

## BIOL 107A: INTRODUCTION TO CELL BIOLOGY

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

The properties and functions of organisms depend upon those of individual cells. To understand organisms, it is necessary to understand cells. The course will begin with an examination of the natural origin of life, and of cells. There will be an introduction to cellular structure and function, beginning with prokaryotic cells, followed by eukaryotic cells. This will be followed by an examination of cell respiration, photosynthesis, and a discussion of how cell compartmentalization is important for efficient cell functioning. Control of cell functioning and structure will be explored through an examination of the molecular nature an expression of the genetic material. The course will finish with an introduction to the application of genetic knowledge in genetic engineering and biotechnology.

*Prerequisites:* Biology 30 and Chemistry 30

### Instructor

Dr. Blaine Legaree

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### Office Hours

Mondays 1:00 – 2:00 pm  
Tuesdays 12:00 – 2:00 pm  
Wednesdays 10:00 – 11:00 am  
Fridays 10:00 – 11:00 am

### Hours of Instruction

|             |            |                     |          |
|-------------|------------|---------------------|----------|
| Lectures:   | Wednesdays | 11:00 am – 12:20 pm | Rm S210  |
|             | Fridays    | 11:00 am – 12:20 pm | Rm S210  |
| Laboratory: | Thursdays  | 2:00 – 4:50 pm      | Rm CC234 |

### Required Resources

1. **Campbell Biology, 2nd Canadian Edition**, 2017, Reece, J.B. *et al.*, ISBN-13: 978-0134189116  
*Available in ebook digital formats at [Coursesmart.com](http://Coursesmart.com), [MasteringBiology.com](http://MasteringBiology.com) & [Amazon.ca](http://Amazon.ca)*
2. **Biology 107 Laboratory Manual**, Winter 2018 Edition. Keyano College
3. **Laboratory coat**. Available at the Keyano Bookstore
4. **Moodle (<http://ilearn.keyano.ca>)**. The course outline, lecture notes and other resources will be made available on Moodle. \*\*Please download or print lecture notes before coming to class.

## Course Outcomes

Upon successful completion of this course, the student will 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 I  | 15% | Fri, Feb 9, 2018                                     |
| Midterm Examination II | 15% | Wed, Feb 14, 2018                                    |
| Laboratory             | 35% | <i>Evaluation detailed in the laboratory manual.</i> |
| Final Examination      | 35% | <i>Date to be set by the Registrar</i>               |

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

## Examinations

Exams consist of multiple choice, short answer and long answer questions and are based on material covered in lectures.

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 assignments, reports and a final lab exam.

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 assignment prior to doing the work, you are expected to do the actual work by yourself **independently** of any other student, including your lab partner. Where, in the opinion of your instructor, there has been collaboration among two or more students in the preparation of laboratory assignments, the grade will be divided between the participants or a grade of zero will be given. Do not share assignments, nor loan them to anyone.

**Late assignments will be penalized 10% per day late and will not be accepted if more than 5 days late.**

**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.*

**Note: 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<br><b>Progression</b> | C+          | 2.3       | 67 – 69.9 | Work has some developed ideas but needs more attention to clarity, style and formatting.                                   |
|                                    | C           | 2.0       | 64 – 66.9 |  |
|                                    | C-          | 1.7       | 60 – 63.9 |  |
| Poor<br><b>Minimum Pass</b>        | 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.                |
|                                    | D           | 1.0       | 50 – 54.9 |  |
| Failure                            | F           | 0.0       | < 50      | Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.                                   |

**Schedule of Topics**

Textbook Readings:

|   |   |   |
|---|---|---|
| 1. An Introduction to Cells and the Scientific Method     | Ch 1.1-1.4<br>Ch 26.1, 26.6             | pg 1-26<br>pg 582-586; 598-599          |
| 2. Macromolecules   | Ch 5.1-5.5                              | pg 74-95                                |
| 3. How Do We Study Cells?                                 | Ch 6.1<br>& class notes                 | pg 105-108                              |
| 4. Biological Membranes, Cell Walls and Cell Surfaces     | Ch 7.1-7.5<br>Ch 6.7<br>Ch 27.1         | pg 136-151<br>pg 129-131<br>pg 604-605  |
| 5. Prokaryotic Cells: Bacteria and Archaea                | Ch 27.1-27.6                            | pg 603-621                              |
| 6. Eukaryotic Cells: Cellular Compartments and Organelles | Ch 6.2-6.5                              | pg 108-123                              |
| 7. Cytoskeletons & Molecular Motors                       | Ch 6.6<br>Ch 27.1                       | pg 123-129<br>pg 605-6 (prok. flagella) |
| 8. Cellular Order and Energetics                          | Ch 8.1-8.3                              | pg 154-164                              |
| 9. Enzymes  | Ch 8.4-8.5                              | pg 164-172                              |
| 10. Cellular Respiration and Fermentation                 | Ch 9.1-9.6                              | pg 175-195                              |
| 11. Photosynthesis  | Ch 10.1-10.4                            | pg 198-218                              |
| 12. The Cell Cycle and Cell Division                      | Ch 12.1-12.3<br>Ch 13.1-13.4<br>Ch 16.3 | pg 243-260<br>pg 266-279<br>pg 345-348  |
| 13. DNA and the Molecular Basis of Inheritance            | Ch 16.1                                 | pg 329-335                              |

|   |                         |                         |
|---|-------------------------|-------------------------|
| 14. DNA Replication and Repair                  | Ch 16.2                 | pg 335-345              |
| 15. Genomes, Genes and the Genetic Code         | Ch 17.1<br>Ch 21.3-21.4 | pg 351-358<br>pg 469-72 |
| 16. Transcription (From DNA to RNA)             | Ch17.2-17.3             | pg 358-363              |
| 17. Translation (From RNA to Protein)           | Ch 17.4-17.5            | pg 363-377              |
| 18. Control of Gene Expression                  | Ch 18.1-18.4            | pg 381-398              |
| 19. Recombinant DNA Technology and Forensics    | Ch 20.1-20.4            | pg 433-460              |
| 20. Viruses and Other Self-Replicating Entities | Ch 19.1-19.3            | pg 414-431              |

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

## Performance Requirements

### Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar.

More specific details are found in the Student Rights and Student 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 Student Code of Conduct Policies.

### Laboratory Safety

In the science laboratories, safety is important.

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.

### Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

### **Academic Misconduct**

Students are considered to be 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 Student 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 Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online Plagiarism Certificate at [ilearn.keyano.ca](http://ilearn.keyano.ca). Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

### **Specialized Supports**

#### **Counselling and Accessibility Services**

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

#### **SKILL Centre**

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.