ca/services/academic-supports/academic-advising">camosun.ca/services/academic-supports/academic-advising</a>
Accessible Learning	<a href="https://camosun.ca/services/academic-supports/accessible-learning">camosun.ca/services/academic-supports/accessible-learning</a>
Counselling	<a href="https://camosun.ca/services/health-and-wellness/counselling-centre">camosun.ca/services/health-and-wellness/counselling-centre</a>
Career Services	<a href="https://camosun.ca/services/co-operative-education-and-career-services">camosun.ca/services/co-operative-education-and-career-services</a>
Financial Aid and Awards	<a href="https://camosun.ca/registration-records/financial-aid-awards">camosun.ca/registration-records/financial-aid-awards</a>
Help Centres (Math/English/Science)	<a href="https://camosun.ca/services/academic-supports/help-centres">camosun.ca/services/academic-supports/help-centres</a>
Indigenous Student Support	<a href="https://camosun.ca/programs-courses/iecc/indigenous-student-services">camosun.ca/programs-courses/iecc/indigenous-student-services</a>
International Student Support	<a href="https://camosun.ca/international">camosun.ca/international</a>
Learning Skills	<a href="https://camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills">camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills</a>
Library	<a href="https://camosun.ca/services/library">camosun.ca/services/library</a>
Office of Student Support	<a href="https://camosun.ca/services/office-student-support">camosun.ca/services/office-student-support</a>

Support Service	Website
Ombudsperson	<a href="https://camosun.ca/services/ombudsperson">camosun.ca/services/ombudsperson</a>
Registration	<a href="https://camosun.ca/registration-records/registration">camosun.ca/registration-records/registration</a>
Technology Support	<a href="https://camosun.ca/services/its">camosun.ca/services/its</a>
Writing Centre	<a href="https://camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills">camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills</a>

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.

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## COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

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### Academic Integrity

Students are expected to comply with all College policy regarding academic integrity; which is about honest and ethical behaviour in your education journey. The following guide is designed to help you understand your responsibilities: <https://camosun.libguides.com/academicintegrity/welcome>  
Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.13.pdf> for Camosun's Academic Integrity policy and details for addressing and resolving matters of academic misconduct.

### Academic Accommodations for Students with Disabilities

Camosun College is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging appropriate academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a documented disability and think you may need accommodations, you are strongly encouraged to contact the Centre for Accessible Learning (CAL) and register as early as possible. Please visit the CAL website for more information about the process of registering with CAL, including important deadlines: <https://camosun.ca/cal>

### Academic Progress

Please visit <https://camosun.ca/sites/default/files/2023-02/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 <https://camosun.ca/sites/default/files/2021-05/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <https://camosun.ca/registration-records/tuition-fees#deadlines>.

### Grading Policy

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.5.pdf> for further details about grading.

### Grade Review and Appeals

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

### 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 (see [Medical/Compassionate Withdrawals policy](#)). Please visit <https://camosun.ca/services/forms#medical> to learn more about the process involved in a medical/compassionate withdrawal.

### Sexual Violence

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 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 Policy: <https://camosun.ca/sites/default/files/2021-05/e-2.9.pdf> and [camosun.ca/services/sexual-violence-support-and-education](https://camosun.ca/services/sexual-violence-support-and-education).

To contact the Office of Student Support: [oss@camosun.ca](mailto:oss@camosun.ca) or by phone: 250-370-3046 or 250-370-3841

### 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 <https://camosun.ca/sites/default/files/2021-05/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

### Looking for other policies?

The full suite of College policies and directives can be found here: <https://camosun.ca/about/camosun-college-policies-and-directives>

**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.