



School of Science
BIOL 201
Cell Biology
Term: Fall
Number of Credits: 3

Course Outline

INSTRUCTOR: Kate Chatfield-Reed, PhD

E-MAIL: kchatfieldreed@yukonu.ca

OFFICE: A2806

TIME/DATES: T/F 10:30 am – 12 pm (lectures) W 2:30 – 5:30 pm (labs) in A2805

OFFICE HOURS: anytime, schedule by email

COURSE DESCRIPTION

This core second-year biology course examines the structure and function of cells and cell membranes in detail. Students gain an understanding of processes such as cell mobility, the cell cycle and cellular reproduction, vesicular transport, endo- and exocytosis, and membrane transport. Cellular genetics (cytogenetics), homeostasis of the cell, and the evolution of cell organelles will also be examined. Students will gain understanding of cellular flow of information from genetic code to protein and the importance of this flow in cellular processes. Students will gain hands-on experience in basic cellular biology lab techniques, such as various microscope, specimen staining, assay, and separation techniques.

COURSE REQUIREMENTS

Prerequisite(s): Successful completion of BIOL 101 and BIOL 102 or equivalent, with a final minimum grade of C in both. Successful completion of a university-level first-year chemistry course (e.g., CHEM 110).

EQUIVALENCY OR TRANSFERABILITY

This course transfers to most universities in BC as second-year Cell Biology. However, please be aware that receiving institutions determine final course transferability. Find further information at:

<https://www.yukonu.ca/admissions/transfer-credit>

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- explain the unifying and separating features of prokaryotic and eukaryotic cells and the implications of these features in evolution and diseases that impact humans,
- identify and explain the structure and function of all organelles in eukaryotic cells using an evolutionary approach,
- explain molecular structure and diversity of the four types of molecules important to life: carbohydrate, lipid, protein, and nucleic acids and how these molecules facilitate cellular function,

- describe how organelles and membranes work individually and together to achieve homeostasis of the cell,
- outline and compare theories of evolution of organelles and metabolism, including the function of electron transport chains and energy flow, and
- understand the cell cycle, controls, molecular signalling, and interactions between cells, as well as the identifying features and metabolism of cancer cells.

Lab learning outcome: students will be able to demonstrate lab techniques relating to cellular biology such as microscope and staining techniques of both live and preserved specimens, isolation and separation techniques as well as identification of organelles and features of cells.

COURSE FORMAT

This course will be delivered with the following breakdown per week: three hours of lecture (in two 1.5-hour blocks), one three-hour lab, and zero hours of tutorial. Although it will vary from individual to individual, students should expect to spend 3 hours on course material outside of the classroom time (per week) on studying or completing assignments.

Delivery format

This course will be delivered in a face-to-face (in person) format. Students will be expected to access the YU online learning platform for additional material (Moodle). Labs are conducted in person.

EVALUATION

Participation	10 %
Term Project	15 %
Chapter Quizzes (6)	25 %
Lab Assignments	30 %
Final	20 %
Total	100%

Participation

Participation is the degree to which students engage with the class material and their peers. All students are invited to ask questions, participate in activities, and provide their thoughts during discussions. Students are asked to attend class regularly, arrive on time, and arrive ready for learning. Students will be asked to read material in advance and sometimes provide content for class discussions.

Term Project

The term project will be a self-selected topic to be investigated over the full term. The student will create a project proposal, rough draft, and final product. Students will also engage in self-review and peer review as part of developing their final project.

Chapter Quizzes

The course material will be assessed in six ~40-minute chapter quizzes. Each quiz will mostly focus on the most recent chapters but will also cover topics from previous chapters.

Lab Assignments

Students are expected to read lab material before coming into the lab. Lab assignments are handed out at the beginning of lab sessions and are to be completed once lab exercises are completed. They are due within one week unless otherwise announced. Late assignments may be deducted -5% of marks per day. Some larger lab assignments may be assigned that build on material covered over multiple labs.

Final Exam

Students will use their knowledge of methods and applications in cell biology to answer multiple choice, short answer, and long answer questions.

Students must pass the lab and lecture portions of the course independently.

COURSE WITHDRAWAL INFORMATION

The last date to withdraw without academic penalty is Nov. 5, 2026. Refer to the YukonU website for other important dates.

TEXTBOOKS & LEARNING MATERIALS

The textbook for this course is open access:

<https://open.oregonstate.education/cellbiology/front-matter/acknowledgments/>

Students will be expected to read and understand scientific articles relating to course material.

Lab materials (e.g., lab manuals) are provided at least one week prior to the scheduled lab.

Students are required to wear a lab coat during lab sessions. These can be purchased at the YU campus store. Students are also required to use disposable gloves and safety glasses on occasion. These are provided.

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Note that artificial intelligence tools such as Chat GPT can be useful in the same way as a web search or Wikipedia. They can be a starting point but cannot be used to do the work for you. Simply copying the output from something like Chat GPT and submitting it as your own work will be considered plagiarism the same as if you copied directly from a book, webpage, or classmate. Furthermore, appropriate

www.yukonu.ca

referencing is expected in submitted work. You would not reference Chat GPT as it is not an actual source of information, much as you would not reference the results of a web search. References should be to the published scientific literature, or, when appropriate, to the popular scientific media.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

ACCESSIBILITY AND ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact [Accessibility Services](#) for resources or to arrange academic accommodations: access@yukonu.ca.

TOPIC OUTLINE

Topic	Chapter	# Lectures
Visualizing Cells through Microscopy	1	1
Biological Membranes	2	3
DNA, Chromosomes, and the Interphase Nucleus	3	3
The Endomembrane System	4	3
Mitochondria and Chloroplasts	5	3
The Cytoskeleton	6	3
Cell Signalling	7	3
The Cell Cycle and Mitosis	8	4

Lab Schedule and List of Topics

Lab 1 Introduction to the lab, safety, microscopes, and cell counting

Lab 2 Measurement of protein content of cells (*2 lab periods*)

Lab 3 DNA

Lab 4 Cell Behaviour and cell counting review

Lab 5 Organelles – isolation and catalytic activity of mitochondria and chloroplasts (*2-3 lab periods*)

Lab 6 Cytochemical methods, the cell cycle, mitosis and meiosis

Lab topics can change depending on availability of materials.