Lakehead University
Orillia Campus
Department of Biology

BIOLOGY 2711 –BIOLOGY OF MICROORGANISMS –- WINTER 2025

Lectures: Tuesdays and Thursdays 10:00am – 11:30am
Location: OA2010
Lab: BIOL 2711L WO1: Thursdays 2:30pm – 5:30pm (OA3002)
BIOL 2711L WO2: Wednesdays 2:30pm to 5:30pm (OA3002)

Instructor for lectures and labs: Dr. Usha Menon, Office: OA 3003, Phone: 705-330-4008 Ext.2988
Email: umenon@lakeheadu.ca
Office Hours: Mondays and Tuesdays 4:30pm to 5:30pm **(email for an appointment)**

Course Description: An introduction to microbial cell biology, genetics and interactions between microorganisms and humans. Laboratory work includes basic microbiological techniques and identification of microorganisms.

Course objectives: Microorganisms are ubiquitous. Bread making to bioterrorism; yogurt to infectious diseases; deep oceanic trenches to outer space; soy sauce to genetically modified organisms; the presence and activities of microbial world is fascinating. By integrating new molecular techniques and exploring the ever-evolving microbial world, students will be equipped to appreciate the critical contributions of microbes to biological processes and their implications for health, biotechnology, and the environment. The course provides the students with a deeper and more comprehensive understanding of the vital role microorganisms play in various fields, from food production, medicine, biotechnology, environmental science, to even bioterrorism with a focus on three key themes: microbial cell structure, metabolism, and genetics; immunology and microbial diseases; and microbial ecology.

Lab: There is a lab that is an integral part of this course. Students will learn the basic skills to work with bacteria, proper use of microscope, staining and aseptic techniques, isolation, identification and characterization of microorganisms.

Required Text: **Nester's Microbiology**: A Human Perspective. 11th Edition (2024)
By Denise G Anderson, Sarah N Salm, Deborah P Allen and Eugene W Nester
Published by: McGraw Hill Education; ISBN: 978-1-260-09221-9

Estimated price of the new book at the bookstore - $129.95

Lab Manual: Biology 2711- Biology of Microorganisms- Laboratory Manual (Winter 2025)

Final date to drop (withdraw): March 7, 2025

Marking Scheme:

Midterm:	25%
Final:	30%
Presentation:	15%

*Lab: 27.5% (detailed marking scheme provided on lab D2L)
Participation in class discussions: 2.5%

Total :100%

Lecture Schedule

NOTE: The following list of topics is subject to change. Lectures might overlap or continued in the next class. Laboratory time and lecture time might get exchanged at the instructor's discretion.

Date	Topic	Required Readings
Jan 7 Jan 9	Course outline and Introduction Humans and the microbial world	 Chapter 1
Jan 14 Jan 16	The Molecules of Life Microscopy and Cell Structure	Chapter 2 Chapter 3
Jan 21 Jan 23	Microbial growth Microbial growth	Chapter 4 Chapter 4
Jan 28 Jan 30	Control of microbial growth Control of microbial growth	Chapter 5 Chapter 5
Feb 4 Feb 6	Microbial metabolism Microbial metabolism	Chapter 6 Chapter 6
Feb 11 Feb 13	The Blueprint of Life, from DNA to Protein (DNA replication) The Blueprint of Life, from DNA to Protein (Gene expression and regulation)	Chapter 7 Chapter 7
Feb 18 **Feb 20**	**Family day week – no classes** **Family day week – no classes**	
Feb 25 Feb 27	**Mid-term** (till Chapter 6) Bacterial genetics	 Chapter 8
Mar 04 Mar 06 **Mar 06**	Prokaryotic classification Viruses, Prions and Viroids **Form student groups and submit the topics for presentation**	Chapter 10 Chapter 13
Mar 11 Mar 13	Concepts of immunology & Immunological disorders Host microbe interactions and Epidemiology	Chapters 14, 15, 17,18 Chapters 16, 19
Mar 18 Mar 20	Infectious diseases Microbial ecology & Environmental Microbiology	Chapters 21 -27 Chapter 28, 29
Mar 25 **Mar 27**	**Student presentations** **Student presentations**	
Apr 1 **Apr 4**	**Student presentations** **Student presentations**	

FINAL EXAM --- DATE TO BE ANNOUNCED (NOT CUMULATIVE)

Additional Information and Requirements:

Student group presentations – Students are responsible to give presentations on relevant topics in Microbiology (a list of topics will be provided) that might be of general interest. Students are directed to form **groups of 4**, and work as a team and prepare the presentation for the group. Each student should present individually for about **7 min**. Each student group will prepare a **30-minute** power point presentation followed by 5 minutes discussion. Guidelines and details about student presentations will be discussed in the class. Each student presentation will be graded individually for its clarity, depth of knowledge and answering questions at the end. Students are required to form the groups and submit their topics by **March 6, 2025**. There will be a sign-up sheet with time slots provided on the Course link. The student presentations will be conducted during the lecture times on the week of March 24th and March 31st of 2025. Please note that the peer student participation and discussion is also graded and included in the student presentation marks (15%) so be there to attend these presentations and participate in the discussions.

Rescheduling a missed exam is up to Instructor's discretion depending on the reasons for missing.

In case if there are any assignments/ reports to be submitted as a part of this course, to be fair to those who hand their reports/assignments in on time, **10% of the mark will be deducted for each day your report/assignment is late.** Reports/assignments submitted more than one week following the original due date will not be accepted for marking.

There **will not** be any opportunities in this course for **'make-up'** or **'re-do'** of a missed or failed assignment/ presentation. Additional work to improve your grade **is not an option** as well. Therefore, students are encouraged to prepare adequately before each test/assignment.

Academic Dishonesty

Plagiarism is an extremely serious academic offense and carries penalties varying from failure in an assignment to expulsion from the university. Students are encouraged to review Section IX of the University Regulations regarding academic dishonesty. (http://calendar.lakeheadu.ca/current/contents/regulations/univregsIXacdishon.html).

Students are required to complete AIM (Academic Integrity Matters) course on the course link site.

If required more explanation, obtain a copy of the "Code of Student Behaviour and Disciplinary Procedures" from the Office of the Registrar. Students are also encouraged to review the Lakehead University Code of student Conduct and Disciplinary Procedures https://www.lakeheadu.ca/faculty-and-staff/policies/student-related/code-of-student-behaviour-and-disciplinary-procedures

Do not copy, paraphrase, or translate anything from anywhere without citing where you obtained it!

About GenAI use for preparing lecture assignments in this course
GenAI Use Prohibited

Generative artificial intelligence (Generative AI or GenAI) is a category of AI systems capable of generating text, images, or other media in response to prompts. These systems include ChatGPT and its variant Bing (built by OpenAI) and Bard (built by Google) among several others. Other Generative AI models include artificial intelligence art systems such as Stable Diffusion, Midjourney, and DALL-E. Any use of GenAI systems to produce assignments for this course is not permitted. All work submitted for evaluation in this course must be the student's original work. The submission of any work containing AI generated content will be considered a violation of academic integrity ("Use of Unauthorized Materials").

Appendix I: List of Project Topics

1. Microbiology of food production
2. Microbiology of food spoilage
3. Microbiology of food preservation
4. Biofuels
5. Ebola
6. Antibiotics producing microorganisms
7. Role of microorganisms in genetic engineering
8. "Flesh-eating" streptococci
9. *Helicobacter pylori* and ulcer
10. Prions and mad cow disease
11. MRSA (Methycillin Resistant *Staphylococcus aureus*)
12. Antibiotic resistance
13. COVID-19
14. SARS (Severe Acute Respiratory Syndrome)
15. *Escherichia coli* O157:H7/ Walkerton Tragedy
16. Viroids
17. Bioterrorism/ *Bacillus anthracis*
18. West Nile Virus
19. Microbial production of chemicals and pharmaceuticals
20. Microbial life in extreme environments
21. Bioluminescent bacteria
22. Oil spill bioremediation
23. Microbial indicators of water pollution
24. Biocorrosion (Microbiologically Influenced Corrosion)
25. Bioleaching
26. Biomineralisation
27. Biosolids
28. Bacterial pathogens in aquaculture