

BIOL 2020 Cell Biology: Fall 2025

Welcome to Cell Biology!

We are glad that you are here, and look forward to a meaningful, engaging term together.

As the Instructors for BIOL 2020, we acknowledge that we are teaching, learning and living in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People. We respect the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and we recognize that it is our responsibility to learn what it means to be a Treaty person in Nova Scotia.

We also recognize that it is our responsibility to learn more about the histories, contributions, and legacies of African Nova Scotians, who have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Teaching Team:

Mindy McCarville



mindy.mccarville@dal.ca

Course Coordinator
Lab Instructor

Dr. Nicanor González Morales



Nicanor.gonzalez@dal.ca

Lecturer

Dr. Laura Tatar



ltatar@dal.ca

Lab Instructor
Lab Technician

Course Description:

Biology 2020 introduces you to the eukaryotic cell. Lecture content describes major cell components and activities at ultrastructural and molecular levels. The concept of the cell as an integrated structural, functional unit is developed. Lab content focuses on modern experimental approaches for studying cell biology.

We are open to creating an inclusive learning environment for everyone.

We are willing to listen and learn about barriers and accommodate accordingly.

Course Prerequisites: BIOL 1010 or BIOL 1020 or SCIE 1505 or equivalent (minimum grade of C).

Course Delivery:

Lectures: Presented in-person MWF from 9:35-10:25 am in the Potter Auditorium in the Rowe Management Building. Lecture recordings will be available on Brightspace.

Labs: There are four wet lab sessions, and one Final Lab Reflection module held throughout the term. Consult the **Lab Schedule** document for specific dates and times. In-person attendance is mandatory; talk to Mindy if you are unable to attend a lab for any reason.

Brightspace Resources: Brightspace should be your #1 source for help! You can find lecture slides, lecture recordings and all the lab-related materials (the Lab Guides, the Lab Quizzes, etc!) on the site.

Course Goals and Objectives:

- Describe the process by which carbohydrates, lipids and proteins are assembled from monomers and identify their functional roles in the eukaryotic cell.
- Describe the structure and function of the organelles found in eukaryotic cells, demonstrating an appreciation for the overall architecture of the cell.
- Identify the components of biological membranes, including the various types of membrane proteins.
- Explain the fluid mosaic model and describe how membranes exhibit selective permeability.
- List the main components of the cytoskeleton
- Explain how cells are connected physically to other cells
- List the key products and features of glycolysis, the citric acid cycle, and oxidative phosphorylation and understand the flow of energy through the entire process.
- Recall the steps relating to cell division, understand what cellular processes happen at each step, and describe the control mechanisms for the process.
- Understand the mechanism by which cells communicate and name a few examples.
- Demonstrate pipetting proficiency.
- Describe how cells can be maintained *in vitro*.
- Demonstrate the basic steps to align a compound microscope.
- Calculate cell concentration using a hemocytometer.
- Design an experiment using controls.
- Prepare a protein dilution series.
- Describe how protein can be extracted from cells and how protein concentration can be calculated.
- Calibrate a spectrophotometer.
- Construct a standard curve to determine sample concentration.
- Present data in graphical format using appropriate scientific conventions.
- Describe protein electrophoresis and western blotting theory and interpret related data.

Recommended Textbook:

There is no “required” textbook for this course. The content in the tests and exam are from the lecture content. That being said, lecture content could be reinforced by any edition of the following textbooks.

- **Becker’s World of the Cell** (Harden and Bertoni, published by Pearson).
- **Molecular Biology of the Cell** (Alberts et al, published by Norton), or
- **Karp’s Cell and Molecular Biology** (Wasa and Marshall, published by Wiley).

There is also an Open Access textbook that some people may find helpful:

- <https://open.oregonstate.education/cellbiology/>

Technical Requirements:

Students can download the entire Microsoft Office 365 Suite (full version) from Dalhousie for free. For our course, we recommend that you have the full version. Keep in mind that the online apps may lack some of the features normally available in the full version of Microsoft Office.

Course Assessments:

Component	Due Date (AST – Halifax time)	Value	Notes
Lecture: (60%)			
Midterm	October 31 st 9:35 - 10:25 am	20%	<ul style="list-style-type: none"> Multiple Choice. Room assignments TBA.
Final Exam	To be scheduled by the Registrar's Office	40%	<ul style="list-style-type: none"> Multiple Choice. Cumulative; includes lecture content from all weeks.
Lab: (40%)			
Lab Quizzes	Quizzes 1-4 due on your lab day, prior to start time. Quiz 5 due by midnight December 9 th .	6%	<ul style="list-style-type: none"> Five quizzes, each worth 1.5%. Lowest quiz grade is dropped automatically. Quiz grades are final; quizzes cannot be re-opened.
Flowcharts & In-Lab Worksheets	Your lab day.	16%	<ul style="list-style-type: none"> Four submissions, one for each of the 4 labs. <ul style="list-style-type: none"> Each worksheet is worth 3.7%. Each flowchart is worth 0.3%. Paper copy of flowchart is due at start of lab. Paper copy of worksheet is to be submitted before you leave the lab. (The exception is Lab 2, which requires work to be submitted to Brightspace by the indicated deadline.)
Final Lab Reflection	Midnight, the day after you complete Lab 4.	3%	<ul style="list-style-type: none"> Submitted to Brightspace
Lab Test	Wednesday, Dec 10 th 9:35 - 10:25 am	15%	<ul style="list-style-type: none"> Short answer. Room assignments TBA.

Final Grade Calculation:

At the end of the term, if you score a higher percent on the final exam than on the midterm, we will automatically shift the midterm weight to the exam. (*You do not have to email us to ask – we will just do it for you!*)

Example Grade Distributions and Re-Weightings:

Example 1 (Exam is higher than Midterm)	Example 2 (Student missed the Midterm)	Example 3 (Midterm is higher than Exam)
Labs = 30/40 (i.e. 75%) Midterm = 10/20 (i.e. 50%) Exam = 28/40 (i.e. 70%) <i>Default grade = 68%.</i> Optimization: Exam mark was higher than the midterm, so we will increase the exam weight to use an exam grade of 42/60. New final grade = 72%	Labs = 30/40 (i.e. 75%) Midterm = 0/20 (i.e. 0%) Exam = 28/40 (i.e. 70%) <i>Default grade = 59%.</i> Optimization: No grade for the midterm, so we will increase the exam weight to use an exam grade of 42/60. New final grade = 72%	Labs = 30/40 (i.e. 75%) Midterm = 15/20 (i.e. 75%) Exam = 28/40 (i.e. 70%) In this case, the exam mark is lower than the midterm so there is no re-weighting of any marks. Final grade = 73%

Policies for Missed Assessments:

Note: BIOL 2020 does not use Student Declaration of Absence (SDA) forms. Do not send us an SDA.

Assessment	What happens if you miss it?
Midterm	<ul style="list-style-type: none"> There are no make-up opportunities. (See Notes below). If you miss the midterm, the weight will automatically be added to the final exam, regardless of the reason for your absence. There is no need to inform anyone.
Lab Quizzes	<ul style="list-style-type: none"> You will get zero on the quiz. (See Notes below). Lowest quiz grade will automatically be dropped. Quiz grades are final; quizzes cannot be re-opened.
Lab Assignments	<ul style="list-style-type: none"> Lab assignments must be submitted by the end of your lab time, or in the case of an electronic submission, by the specified time. (See Notes below). Labs are mandatory. However, if you cannot avoid missing a lab, the weight of the worksheet will be moved to the Lab Test (to a maximum of one missed lab). If you miss more than one labs, a zero will be assigned for those lab worksheets. If you miss a lab, you are required to email a copy of your flow-chart to Mindy within 48 hours of the scheduled lab day. The weight of the flow-chart is not moved to the Lab Test. For the Lab 2 online submission, late submissions will be subject to a deduction of 20% per day, starting at 12:01 am.
Final Lab Reflection	<ul style="list-style-type: none"> The weight of the Final Lab Reflection will not be moved to the Lab Test. Late submissions will be subject to a deduction of 20% per day, starting at 12:01 am.
Lab Test	<ul style="list-style-type: none"> You must contact Mindy <u>prior to the lab test</u> along with the reason for not writing the test at the designated time. In the case of a valid absence, a make-up test will be scheduled within 7 days of the original date. Two opportunities for a make-up will be provided.
Final Exam	<ul style="list-style-type: none"> You must contact Mindy <u>prior to the exam</u>, along with the reason for not writing the exam at the designated time. In the case of a valid absence, a make-up exam will be scheduled within 7 days of the original date. If you cannot write the make-up examination on the scheduled date due to a valid reason, a second and final opportunity to write the exam will be given.

Note 1: “Long-term absence” refers to absences of more than three consecutive days due to major or chronic physical or mental health conditions, or other extenuating circumstances such as caregiving duties; immediate family illness, injury or death; involvement in an accident; legal proceedings; being a victim of a crime, domestic or intimate partner violence.

Note 2: if you have an **Accessibility Plan** that allows for coursework deferrals or deadline extensions, you must contact your instructor in advance to implement your plan.

Assessment Re-evaluation:

Marks are awarded based on correct responses. If you notice an error in marking (i.e., the rubric is filled out incorrectly, the TA mentioned that you missed something, but you actually included it, etc.), please notify Mindy and your mark will be adjusted accordingly.

If you have specific and valid concerns that your assignment was marked incorrectly and are requesting a full re-evaluation of an assessment, please note that your mark may stay the same or it may increase/decrease. Requests for re-evaluation must occur within 7 days of releasing the grade, and only those requests with legitimate concerns will be addressed.

Academic Integrity:

We take academic integrity seriously. If there is suspicion of an academic offence, we will engage Dalhousie's academic integrity process and forward the case to a Faculty of Science Academic Integrity Officer. Do not put yourself in a situation where your academic career is in jeopardy.

Contents of the lab assignments, Brightspace quizzes, tests, lab test, and the final exam are all property of BIOL 2020 and are strictly confidential. You may not share, distribute, or post any of the content from these assessments with anyone, either in-person or online (e.g., Email, WhatsApp, Discord, Chegg, Course Hero, Studocu, etc.)

Lab Quizzes: Brightspace quizzes are open book/notes. This means that you are welcome to use our Brightspace resources. However, you are not allowed to access other internet sites (e.g., Chegg, Google, YouTube, etc.) Collaboration during the quizzes is not permitted. By starting the assessment, you are declaring that the work submitted is solely of your own efforts. You **cannot** use AI-driven tools while completing the quizzes. Usage of these tools in this particular context is considered to be an academic offence and will be handled as such.

Lab Flowcharts: Must be completed individually. You **cannot** use AI-driven tools while completing the in-lab worksheets. Usage of these tools in this particular context is considered to be an academic offence and will be handled as such.

Lab Assignments: Must be submitted individually, however students are encouraged to work with their lab partner. Similarities or identical phrasing in submission of assignments from lab partners is acceptable and not considered an academic offence. You **cannot** use AI-driven tools while completing the in-lab worksheets. Usage of these tools in this particular context is considered to be an academic offence and will be handled as such.

Final Lab Reflection: Must be submitted individually. This is NOT a group assignment. You **cannot** use AI-driven tools while completing the Final Lab Reflection. Usage of these tools in this particular context is considered to be an academic offence and will be handled as such.

Midterm, Lab Test and Exam: Closed book. Must be completed individually without collaboration with any other person.

Generative AI and Large Language Models (e.g. ChatGPT): You may not use AI-driven tools to produce work to be submitted for evaluation. This means that you absolutely cannot use AI-driven tools while completing the in-lab worksheets, flowcharts, pre-lab quizzes, or the Final Lab Reflection. Usage of these tools in these particular contexts is considered to be an academic offence and will be handled as such.

Copyright Notice:

All course materials are designed for use as part of BIOL 2020 at Dalhousie University and are the property of the course Instructors. This includes, but is not limited to, lecture slides and videos, lab-related documents, lab slides and videos, Brightspace quizzes, lab assignments, tests, and examinations. These documents are solely for your learning and evaluation in BIOL 2020. It is an academic offence to share these materials outside of this course space in such a way that others might gain an unfair advantage, and students who do so may be subject to University discipline. Copying this material for distribution may also lead to a violation of Copyright law.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale:

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (< 50)
A- (80-84)	B- (70-72)	C- (55-59)	

Faculty of Science: University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: <http://www.dal.ca/cultureofrespect.html>

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Student Resources and Support

University Policies and Programs

Important Dates in the Academic Year (including add/drop dates):

http://www.dal.ca/academics/important_dates.html

Classroom Recording Protocol: https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html

Dalhousie Grading Practices Policies: https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Grade Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html

Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

Learning and Support Resources

General Academic Support – Advising (Halifax): https://www.dal.ca/campus_life/academic-support/advising.html

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Indigenous Connection: <https://www.dal.ca/about-dal/indigenous-connection.html>

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803: <https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf>

Black Student Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre.html

South House Sexual and Gender Resource Centre: <https://southhousehalifax.ca/about/>

LGBTQ2SIA+ Collaborative: <https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html>

Dalhousie Libraries: <http://libraries.dal.ca/>

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Dalhousie Student Advocacy Services: <https://www.dsu.ca/dsas?rq=student%20advocacy>

Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Human Rights and Equity Services: <https://www.dal.ca/dept/hres.html>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Faculty of Science Advising Support: <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

Safety

Biosafety: <http://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>