

DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2023

GN2700 A3: FOUNDATIONS OF MOLECULAR GENETICS – 3 (3-1.5-0)

67.5 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: Basic concepts on the organization of genetic material and its expression will be developed from experiments on bacteria and viruses during the course.

PREREQUISITE(S)/COREQUISITE: BI2070

REQUIRED TEXT/RESOURCE MATERIALS:

Textbook: “Principles of Genetics” by Snustad & Simmons, 7th edition, John Wiley & Sons Inc., 2016.

Papers: A set of historical journal articles have been selected for this course and will be available on myclass. The papers will be studied during the seminar sessions and students will complete assignments on their content.

DELIVERY MODES: Lectures – Tuesdays & Thursdays 8:30 – 9:50
Seminars – Mondays 2:30 - 3:50

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

COURSE OBJECTIVES: Students will gain a deeper understanding of bacterial molecular genetics, from a historical to contemporary perspective. Emphasis will be placed on the ability to analyze and interpret primary literature related to molecular genetics.

LEARNING OUTCOMES:

1. To gain an understanding of how prokaryotes exchange genetic information.
2. To understand the molecular basis for processes such as replication, transcription, translation, mutation, DNA repair and recombination.
3. To comprehend how gene expression is regulated in prokaryotes and viruses.
4. To develop the ability to 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 – 30%
Seminar – 30%
Final Exam – 40%

The midterm will be held in class on **Wednesday, February 16th**. The final exam will be cumulative and will be held during the exam period. Failure to write the midterm or the final exam will result in a grade of zero, unless proper 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)	
	6 th ed.	7 th ed.
1. Introduction to GN 2700	11-15	11-15
2. Genetic concepts	333-5, 340-6 , *O393-9	314-5, 329-32 *O393-9
3. DNA structure	197-203	194-9
4. DNA replication	220-243, 245-250	217-39, 241-6
5. Phage DNA replication	230, 243-4	227, 240
6. Central Dogma	256-71, 286-313	252-66, 281-307
7. T4 Genetic Analysis	163-6, 306-11, 342-6, *O393-405	161-4, 302-4, 329-32, *O393- 405
8. Transformation	172-5	170-3
10. Transduction	182-5	180-3
11. Plasmids and Conjugation	175-82	173-80
12. Transposition	477-83, 488-93	**WC(ch21)1-6, 11-17
13. Mutation	313-4, 321-38, 346-7, 498-9	307-8, 313-29, **WC(ch21)22- 23
14. DNA Repair	348-53	333-8
15. Recombination	354-8, 450-5, 467-9	338-42, 426-31 442-5
16. Gene expression	504-23	459-78
17. Lambda phage	166-9, 228-30	164-7, 225-7
18. Techniques of Molecular Genetics	366-89, 397-99, 403-5, 409-14, 424-26, 463-66,	350-72, 379-81 384-5, 387-95

**These pages are available on myclass, in the link for 'Definitions of the Gene'*

***These pages are available online, in the chapters provided by the publisher*

STUDENT RESPONSIBILITIES: Students are expected to keep up with the course material. 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.