

**DEPARTMENT OF SCIENCE
COURSE OUTLINE – Fall 2024**

MI2650: GENERAL MICROBIOLOGY

3 (3-0-4) 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: Beatrice Amar Ph.D. **PHONE:** 7805392031
OFFICE: J208 / HEC **E-MAIL:** BAmar@NWPolytech.ca
OFFICE HOURS: Mon-Thursday 11.30 a.m. – 1.30 pm.

CALENDAR DESCRIPTION:

This course will focus on the structure and physiology of free-living and pathogenic bacteria. The diversity of their metabolic activities, the interaction of microbes with their environment, symbiotic relationships and cell-to-cell communication are major topics. Lectures and laboratory exercises are coordinated to explore topics in basic microbiology, environmental microbiology, molecular microbiology, and the production of economically or medically important products through microbial biotechnology.

PREREQUISITE(S)/COREQUISITE: BI1070 and CH1610 or CH2610

REQUIRED TEXT/RESOURCE MATERIALS:

1. “Brock – Biology of Microorganisms” (15th Edition, 2017) Madigan, Martinko, Dunlap & Clark. Pearson / Benjamin Cummings Publishers.

The 14th edition may be used as the text. However, some sections of the course have changed considerably so the pages referred to on the Topic Outline may not be accurate for the 14th edition.

2. MI 2650 Lab Manual, Northwestern Polytechnic (Available on D2L course page – you can print it)

DELIVERY MODE(S): Classes	Tuesday	10 a.m. – 11.20 a.m. (J203)
	Thursday	10 a.m. – 11.20 a.m. (J203)
Labs	Wednesday	2.30 p.m. – 5.20 p.m. (J126)
	Friday	10 a.m. – 10.50 a.m. (J126)

LEARNING OUTCOMES:

Students will be able to:

1. State the major milestones in microbiology and name the pioneers of this field and explain their contributions to microbiology.
2. Outline different types of microscopy and discuss their specific applications.
3. Explain the structure and metabolism of prokaryotic microorganisms.
4. Explain the applications of microorganisms in various industries such as agriculture, biomining and bioremediation.
5. Compare and contrast classic and modern methods in studying complex microbial communities.
6. Explain the importance of microbes to the environment.
7. Apply aseptic techniques to isolate micro-organisms from environmental samples.
8. Collect scientific data and present them in the form of a scientific paper.
9. Apply learned principles to other areas of biology.

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.alberta.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:

Lab Reports	14%
Lab Quizzes	6%
Final Lab Exam	15%
Assignments	15%
Mid-term Exam	20%
Final Exam	30%
<hr/> Total	100%

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	95-100		C+	2.3	67-69
A	4.0	85-94		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:

MI2650 - TOPIC OUTLINE

To improve understanding of the material covered during classes and to ensure successful completion of MI2650, it is strongly suggested that students read the relevant text pages in advance of the classes.

	<u>TEXT READINGS</u>	
	14 th Edition	15 th Edition
1. Introduction to Microbiology	1-25; 355-359	1-33
2. Prokaryotic structure and function	32-64; 159; 111-113	34-64; 75-77; 104-105; 320-324
3. Nutrition & Metabolic Diversity of Prokaryotes	79-80; 82-84; 95-96; 379-432; 650-657	74-75; 77-78; 81-83; 94-95; 392-450; 673-678
4. Genetic Regulation & Signal Transduction	120-127; 216-230; 232-233	115-119; 173-188; 212-213
5. Microbial Growth	144-171; 305-308	137-144; 152-164; 207-209; 210-212; 552-553
6. Control of Microbial Growth	158-182; 811-826	164-170; 217-220; 852-858
7. Microbial Associations:	598-600	696-699
Nitrogen Fixation	336-339; 678-679	407-409; 700-705
<i>Agrobacterium</i>	100-102; 673-678	708-709
Ruminant digestion	683-687	721-726
Microbes and man	687-691; 714-725	730-736; 745-750; 752-754

STUDENT RESPONSIBILITIES:

Since participation in lectures, and completion of assignments are important components of this course, regular attendance in class is strongly advised. Students who chose not to attend or complete assignments must assume the risks involved.

Students in MI2650 MUST read the relevant pages of the textbook in order to supplement the

information provided in classes. In order to successfully complete MI2650, students MUST attend all scheduled laboratory sessions and achieve a mean score of 50% on the laboratory assignments, including the Lab Exam. All laboratory assignments MUST be completed and handed in at the time specified. **Late reports will not be marked.**

Due to the complexity of the laboratory exercises in MI2650, they can be completed only during the scheduled times.

Since material covered in BI1070 is relevant to MI2650, it is assumed that students have retained that information and will be able to answer exam questions that refer to it.

STATEMENT ON ACADEMIC MISCONDUCT:

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available at <https://www.nwpolytech.ca/about/administration/policies/index.html>.

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