



## COURSE OUTLINE

### 1. **Course:** BIOL 331, Introduction to Cellular and Molecular Biology - Winter 2023

#### **Coordinator(s)**

<b>Name</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Carrie Shemanko	shemanko@ucalgary.ca	403 220-3861	BI 238C	TBA

#### **Section(s)**

Lecture 01 : MWF 12:00 - 12:50 in MFH 162

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Carrie Shemanko	shemanko@ucalgary.ca	403 220-3861	BI 238C	TBA
Dr Douglas Muench	dmuench@ucalgary.ca	403 220-7935	BI 399	TBA
Dr. Elizabeth Polvi	elizabeth.polvi@ucalgary.ca	TBA	BI 430C	TBA

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

#### **In Person Delivery Details:**

A. Tutorials will in-person as scheduled.

B. Students must attend the tutorial in which they are registered. You will be asked to work in pre-assigned teams for the tutorial component of this course. Studies have shown that diverse teams of 5-7 people perform the best and provide all members with the best possible learning outcomes. To ensure that we can form the most diverse teams possible, we will make use of the ITP Metrics system to form teams. To help with team formation, you will be asked to complete a survey early in the semester. Once teams are formed, you will be asked to work with your teammates on the graded tutorial Teamwork this semester. To ensure individual accountability in all team work that will be completed this semester, you will be asked to also use the ITP Metrics system to evaluate the contributions of each of the members of his/her group and these evaluations will be used when assigning the final group grade for tutorial Teamwork. Further details on how you will be asked to evaluate your peers will be provided in class.

#### **Re-Entry Protocol for Labs and Classrooms:**

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

#### **Course Site:**

D2L: BIOL 331 L01-(Winter 2022)-Introduction to Cellular and Molecular Biology

**Note:** Students must use their U of C account for all course correspondence.

#### **Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Biological Sciences Equity Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, staff, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that

enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Chair, Constance Finney ([constance.finney@ucalgary.ca](mailto:constance.finney@ucalgary.ca)), or a committee representative of your choice at <https://science.ucalgary.ca/biological-sciences/about/equity-diversity-and-inclusion>

**2. Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

**Prerequisite(s):**

Biology 311.

**Antirequisite(s):**

Credit for Biology 331 and Medical Science 351 will not be allowed.

**3. Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

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

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Weekly Tutorial Worksheets 3% each	24%	Ongoing		
Peer Assessment	2%	Ongoing		
Team Contracts <sup>1</sup>	2%	Ongoing		
Midterm Exam	30%	Mar 04 2023		
Assignment 1	6%	Mar 13 2023		
Assignment 2	6%	Apr 12 2023		
Registrar Scheduled Final Exam	30%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

<sup>1</sup> This is done during the first week of in-person tutorials.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
<b>Minimum % Required</b>	91 %	86 %	81 %	76%	71%	67 %	63 %	59%	55%	50 %	45 %

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

**4. Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

Due to the design of the course, a student can only miss two in-person tutorials. Students must contact their TA

and their instructor within 48 hours of the absence. Accommodations for missed in-person components will be made on a case-by-case basis and if approved, the weight of the missed tutorial will be spread across the other completed tutorials. Additional absences will result in a zero grade in that tutorial.

If a student legitimately misses the midterm exam, the student will write an alternate exam.

Missed assignments are penalized 10% per day late, and will only be accepted until the grades and feedback are released.

#### 5. **Scheduled Out-of-Class Activities:**

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm Exam	TBD	Saturday, March 4, 2023 at 10:00 am	2 Hours

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

#### 6. **Course Materials:**

Required Textbook(s):

Karp, *Cell and Molecular Biology 9e*: Wiley.

Wiley Plus is not required for the course.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

#### 7. **Examination Policy:**

No electronic or written aids will be allowed during the writing of any exams. Non-programmable calculators will be permitted. Students should read the calendar Section G on examinations.

Students should also read the Calendar, [Section G](#), on Examinations.

#### 8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

#### 9. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

## 10. Human & Living Organism Studies Statements:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

**STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students taking laboratory and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

## 11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work [form](#) to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

Students wishing a reappraisal of tutorial worksheet must first make a written request to their TA, indicating the issue and the reason for the request within one week of receiving their initial grade. Students wishing a reappraisal of an assignment must write to the instructor with clear reasons for the reappraisal within one week of receiving their initial grade. The entire assignment may be regraded.

## 12. Other Important Information For Students:

- a. **Mental Health** 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 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 (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Services:** For more information, see their [website](#) or call [403-210-9355](#).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.
- e. **Student Union Information:** [SU contact](#), Email your SU Science Reps: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca), [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca),
- f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Lisa Gieg by email [imgieg@ucalgary.ca](mailto:imgieg@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- g. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)  
[Student Academic Misconduct Policy](#) and [Procedure](#)  
[Faculty of Science Academic Misconduct Process](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- h. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.
- i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- j. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

The course is broken down into the following 10 themes, with each theme containing a series of topics and sub-topics:

1. Cells are functional units of life
2. Cellular membranes are critical to biological processes in the cell
3. Protein synthesis and the endomembrane system
4. Different types of vesicles allow for anterograde and retrograde transport
5. Major functions of the cytoskeleton
6. Interactions between cells and the environment
7. Plant cell biology
8. Cell communication

9. Control of gene expression and reprogramming

10. Cancer and what protects us

Biol331 Lecture and Tutorial Schedule Winter 2023				
Date	Lecturer	Topic	Readings	Tutorials
Jan 9	Dr. Polvi	Review of the cell	1.1-1.3, 2.1, 2.3, 2.5	No tutorial
11	Dr. Polvi	Introduction to cellular membranes	4.1, 4.2	
13	Dr. Polvi	Structure of plasma membranes: Fluidity and membrane proteins	4.3, 4.4	
16	Dr. Polvi	Membrane transport	4.6	No tutorial
18	Dr. Polvi	Membrane transport	4.6	
20 Add/drop	Dr. Polvi	Analyzing membranes	4.3, 4.5, 18.7	
23	Dr. Polvi	Membranes and action potentials	4.7	No tutorial (ITP Metrics survey for team formation)
25	Dr. Polvi	Introduction to endomembrane system and lysosomes	8.1-8.2, 8.7	
27	Dr. Polvi	Endomembrane system: ER	8.3	
30	Dr. Polvi	Endomembrane system: Golgi complex and vesicle transport	8.4, 8.5	Tutorial 1
Feb 1	Dr. Polvi	Transport of lysosomal proteins and endocytosis	8.5, 8.9	Team Contracts
3	Dr. Polvi	Cytoskeleton introduction	9.1, 9.2	Tutorial 2 (Dr. Polvi) Membrane Proteins
6	Dr. Polvi	Cytoskeleton and microtubules	9.4, 9.5	
8	Dr. Polvi	Cytoskeleton: Cilia and flagella	9.6	
10	Dr. Polvi	Cytoskeleton: Intermediate filaments and actin filaments	9.7, 9.8	Tutorial 3 (Dr. Polvi) Membrane Potentials and Ion Channels
13	Dr. Polvi	Cytoskeleton: Muscle organization and contraction	9.9	
15	Dr. Polvi	Cytoskeleton: Actin-binding proteins and motility	9.11, 9.12	
17	Dr. Polvi	Review lecture		
20-24		Reading Week		
27	Dr. Muench	Plant cell biology		Tutorial 4 (Dr. Polvi) Vesicular Transport
Mar 1	Dr. Muench	Plant cell biology		
3	Dr. Muench	Plant cell biology		
4		Midterm exam 10:00 am - 12:00 pm		
6	Dr. Shemanko	DNA organization and cell identity DNA organization, chromosome structure, epigenetics		Tutorial 5 (Dr. Polvi) Cytoskeleton
8	Dr. Shemanko	Stem cells, therapeutic and reproductive cloning	12.4	
10	Dr. Shemanko	Interactions between cells and environment ◦ Cell-cell interactions	12.6, 1.3	

13	Dr. Shemanko	Cell-junctions	7.4	Tutorial 6 (Dr. Shemanko) Microscopy
Assignment 1 due (covers tutorials 2-5)				
15	Dr. Shemanko	Extracellular Matrix	7.3-7.6	
17	Dr. Shemanko	Cell communication - Introduction to Intercellular Signaling	7.1, 7.3 Integrins	
20	Dr. Shemanko	◦ Cell signaling: G proteins & cAMP pathway	15.1-15.2	Tutorial 7 (Dr. Shemanko) Gap junctions and tight junctions
22	Dr. Shemanko	◦ Cell signaling: IP3/Ca2+/PKC pathways	15.3	
24	Dr. Shemanko	◦ Cell signaling: Receptor tyrosine kinases	2.7, 4.2, 15.3	
27	Dr. Shemanko	Control of gene expression and reprogramming ◦ Gene regulation and steroid hormones	15.5, 15.8	Tutorial 8 (Dr. Shemanko) Matrix metalloproteases, scratch migration assays, Boyden chamber assays, and zymography
29	Dr. Shemanko	◦ Regulation of the cell cycle	12.7 14.1, 14.2, 14.4, 16.3	
31	Dr. Shemanko	DNA damage and cell cycle checkpoints ◦	14	
April 3	Dr. Shemanko	Cancer and what protects us ◦ Introduction	16.3	Tutorial 9 (Dr. Shemanko) Gene expression profiling and cell-based assays
5	Dr. Shemanko	Tumor Suppressors - Proto-oncogenes and Oncogenes	16.3	
April 7,10 Easter				
12	Dr. Shemanko	Q&A for final Exam		
Assignment 2 due (covers tutorials 6-9)				

**Course Outcomes:**

- Explain how macromolecules interact to support cell structure, function, dynamics and responses to environmental signals
- Describe the evolutionary diversity of cells, and how this diversity contributes to tissue and whole organism function
- Apply knowledge and technical understanding of cell and molecular biology to interpret experimental data

Electronically Approved - Jan 03 2023 10:23

**Department Approval**

Electronically Approved - Jan 06 2023 13:33

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**Associate Dean's Approval**