

**MDSC 351**  
**Honours Cell and Molecular Biology**

**Instructor:**

Mayi Arcellana-Panlilio, PhD, Course coordinator & Lecturer  
e-mail: [myarcell@ucalgary.ca](mailto:myarcell@ucalgary.ca)

**Office Hours/Policy on Answering Student Emails**

Please note that all course communications must occur through your @ucalgary.ca email, and I will respond to emails sent via student's @ucalgary.ca emails within 48 hours.  
When sending an e-mail, please use "MDSC 351" in the subject line of the message.

**Teaching Assistants:**

Sheng Chun "Chris" Chang, Graduate teaching assistant  
[shengchun.chang@ucalgary.ca](mailto:shengchun.chang@ucalgary.ca)

Cassidy Da Silva, Graduate teaching assistant  
[cassidy.dasilva@ucalgary.ca](mailto:cassidy.dasilva@ucalgary.ca)

Andreas Dauter, Graduate teaching assistant  
[andreas.dauter@ucalgary.ca](mailto:andreas.dauter@ucalgary.ca)

Santhosh Nathan, Graduate teaching assistant  
[santhosh.nathan@ucalgary.ca](mailto:santhosh.nathan@ucalgary.ca)

**Peer Mentors:**

Michelle Alayev  
[michelle.alayev@ucalgary.ca](mailto:michelle.alayev@ucalgary.ca)

Said Hussein  
[said.hussein@ucalgary.ca](mailto:said.hussein@ucalgary.ca)

**Time and Location:**

On Tuesdays, lectures and integrated tutorials run from 3:30 to 6:30 pm.  
On Thursdays, lectures and integrated group sessions run from 3:30 to 5:30 pm.  
All classes take place in Theatre One of Health Sciences Centre

**Prerequisite/Co-Requisite:**

MDSC 341 and admission to the BHSc Honours program, or consent of instructor.

**Course Description:**

Introduction to principles in cellular and molecular biology. Emphasizes how structure underlies and determines function in the cell and how complex processes are organized and regulated at the molecular level.

## Overarching Theme

Combining interactive lectures, small group discussions, and inquiry-based learning, this course intends to build on the concepts learned in the introductory biology and genetics courses and to provide the solid background in cellular and molecular biology that students in the Bachelor of Health Sciences need to understand many aspects of modern medical sciences. This course will focus on the structural organization of cells and the molecular basis of dynamic cellular processes, with emphasis on eukaryotic cells. Topics will include membrane trafficking, cell signaling, cytoskeleton, cell cycle, and cells and their environment.

## Global Objectives

- By the end of this course, the student will have learned key concepts of cell and molecular biology, specifically how structure underlies and determines function in the cell, and how complex processes are organized and regulated at the molecular level.

## Course Learning Outcomes

By the end of this course, students will be able to:

1. Explain key concepts of cell and molecular biology;
2. Apply their understanding of these concepts in new situations;
3. Draw connections among ideas, whether presented in this course or elsewhere;
4. Evaluate ideas, evidence, and interpretations;
5. Articulate their learning through original work (written or in other media);
6. Facilitate the learning of others; and
7. Reflect on their performance.

## Required Textbook

Iwasa J and Marshall W. 2020. Karp's Cell and Molecular Biology. Hoboken, N.J.: John Wiley & Sons, Inc. Ninth edition. Note that the 8<sup>th</sup> edition would do as well.

## Learning Technology Requirements

Brightspace (by D2L) is located on the University of Calgary server and will be used extensively for communication with students. **It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive emails sent by instructors or fellow students through D2L.**

Only your @ucalgary.ca email address may be linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account.

## Evaluation

The University policy on grading and related matters is described in section F of the 2021-2022 Calendar.

In determining the overall grade in the course, the following weights will be used:

Problem summary essay 1	15%	Associated learning objectives: 1-5,7
Problem summary essay 2	15%	Associated learning objectives: 1-5,7
Exam #1	20%	Associated learning objectives: 1-4
Exam #2	20%	Associated learning objectives: 1-4
Novel problem project	15%	Associated learning objectives: 1-7
Exercises, tutorials, concept maps, reflections	<u>15%</u>	Associated learning objectives: 1-7
	100%	

\*\*There is no final exam for this course.

\*\* A student's final grade for the course is the sum of the separate components. It is not necessary to pass each one separately to pass the course.

### **A Note regarding Writing Assignments:**

Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2021-22 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The Bachelor of Health Sciences values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs, and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). Sources used in research papers must be properly documented. The University of Calgary offers instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are **strongly encouraged** to take advantage of these programs.

### **A Note regarding Group Work:**

Students will be assigned randomly to working groups at the beginning of the semester. These groups will meet for discussions and to collaborate on assignments during class times. The Novel Problem project will be completed by these same groups. Each group will have their own discussion forum on D2L where they will log their conversations to select a topic, decide on a presentation theme, assign tasks, do individual research, and post links to articles or summaries to the group.

### **Grading Scheme:**

<b>Letter Grade</b>	<b>Description</b>	<b>Percentage</b>
<b>A+</b>	Outstanding performance	96-100
<b>A</b>	Excellent performance	90-95
<b>A-</b>	Approaching excellent performance	85-89
<b>B+</b>	Exceeding good performance	80-84
<b>B</b>	Good performance	75-79
<b>B-</b>	Approaching good performance	70-74
<b>C+</b>	Exceeding satisfactory performance	65-69
<b>C</b>	Satisfactory performance	60-64
<b>C-</b>	Approaching satisfactory performance	57-59
<b>D+</b>	Marginal pass	54-56
<b>D</b>	Minimal pass	50-53
<b>F</b>	Did not meet course requirements	0-49

### **Missed Components of Term Work:**

Any unexcused late submissions will suffer a penalty of 10% per day. No submissions will be accepted beyond the 3rd day for any assignment.

Students who miss an exam will receive a mark of zero unless the instructor has been previously notified. There will be NO exceptions to this policy.

Extensions will NOT be granted on any assignment. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class, meetings and examinations. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/e-4.html>).

### **Course Evaluations and Student Feedback**

Student feedback will be sought at the end of the course through the Universal Student Rating of Instruction (USRI) and a qualitative student evaluation. Students are welcome to discuss the process and content of the course at any time with the instructor. Students may also address any concerns they may have with Dr. Ebba Kurz, Associate Dean (Undergraduate Health and Science Education) in the Cumming School of Medicine ([kurz@ucalgary.ca](mailto:kurz@ucalgary.ca)).

### **Attendance**

While attendance per se is not compulsory, one should be aware that 15% of the final mark is derived from a student's participation in activities done during class time.

Also, attendance will be checked on both days of the Novel Problem presentations.

### **Conduct During Lectures**

The classroom should be respected as a safe place to share ideas without judgement - a community in which we can all learn from one another. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

As members of the University community, students, employees and academic staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar, the Code of Conduct and Non-Academic Misconduct policy and procedures, which can be found at <https://www.ucalgary.ca/legal-services/university-policies-procedures>.

**Students are expected to take notes during class and should not rely solely on material supplied by the instructors.**

### **Use of Internet and Electronic Communication Devices in Class**

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. However, research studies have found that inappropriate/off-topic use of electronic devices in the classroom negatively affects the learning of others during class time.

Students are responsible for being aware of the University's Internet and email use policy, which can be found at <https://www.ucalgary.ca/policies/files/policies/electronic-communications-policy.pdf>.

## **UNIVERSITY OF CALGARY POLICIES AND SUPPORTS**

### **Copyright**

All students are required to reach the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright-policy.pdf>) and requirements of the Copyright Act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks, etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy <https://www.ucalgary.ca/pubs/calendar/current/k.html>.

### **Instructor Intellectual Property**

Course materials created by instructors (including course outlines, presentations and posted notes, labs, case studies, assignments, and exams) remain the intellectual property of the instructor. These materials may **NOT** be reproduced, redistributed, or copied without the explicit consent of the professor. **The posting of course materials to third-party websites such as note-sharing sites without permission is prohibited.** Sharing of extracts of these course materials with other students enrolled in the course **at the same time** may be allowed under fair dealing.

### **Academic Accommodations**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at <https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations>. Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities (<https://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities.pdf>). SAS will process the request and issue letters of accommodations to instructors. For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/).

Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to Dr. Ebba Kurz, Associate Dean (Undergraduate Health and Science Education) ([kurz@ucalgary.ca](mailto:kurz@ucalgary.ca)).

### **Academic Misconduct**

The University of Calgary is committed to the highest standards of academic integrity and honesty. The University of Calgary has created rules to govern all its members regarding the creation of knowledge and the demonstration of knowledge having been learned.

Academic Misconduct refers to student behaviour that compromises proper assessment of a student's academic activities and includes (but is not limited to): cheating, fabrication, falsification, plagiarism, unauthorized assistance, failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses, and failure to comply with exam regulations applied by the Registrar. **It also includes using of third-party websites/services to access past/current course material, essay/assignment writing services, or real-time assistance in completing assessments, seeking answers to assessment questions and similar, whether paid, bartered, or unpaid.**

For information of the Student Academic Misconduct Policy and Procedures, please visit;

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>  
<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

Additional information is available on the Academic Integrity website at: <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

### **Recording of Lectures**

Audio or video recording of lectures (or similar) is **prohibited** except where explicit permission has been received from the instructor or it is an approved accommodation.

### **Freedom of Information and Protection of Privacy Act**

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

### **Appeals**

If there is a concern with the course, academic matter, or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section I of the University Calendar. Students must follow the official reappraisal/appeal process and may contact the Student Ombuds' Office (<http://www.ucalgary.ca/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct. Students should be aware that concerns about graded term work may only be initiated **within 10 business days** of first being notified of the grade. <https://www.ucalgary.ca/pubs/calendar/current/i-2.html>

### **Sexual and Gender-Based Violence Policy**

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual and gender-based violence policy guides us in how we respond to incidents of sexual and gender-based violence, including supports available to those who have experienced or witnessed sexual or gender-based violence, or those who are alleged to have committed sexual or gender-based violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>.

### **Resources for Support of Student Learning, Success, Safety and Wellness**

Student Success Centre	<a href="http://www.ucalgary.ca/ssc/">http://www.ucalgary.ca/ssc/</a>
Student Wellness Centre	<a href="http://www.ucalgary.ca/wellnesscentre/">http://www.ucalgary.ca/wellnesscentre/</a>
Distress Centre	<a href="http://www.distresscentre.com/">http://www.distresscentre.com/</a>
Library Resources	<a href="http://library.ucalgary.ca">http://library.ucalgary.ca</a>

### **Wellness and Mental Health Resources**

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness, and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (<https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy (<http://www.ucalgary.ca/mentalhealth/>).

**Student Ombuds' Office**

The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit [www.ucalgary.ca/ombuds/](http://www.ucalgary.ca/ombuds/) or email [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca)

**BHSc Student Faculty Liaison Committee (SFLC)**

The BHSc SFLC, with elected representatives from all majors, serves to raise issues of interest to BHSc students to the program administration, including items pertaining to curriculum, scheduling and events. A list of current representatives can be found on the BHSc website.

**Student Union (SU) Information**

The SU Vice-President Academic can be reached at (403) 220-3911 or [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca); the SU representatives for the Cumming School of Medicine can be reached at [medrep1@su.ucalgary.ca](mailto:medrep1@su.ucalgary.ca) or [medrep2@su.ucalgary.ca](mailto:medrep2@su.ucalgary.ca).

**Student Success Centre**

The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: <https://www.ucalgary.ca/student-services/student-success>

**Emergency Evacuation/Assembly Points**

As part of the University of Calgary Emergency Evacuation plan, students, faculty, and staff should locate the closest Assembly Point in case of Fire Alarm. Safety signage is posted throughout the campus showing the locations and the possible route to these locations. All students, faculty, and staff are expected to promptly make their way to the nearest Assembly Point if the Fire Alarm is activated. No one is to return into campus facilities until an all clear is given to the warden in charge of the Assembly Area. For more information, see <https://www.ucalgary.ca/emergencyplan/building-evacuation/assembly-points>

**Safewalk**

Campus security will escort individuals, day, or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.

## Class Schedule

The following is a list of topics for class, readings, and assignment / exam due dates. Please note that unforeseen circumstances may cause changes to the schedule with respect to the timing of topics and readings. Students will be notified of all changes in a timely manner by way of email and D2L announcements. The exam dates are firm and will not be altered.

2022	MDSC 351		
	Lectures	Tutorials	Karp 9e
Week 1			
11-Jan	Intro/overview of cells & cell research	Tutorial 1: Sample problem/Small-group tutorial format	1
13-Jan	DNA structure & DNA replication	Intro to Concept maps / Concept Map #1	10,13
Week 2			
18-Jan	Gene expression& control of gene expr	Tutorial 2: Personal reflection in inquiry learning	11,12
20-Jan	Cell structure and function: the nucleus	Concept Map #2 / Reflection 1	12
Week 3			
25-Jan	Plasma membrane I	Tutorial 3: Introduce Problem summary #1	4
27-Jan	Plasma membrane II	Concept Map #3	4
Week 4			
01-Feb	Cytoplasmic membrane systems I	Tutorial 4: Paraphrasing and summarizing	8
03-Feb	Cytoplasmic membrane systems II	Concept Map #4 / Reflection 2	8
Week 5			
07-Feb		<b>PS#1 submission</b> deadline Monday night, 11:59 pm	
08-Feb	Mitochondria and energy metabolism		5
10-Feb	Cytoskeleton and cell movement	Concept Map #5 / Reflection 3	9
Week 6			
15-Feb	Exam #1 Review	Concept Map #6 (Midterm concepts)	
17-Feb	<b>Exam #1:</b> material from Jan 11th to Feb 10th		
18-Feb		Reflection 4	
Week 7			
22-Feb	Reading Week - no classes		
24-Feb			
Week 8			
01-Mar	Cell junctions, adhesion, and the ECM	Tutorial 5: Introduce PS#2	7
03-Mar	Cell signaling I	Concept Map #7 / Reflection 5	15
Week 9			
08-Mar	Cell signaling II	Tutorial 6: Brainstorming for novel problem	15
10-Mar	Cell cycle	Concept Map #8	14
11-Mar		Novel problem plan due Friday night, 11:59 pm	
Week 10			
14-Mar		<b>PS# 2 submission</b> deadline Monday night, 11:59 pm	
15-Mar	DNA Damage and repair	Tutorial 7: Groups meet	13
17-Mar	Apoptosis	Concept Map #9 / Reflection 6	15
Week 11			
22-Mar	Cancer	Tutorial 8: Groups meet	16
24-Mar	Immune Response	Concept Map #10 / Reflection 7	17
Week 12			
29-Mar	Exam #2 Review		
31-Mar	<b>Exam #2:</b> material from Mar 1st to Mar 24th		
Week 13			
05-Apr	Presentations	<b>Peer evaluations for Tue presentations</b> due at 11:59 pm	
07-Apr	Presentations	<b>Peer evaluations for Thu presentations</b> due at 11:59 pm	
08-Apr		<b>Novel problem presentation &amp; supporting docs</b> due at 11:59 pm	
Week 14			
12-Apr	Course evaluations/Wrap-up lecture	<b>Submission of Individual NP components</b> due at 11:59 pm	
	<b>Due dates for short assignments:</b>	Tutorial worksheets (except #6) are due by 11:59 pm on the same day	
		Concept maps should be uploaded by next Monday at noon	
		Reflections should be posted by Friday night at 11:59 pm	