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## **Course Outline**

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**INSTRUCTOR:** Kate Chatfield-Reed, PhD

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**OFFICE:** A2806

**PHONE:** (867) 456-8563

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

**OFFICE HOURS:** anytime, schedule by email

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### **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

Lecture Assignments	15 %
Midterm Exams (2)	20 %
Lab Quizzes	10 %
Lab Assignments	25 %
Final Exam	30 %
<b>Total</b>	<b>100%</b>

### Lecture Assignments

Each chapter will have an assignment for a total of 13-15 assignments total. Larger assignments may be given more weight.

### Midterm Exams

There are two 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.* Lab quizzes are designed to help students prepare for the weeks lab and improve understanding of experimental techniques.

## Lab Assignments

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. Some larger lab assignments may be assigned that build on material covered over multiple labs.

## 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 Mar. 5<sup>th</sup>, 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#](https://evesun2.github.io/micb211_etextbook/intro.html#).

Students can choose to purchase Prescott's Microbiology; either as a hard copy from the YukonU bookstore, or an online eText access through the publisher (McGraw Hill). It will also be available on hold at the University library.

*(optional) Prescott's Microbiology, 12<sup>th</sup> 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.

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](mailto:access@yukonu.ca).

## TOPIC OUTLINE

General topic	Chapter	Topics	# Lectures
1. Unit 1	1	Brief Introduction to Microbes	
	2	Microbial Cell Structures	
	-	Archaea	
	-	Eukaryotes	
	3	Microbial Growth	
	4	Chemistry for Microbiology	
	5	Introduction to Microbial Metabolism and Energetics	
	6	Catabolism and its Diversity	
	7	Anabolism and its Diversity	
2. Unit 2	8	Gene Expression and Regulation	
	9	Sensing and Responding to the Environment	
	10	The Community Lifestyle of a Biofilm	
	11	The Human Microbiome	
	12	Bacterial Pathogenesis and Virulence	
	13	Antimicrobials and Resistance	
	-	Food and Industry	
3. Review	all		1

*Final exam – date set by administration and available on the website  
<https://www.yukonu.ca/programs/courses/biol-203>*

**Lab Schedule and List of Topics – *Labs typically start in the second week of classes.***  
**Labs take place in Room A2805**

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

Lab 2 – Environmental sampling and serial dilutions

Lab 3 – Colony morphology and cell counting

Lab 4 – Differential staining and motility

Lab 5 – Genetic Sequencing

Lab 5 – Metabolism Lab - Alternative Carbon Sources?

Lab 6 – Antimicrobials

Lab 7 – DNA Extraction

Lab 8 – Bacterial Transformation

*Lab topics can change depending on availability of materials.*