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: 2:00–4:00 pm
Tues: 10:00–11:00 am
Wed: 12:00–1:00 pm
Thurs: 10:00–11:00 am

Hours of Instruction

Lectures: Mon/Tues/Thurs: 1:00–1:50 pm   Rm S210

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 ebook digital formats at the Keyano Bookstore, the textbook publisher & other sources.

2. **Biology 107 Laboratory Manual**, Fall 2022 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 11 – in class
Midterm Examination 2	15%	Mon, Nov 7 – in class
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: Laboratory assignments are to be the product of **each student's own work**. Although you may work in pairs during the lab period and discuss the exercises together, you are expected to do the actual assignment 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 _all_ labs unless excused for valid reasons. *Unexcused absence from any lab period or failure to submit a lab report may result in your being assessed a failing grade in the course. Absence from more than any two (2) laboratory periods for any reason may also result in a failing grade.*

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
Excellent	A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
	A	4.0	85 – 92.9	
	A-	3.7	80 – 84.9	
Good	B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
	B	3.0	74 – 76.9	
	B-	2.7	70 – 73.9	
Satisfactory	C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
Progression	C	2.0	64 – 66.9	
	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 Withdraw Course or Program or a Change of Registration form. Please refer to the important dates listed in the Academic Schedule in the [Keyano College Credit Calendar](#). The Keyano College credit calendar also has information about Student Rights and the Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and the Code of Conduct 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.

Academic Misconduct

Students are considered responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- 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
- Handing in the same unchanged work as submitted for another assignment
- Breach of confidentiality.

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 Rights and Code of Conduct 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 and Code of Conduct 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. Here's a list of recommended system requirements.

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:

Minimum Requirements:
• A Windows 10 or Macintosh (V10.14 and above) **computer/laptop**
• Minimum 4GB of RAM.
• 10GB available hard drive storage.
o Install the Microsoft Office 365 suite (~3GB) *
• Microphone, webcam and speakers. (All modern laptops have these three accessories built-in.)
• Windows and Macintosh have built-in anti-virus/malware software. It is essential to install system updates to keep your device secured regularly.
• *Microsoft Office 365 is free to Keyano students.
Recommended Requirements
• 8GB of RAM
• Regularly back up or synchronize your files, locally or with a cloud-based storage option.
o OneDrive is the cloud-based storage option free to students after the setup of KeyanoMail and Microsoft 365.
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.

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.

COVID-19

We are subject to provincial, and municipal bylaws, and policies. These decisions may change pending further direction from the Alberta Chief Medical Officer, Alberta Health Services, and other provincial guidelines. To protect yourself and others, get immunized, wash your hands, wear a mask, keep your distance (2m/6 ft) and remain home when feeling unwell. For the most recent COVID-19 information, please refer to albertahealthservices.ca/COVID.

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.

Academic Success Centre: 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. For additional information, please email Academic.Success@keyano.ca.

Academic Success Coach: The Academic Success Coach is located in the Academic Success Centre and works 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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Sandra Efu, Dean   Date Authorized

Signed copies to be delivered to:
Instructor
Registrar's Office