BIOL 107A: INTRODUCTION TO CELL BIOLOGY

3 credits, 3 hours lecture per week, 3 hours laboratory per week

This course is an introduction to cellular structures, molecules, energetics and processes, including that of both prokaryotic and eukaryotic cells. The course includes topics on cellular structures and functions, cellular respiration, photosynthesis, cell division, and the molecular expression of genetic material through the processes of replication, transcription and translation.

Prerequisites: Biology 30 and Chemistry 30

Note: BIOL 107 and 108 can be taken in any order; neither course is a pre-requisite for the other.

Instructor

Dr Blaine Legaree

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Office Hours

Mon: 10:00-11:00 am
Tues: 9:00-10:00 am
Wed: 1:00-2:00 pm
Thurs: 9:00-10:00 am & 1:00-2:00 pm

Hours of Instruction

Lectures:	Mon	9:00-9:50 am	Rm CC235
	Tues	8:00-8:50 am	Rm CC235
	Wed	9:00-9:50 am	Rm CC235
Laboratory:	Thurs	2:00–4:50 pm	Rm CC234

Required Resources

1. **Campbell Biology, 3rd Canadian Edition**, 2021, Urry, L.A. *et al*., ISBN-13: 978-0134851716 *Available in digital formats at the Keyano Bookstore and the publisher*.

2. **Biology 107 Laboratory Manual**, Fall 2023 Edition. Keyano College.

3. **Laboratory coat.** Available at the Keyano Bookstore.

4. **Waterproof marker**. Finetip marker (e.g. Sharpie) for labelling test tubes, etc.

5. **Ruler**. A metric ruler that measures millimetres (mm).

6. **Laboratory goggles**. Available at the Keyano Bookstore. *If you are taking Chemistry, you will need your own pair. If you are taking Biology only, you may wish to share a pair of goggles as they are only required for certain exercises.*

7. **Moodle (http://ilearn.keyano.ca)**. Login to access course materials and to submit assignments.

Course Outcomes

Upon successful completion of this course, the student shall be able to:

- Apply knowledge of the structure of molecules and cells to explain how energy, matter, and information move within and between cells of eukaryotes and prokaryotes.
- Demonstrate a number of important laboratory techniques used in the study of cell and molecular biology.
- Apply the scientific method to generate and analyze data obtained in the lab.
- Demonstrate written communication skills through exams and laboratory assignments.

Evaluation

Midterm Examination 1	15%	Tues, Oct 10, 2023
Midterm Examination 2	15%	Mon, Nov 6, 2023
Laboratory	40%	*Evaluation detailed in the laboratory manual.*
Final Examination	30%	*Date to be set by the Registrar*

A grade of C- is required for progression or transfer.

Examinations

Exams are based on material covered in lectures and will consist of multiple choice, matching, and written questions.

The final exam is cumulative but will focus on material covered following the second midterm.

The final exam must be written in order to complete this course.

Laboratory

The laboratory component is detailed in the course laboratory manual and includes written reports and a final lab exam.

Academic integrity: Although you may work in pairs during the lab period and discuss the exercises together, you are expected to complete laboratory assignments by yourself **independently of any other student**, including your lab partner. Do not share or loan assignments to anyone. **Any acts of plagiarism and academic misconduct are subject to penalties detailed in the Keyano Academic Integrity Policy.** All students are required to complete the **Understanding Plagiarism Tutorial** prior to handing in any assignments in this course.

Late assignments are subject to a penalty of 10% per day late and will not be accepted if more than one week late.

Attendance: Students are required to attend and complete all laboratory exercises unless excused for valid reasons. *Unexcused absence from any lab period or failure to submit a lab report may result in being assessed a failing grade in the course.*

> **Lectures, study questions, lab assignments, and textbook readings are all designed to help you succeed in this course. Completing assignments and attending lectures are essential to your success. Students who do not complete all the required work should not expect to pass the course. Good study habits, such as reviewing material in advance of the midterms and participating in class, will also aid your efforts.**

Grading System

Descriptor	Alpha Grade	4.0 Scale	Percent	Rubric for Letter Grades
	A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
Excellent	A	4.0	85 – 92.9	
	A-	3.7	80 – 84.9	
	B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
Good	B	3.0	74 – 76.9	
	B-	2.7	70 – 73.9	
	C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
Satisfactory	C	2.0	64 – 66.9	
Progression	C-	1.7	60 – 63.9	
Poor	D+	1.3	55 – 59.9	Work is completed in a general way with minimal support, or is poorly written or did not use proper format.
Minimum Pass	D	1.0	50 – 54.9	
Failure	F	0.0	< 50	Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.

Lecture Topics

	Textbook Readings:	
1. An Introduction to Cells and the Scientific Method	Ch 1.1-1.4 Ch 26.1-26.2 Ch 26.6	pg 1-26 pg 586-592 pg 602-603
2. Macromolecules	Ch 5.1-5.5	pg 72-92
3. Microscopy, Cell Culture and Other Laboratory Techniques	Ch 6.1 & class notes	pg 104-107
4. Biological Membranes, Cell Walls and Cell Surfaces	Ch 7.1-7.5 Ch 6.7 Ch 27.1	pg 137-152 pg 128-131 pg 608-609
5. Prokaryotic Cells: Bacteria and Archaea	Ch 27.1-27.6	pg 607-624
6. Eukaryotic Cells: Cellular Compartments and Organelles	Ch 6.2-6.5	pg 107-122
7. Cytoskeletons & Molecular Motors	Ch 6.6 Ch 27.1	pg 122-128 pg 605-6 (prok. flagella)
8. Cellular Order and Energetics	Ch 8.1-8.3	pg 155-165
9. Enzymes	Ch 8.4-8.5	pg 165-173
10. Cellular Respiration and Fermentation	Ch 9.1-9.6	pg 176-196
11. Photosynthesis	Ch 10.1-10.5	pg 199-219
12. The Cell Cycle and Cell Division	Ch 12.1-12.3 Ch 13.1-13.4 Ch 16.3	pg 246-263 pg 270-283 pg 350-352
13. DNA and the Molecular Basis of Inheritance	Ch 16.1	pg 335-340
14. DNA Replication and Repair	Ch 16.2	pg 340-350
15. Genomes, Genes and the Genetic Code	Ch 17.1 Ch 21.3-21.4	pg 355-362 pg 474-478
16. Transcription (From DNA to RNA)	Ch17.2-17.3	pg 362-367
17. Translation (From RNA to Protein)	Ch 17.4-17.5	pg 367-381
18. Control of Gene Expression	Ch 18.1-18.4	pg 385-408
19. Recombinant DNA Technology and Forensics	Ch 20.1-20.4	pg 438-464
20. Viruses, COVID-19 and Vaccines	Ch 19.1-19.3	pg 419-436

Please Note: To facilitate unforeseen time constraints, time allotted to each topic is subject to change.

Laboratory Safety

Students must complete the ***WHMIS for Students* online training course** on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Before entering the lab, students are responsible reviewing the lab manual and relevant Safety Data Sheets for the purpose of evaluating risks associated to health. Some hazards used in the laboratory may have additional risks to those with pre-existing medical conditions.

Performance Requirements and Student Services

Student Responsibilities

As a student, it is your responsibility to contact the Office of the Registrar to complete the required forms, including the Withdrawal/Drop Form. All forms are available on the College website. Please refer to the important dates listed in the Academic Schedule in the Keyano College credit calendar and/or on the College website. It is the responsibility of each student to be aware of the guidelines outlined in the Student and Academic Policies.

Student Attendance

Class attendance is helpful for two reasons: First, class attendance maximizes a student's learning experience. Second, attending class is an excellent way to keep informed of matters relating to the course administration (e.g., the timing of assignments and exams).

Ultimately, you are responsible for your learning and performance in this course. It is the responsibility of each student to be prepared for all classes. Absent students are responsible for the material covered in those classes, and students must ensure they are ready for their next class, including completing any missed assignments and notes.

Course Evaluation

Midterm exams and term work is to be completed at the time/date indicated in your course syllabus. It is the expectation of the College that students make every reasonable effort to complete all course evaluation, including, quizzes, midterms, and exams, as scheduled. In the event of an emergency, rescheduling of exams and/or extensions are only provided at the discretion of the course instructor. Students should contact the instructor as soon as they are able, to notify them of missing an evaluative component. Instructors will use discretion in deciding whether circumstances justify granting a reschedule and/or extension.

Regular term quizzes, midterms, and exams are not eligible for deferral and/or date extension accommodations. Students with accommodations, please refer to Accessibility Services.

Final Exams are subject to deferral processes, please refer to the current Keyano College Credit Calendar.

Academic Misconduct

Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. It is expected that students at Keyano College will adhere to these ethical values in all activities related to learning, teaching, research, and service. Any action that contravenes this standard, including misrepresentation, falsification, or deception, undermines the intention and worth of scholarly work and violates the fundamental academic rights of members of our community.

Academic dishonesty may take many forms:

- Plagiarism or the submission of another person's work as their own,
- The use of unauthorized aids in assignments or examinations (cheating),
- Using Artificial Intelligence (AI) to complete coursework (without instructor approval),
- Collusion or the unauthorized collaboration with others in preparing work,

- The deliberate misrepresentation of qualifications,
- The willful distortion of results or data,
- Substitution in an examination by another person,
- Submitting unchanged for another assignment, and
- Breach of confidentiality.

In all academic work, the ideas and contributions of others must be appropriately acknowledged and work that is presented as original must be, in fact, original. Using an AI-content generator (such as ChatGPT) to complete coursework without proper attribution or authorization is a form of academic dishonesty. If you are unsure about whether something may be plagiarism or academic dishonesty, please contact your instructor to discuss the issue.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the *Student & Academic Policies* section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights, Academic Integrity, and Non-Academic Misconduct Policies.

To ensure your understanding of plagiarism, you may be required to complete the online Understanding Plagiarism tutorial and submit the certificate of completion.

Online Learning

Technology and internet connectivity will impact your online learning experience. You may be required to watch online videos, take online quizzes, or participate in live online classes. Live/virtual courses will be hosted in Microsoft Teams or Zoom. For all course delivery types, you will access your course resources on Keyano's learning management system: Moodle (iLearn). Login in using your Keyano username and password. Keyano College operates in a Windows-based environment, and having access to the correct tools for online learning is essential.

Internet Speed

Minimum download and upload speeds of 10 Mbps. Recommended download speeds of 25 Mbps and upload speeds of 10 Mbps (if you are sharing your internet at home). You can check your internet speed with Speedtest by Ookla.

Computer System Requirements:

Keyano College software are Windows based.

Minimum Requirements and Recommended Upgrades for Windows (preferred system) and Apple devices
These minimum standards are required for a Windows computer/laptop (OS 10 or 11) and a MacIntosh (OS 10.14 or above).   - Windows 10 Operating System or above   4GB of RAM. Recommended upgrade to 8GB of RAM.   10GB+ available hard drive storage space. Note installing Microsoft Office 365 requires 3GB of available hard drive space.   - Install the Microsoft Office 365 Suite (~3GB) - free to Keyano students.   - Microphone, webcam and speakers. (All modern laptops have these three accessories built-in. However, a headset or earbuds with a microphone is also recommended.)   - Windows has built-in anti-virus/malware software. It is essential to install system updates to keep your device secured regularly.
Tablets, iPads and Chromebooks are not recommended: they may not be compatible with the testing lockdown browsers and Microsoft Office 365.

Computer Software

Students have access to Microsoft Office 365 and Read&Write for free using Keyano credentials.

See Recommended Technology for more information.

Recording of Lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not share, distribute, or publish any of the lectures or course materials; this includes any recordings, slides, instructor notes, etc., on any platform. Thus, no student is allowed to share, distribute, publish or sell course-related content without permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property. The Academic Integrity Policy provides additional information on Keyano College's expectations from students as members of the intellectual community.

ITS Helpdesk

If you have issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.

Specialized Supports

The Student Services Department is committed to Keyano students and their academic success. There is a variety of student support available at Keyano. All student services are available during Keyano business hours: Monday to Friday, 8:30 a.m. to 4:30 p.m. The College is closed on statutory holidays. If you require support outside of regular business hours, please inform the support service team, and they will do their best to accommodate your needs.

Accessibility Services provides accommodations for students living with disabilities. Students with documented disabilities or who suspect a disability can meet with an Access Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact the department to request accommodations for the following semester. Please note that requesting accommodations is a process and requires time to arrange. Contact the department as soon as you know you may require accommodations. For accessibility supports and disability-based funding, please book an appointment by emailing us at: accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students and technology training and support to enhance learning. You can meet with an Access Strategist to learn studying and test-taking strategies. In addition, you can schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing: accessibility.services@keyano.ca

Wellness Services offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators provide a safe and confidential environment for you to seek help with personal concerns. Our Wellness Navigator offers support with basic needs such as housing, financial and nutritional support, and outside referrals when needed. Wellness Services welcomes students to participate in group sessions that address topics including mindfulness and test anxiety throughout the academic year. Individual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research, information, and education technology supports as they engage in their studies. Library staff are available to help you online and in person throughout the semester. Librarians offer individual and small group appointments booked using the online Book A Librarian calendar. The Library also provides research and subject guides to help you with your studies. To view a subject or course-specific guide, check out the complete list of online Subject Guides. To start your research and access citation guides (APA, MLA, Chicago, or IEEE), visit the Research Help page. The Library's collections (including print and online materials) are searchable using OneSearch. The Library offers a Loanable Technology collection to support students accessing and using technology. For an up-to-date list of technology available for borrowing, visit the Library's Loanable Technology webpage. For a detailed list of library resources and services, go to www.keyano.ca/library. For all inquiries, please email askthelibrary@keyano.ca or chat with us online.

The **Academic Success Centre** at Keyano College (CC-119) provides free academic support services to registered students, such as tutoring, writing support, facilitated study groups, workshops, and study space. Academic Content Specialists are available in Mathematics, Science, Trades, Power Engineering, Upgrading/College Prep, Human Services, English, Humanities, and more. Students are encouraged to visit the Academic Success Centre to discuss study strategies and academic concerns.

Specialists in the Academic Success Centre also work with students to develop academic success plans, time management skills, study strategies, and homework plans. For additional information, please email Academic.Success@keyano.ca.

Authorization

This course outline has been reviewed and approved by the Program Chair.

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Blaine Legaree, Instructor

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Marie-France Jones, Chair   Date Authorized

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Coert Erasmus, Dean   Date Authorized

Signed copies to be delivered to:
Instructor