



School of Science
BIOL 203
Microbiology
Term: Winter
Number of Credits: 3

Course Outline

INSTRUCTOR: Kate Chatfield-Reed, PhD

E-MAIL: kchatfieldreed@yukonu.ca

OFFICE: A2806

PHONE: (867) 456-8563

TIME/DATES: M/W 10:30 am – 12 pm (lectures) T 2:30 – 5:30 pm (scheduled lab) in A2805

OFFICE HOURS: anytime, schedule by email

COURSE DESCRIPTION

This second-year microbiology course explores microscopic organisms such as eukaryotes, Archaea, Bacteria, and viruses. Microorganisms are fundamental to all life on earth and students will leave with a greater appreciation of the interconnectedness of microbes to the rest of the natural world. Students will examine and contrast microorganisms through many lenses including cell morphology, signalling, growth/nutrition, metabolism, and genetics. These topics will be approached through a methods and application-based perspective, with an emphasis on how and why we study specific organisms and use specific techniques. We will investigate their role in the environment, health/medicine, food safety, and industry. Students will carry out research projects exploring microorganisms in the laboratory using aseptic technique, microscope and staining techniques, selective/differential growth, polymerase chain reactions, and phylogenetic analysis.

COURSE REQUIREMENTS

Prerequisite(s): Successful completion of BIOL 101 and BIOL 102 or equivalent, with a final minimum grade of C in both.

EQUIVALENCY OR TRANSFERABILITY

This course is awaiting articulation but is expected to transfer to most universities in BC as second-year Microbiology course. However, please be aware that receiving institutions determine final course transferability. Find further information at:

<https://www.yukonu.ca/admissions/transfer-credit>

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Differentiate Archaea, Bacteria, eukaryotes, and viruses based on cell morphology, biochemistry, and genetics.

- Describe key cellular processes related to nutrition/growth, metabolism, molecular biology, and genetics.
- Compare and contrast ways in which microbes interact with their environment through microbial communities and biogeochemical cycles.
- Describe different ways in which humans use or manage microbes in areas such as food production, industry, environmental conservation, and medicine.
- Consult scientific papers to identify specific technical details or scientific results through critical reading of the background, methods, results, and conclusions of the paper.
- Demonstrate safe and ethical selection and execution of lab techniques relating to microbiology such as aseptic technique, microscope and staining techniques, polymerase chain reactions, phylogenetic analysis, and analyse and communicate the results in a lab report.

COURSE FORMAT

This course will be delivered with the following breakdown per week: 3 hours of lecture, 3 hours of lab, and 0 hours of tutorial. Although it will vary from individual to individual, students should expect to spend approximately 3 hours on course activities (reading, studying, completing assignments) outside of the classroom time per week.

Delivery format

This course will be delivered in a face-to-face (in person) format. Students will be expected to access the YukonU online learning platform for additional material (Moodle). Labs can only be conducted in person.

EVALUATION

Participation (Case studies and other)	10 %
Midterm Exam	20 %
Lab Quizzes	5 %
Lab Assignments and Report	35 %
Final Exam	30 %
Total	100%

Participation

Participation is the degree to which students engage with the class material and their peers. All students are invited to ask questions, participate in activities, and provide their thoughts during discussions. Students are asked to attend class regularly, arrive on time, and arrive ready for learning. Students will be asked to read material in advance and sometimes provide content for class discussions.

Midterm Exams

There is one in person midterm exams that should take 45-80 minutes to complete.

Lab Quizzes

Students are expected to read lab material before coming into the lab. The first labs of the semester will have online lab quizzes that are designed to help students prepare for the weeks lab and improve understanding of experimental techniques.

Lab Assignments

The first labs of the semester will have lab assignments are handed out at the beginning of lab sessions and are to be completed once lab exercises are completed. They are due within one week unless otherwise announced. Late assignments may be deducted -5% of marks per day.

The later lab experiments in the course will be chosen, designed, and executed by the students with guidance from the instructor. The labs will be assessed based on the planning, execution, analysis, and reporting of the data. All of the labs will culminate in one large lab report presenting the results.

Final Exam

Students will use their knowledge of methods and applications in microbiology to answer multiple choice, short answer, and long answer questions.

Students must pass the lab and lecture portions of the course independently.

COURSE WITHDRAWAL INFORMATION

The last date to withdraw without academic penalty is Nov. 5th , 2026. Refer to the YukonU website for other important dates.

TEXTBOOKS & LEARNING MATERIALS

This course uses a free open access textbook created by UBC:

https://evesun2.github.io/micb211_etextbook/intro.html#.

(optional) Prescott's Microbiology, 12th edition. 2023. J. Willey, Sandman, and Wood. McGraw Hill. Hoboken, NJ, USA.

Students will be expected to read and understand scientific articles relating to course material.

Lab materials (e.g., lab manuals) are provided in the form of three-hole punched pages at least one week prior to the scheduled lab.

Students are required to wear a lab coat during lab sessions. These can be purchased from YukonU for \$20. Students are also required to use disposable gloves and safety glasses on occasion. These are provided.

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic

assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Note that artificial intelligence tools such as Chat GPT can be useful in the same way as a web search or Wikipedia. They can be a starting point but cannot be used to do the work for you. Simply copying the output from something like Chat GPT and submitting it as your own work will be considered plagiarism the same as if you copied directly from a book, webpage, or classmate. Furthermore, appropriate referencing is expected in submitted work. You would not reference Chat GPT as it is not an actual source of information, much as you would not reference the results of a web search. References should be to the published scientific literature, or, when appropriate, to the popular scientific media.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

ACCESSIBILITY AND ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact [Accessibility Services](#) for resources or to arrange academic accommodations: access@yukonu.ca.

TOPIC OUTLINE

General topic	Chapter	Topics	# Lectures
Unit 1	1	Brief Introduction to Microbes	1
	2	Microbial Cell Structures	1
	3	Microbial Growth	1
	-	<i>review</i>	1
	4	Chemistry for Microbiology	2
	5	Introduction to Microbial Metabolism and Energetics	2
	6	Catabolism and its Diversity	1
	7	Anabolism and its Diversity	1
	-	<i>review</i>	1
Midterm	-	October 26	1
Unit 2	8	Gene Expression and Regulation	2
	9	Sensing and Responding to the Environment	1
	-	<i>review</i>	1
	10	The Community Lifestyle of a Biofilm	1
	11	The Human Microbiome	1
	12	Bacterial Pathogenesis and Virulence	1
	13	Antimicrobials and Resistance	1
	-	<i>applications and review</i>	2
Final	-	Wednesday, December 9 at 9 am	

Lab Schedule and List of Topics

Lab 1 – Introduction to media, serial dilutions, pipetting, and aseptic technique

Lab 2 – Environmental sampling and serial dilutions

Lab 3 – Colony morphology and cell counting

Lab 4 – *Student Choice (will likely take two lab periods)*

Lab 5 – *Student Choice (will likely take two lab periods)*

Lab 6 – *Student Choice (will likely take two lab periods)*

Lab 7 – *Flexible lab to repeat or do new experiments*

Lab topics can change depending on availability of materials.