

DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2023

BI1070 A3 – INTRODUCTION TO CELL BIOLOGY (3-1-3)

105 HOURS FOR 15 WEEKS

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR: Dr. Shauna Henley, **PHONE:** 539-2439
PhD

OFFICE: J215 **E-MAIL:** SHenley@nwpolytech.ca

OFFICE

HOURS: Monday, Tuesday, Thursday, Friday – 1:00 – 2:00.

CALENDAR DESCRIPTION: All life functions are based on cells, and this course will provide an introduction to cell structure and function. Major topics will include the origin of life, the development of prokaryotic and eukaryotic cell lineage, energy conversions, the compartmentalization of biochemical functions within a cell and communication from cell to cell. The genetic control of cell activities is examined through methods of molecular genetic analysis and their application in genetic engineering and biotechnology.

PREREQUISITE(S)/COREQUISITE: Biology 30 and Chemistry 30

REQUIRED TEXT/RESOURCE MATERIALS:

1. “Biology” by Campbell *et al.* (2nd (2018) or 3rd (2020) Canadian Edition), Benjamin Cummings Publishing Company.
2. University of Alberta, Biology 1070 Laboratory Manual 2022/2023.

DELIVERY MODE(S):

Lectures – Mon and Wed, 10:00 – 11:20

Labs – L1 Wed, 2:30 – 5:20

L2 Thurs, 2:30 – 5:20

Seminars – S2 Fri, 8:30 – 9:20

S1 Fri, 2:30 – 3:20

*****Note: recording of lectures will not be permitted**

COURSE OBJECTIVES:

Upon completion of the course, students should be able to:

1. Apply knowledge of the structure of molecules and cells to explain how energy, matter, and information moves within and between cells of eukaryotes and prokaryotes.
2. Apply knowledge of laboratory skills and techniques to generate data and conduct analyses of that data.
3. Demonstrate written communication skills in laboratory reports and seminars.

LEARNING OUTCOMES:

1. To gain an understanding of the structures and functions of basic components of prokaryotic and eukaryotic cells.
2. To gain a knowledge of the cellular components underlying cell movement and cell division.
3. To understand the flow of energy and information in cells and apply this knowledge to cell biology.
4. To develop the ability to design, analyze and report the findings of scientific experiments.
5. To foster critical thinking skills.

TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page

<http://www.transferalberta.ca>.

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS: Midterm Exam – 20%

Final exam – 35%

Laboratory – 35%

Seminar – 10%

The midterm exam will be held in class on **Wednesday, February 15th**. The final exam will be cumulative and will take place during the scheduled exam period. Failure to write the midterm or exam will result in a grade of zero unless appropriate documentation is provided.

GRADING CRITERIA: Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100		C+	2.3	67-69
A	4.0	85-89		C	2.0	63-66
A-	3.7	80-84		C-	1.7	60-62
B+	3.3	77-79		D+	1.3	55-59
B	3.0	73-76		D	1.0	50-54
B-	2.7	70-72		F	0.0	00-49

COURSE SCHEDULE:

	Topics	Required Text Readings (pages)	
		2 nd edition	3 rd edition
1.	Introduction to BI 1070		
2.	Chemistry Review	32-45, 63-95	32-45, 63-93
3.	Classification of Organisms	11-12, 598-600, 614-622	11-12, 602-604, 617-624
4.	Cell Membranes	136-151	136-151
5.	Prokaryotic Cell Structure	603-609	607-613
6.	Cell structure – Organelles	108-122	107-123
7.	Cytoskeleton and Molecular Motors	123-129	123-127
8.	Cell walls and Extracellular Matrix	129-132	128-131
9.	Biological Order and Energy	154-172	155-173
10.	Glycolysis & Anaerobic Metabolism	175-181, 191-193	176-183,192-94
11.	Citric Acid Cycle (Kreb's Cycle)	182-185	183-185

12.	Electron Transport Systems	185-191	186-191
13.	Chloroplasts and Photosynthesis	198-208	199-208
14.	Photosynthesis - Light Reactions	208-212	208-213
15.	Calvin Cycle and Photorespiration	212-218	213-219
16.	Bacterial Cell Growth	251-252, 608-612	254-255, 612-15
17.	Cell Division, Mitosis, Meiosis	243-251, 253-260	246-254, 256-63
		268-278	272-280
18.	DNA Chemistry	329-335	334-340
19.	The Eukaryotic Nucleus	345-348	350-353
20.	DNA Replication	335-345	340-349
21.	Genes, mRNA and Proteins	351-358	355-362
22.	Transcription and RNA Processing	358-363	362-367
23.	Regulation of Transcription	380-394	385-398
24.	Translation	363-376	367-379
25.	Viruses, Phages, Viroids, and Prions	414-431	419-436

STUDENT RESPONSIBILITIES: Students are expected to attend **all** classes, seminars and laboratory sessions. All assignments must be completed in full and handed in by the date specified.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the Northwestern Polytechnic Calendar at <https://www.nwpolytech.ca/programs/calendar/> or the Student Rights and Responsibilities policy which can be found at <https://www.nwpolytech.ca/about/administration/policies/index.html>.

**Note: all Academic and Administrative policies are available on the same page.