



BIOL-200 – Introduction to Microbiology

University Arts and Science

Effective Term & Year: Fall 2022

Course Outline Review Date: 2028-09-01

Program Area: Math and Sciences

Description:

Introduction to Microbiology is an introduction to the general principles of microbiology. Lectures and laboratory exercises explore fundamental topics of microbiology, environmental microbiology and molecular microbiology such as diversity of microorganisms, microbial structure, metabolism, genetics and microbial ecology emphasizing applied, medical and environmental microbiology. The laboratory introduces methods for safe handling of microorganisms, techniques of microbial isolation, enumeration and identification as well as experiments relevant to lectures.

Program Information:

This course is intended primarily for second-year university transfer students wishing to major or honour in biology or related fields.

Delivery Methods: On-campus (Face-to-Face)

Credit Type: College of the Rockies Credits

Credits: 3

Course type/s: Lab Sciences, Sciences

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	

Laboratory/Studio	45
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	90

Course Requisites:

- Complete all of the following
 - Completed the following:
 - BIOL101 – Introduction to Biology 1 (3)
 - Completed or concurrently enrolled in:
 - BIOL102 – Introduction to Biology 2 (3)

Flexible Assessment: Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see <https://www.bctransferguide.ca/> or <https://transferalberta.alberta.ca> . For more transfer credit information, please visit <https://www.cotr.bc.ca/Transfer>

All requests for course transfer credit from institutions in British Columbia or elsewhere should go to the College of the Rockies Enrolment Services office.

Textbook Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

J.M. Willey, L.M. Sherwood and C.J. Woolverton, *Prescott's Microbiology*, 12th ed., McGraw Hill Ryerson, 2022.

Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> for a complete list of the currently required textbooks.

Learning Outcomes:

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

- Recognize microbial ubiquity and the diversity of ecosystems in which microorganisms are found;
- Explain how most bacteria in nature live in biofilm communities interacting with modifying and being modified by their environment;
- Describe how microorganisms interact with both human and non-human hosts in beneficial, neutral, or detrimental ways;
- Explain how life and the processes that support life (biogeochemical cycles, plant and animal microbiota) are dependant on microorganisms;
- Discuss microorganisms as models that provide important knowledge about life processes;
- Identify how humans utilize and harness microbes and their products.
- Outline how cells, organelles, and all major metabolic pathways evolved from early prokaryotic cells;
- Describe basic structural features, metabolism, growth and genetics of bacteria, viruses and eukaryotic microorganisms;
- Discuss the importance of microscopy to our current understanding of the structure and function of microorganisms;
- Explain how mutations, horizontal gene transfer and variety of environments has selected for an enormous diversity of microorganisms;
- Illustrate how human impact influences the evolution of microorganisms (e.g., emerging diseases and the selection of antibiotic resistance).
- Describe and evaluate physical, chemical, biological and mechanical means of controlling microbial growth and describe unique bacterial cell structures that can be targets for antibiotics and immunity;
- Describe the replication cycles of viruses;
- Use specific examples to demonstrate the extensive metabolic diversity in Bacteria and Archaea and explain how survival and growth of any microorganism depends on its metabolic characteristics;
- Discuss how the interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities and how genetic variations can impact microbial functions (e.g., in biofilm formation, pathogenicity, and drug resistance).
- Demonstrate a working knowledge of equipment, PPE and safety practices required for working in a containment level 2 laboratory;
- Demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills;
- Apply scientific method to collect, interpret and present scientific data in microbiology.

Course Topics:

- Introduction, Microorganisms, Microbiology, History & Scope
- Microscopy
- Microbial Cell Structure and Function
- Microbial Nutrition
- Metabolism (and Regulation)
- Microbial Growth and Reproduction
- Control of Microorganisms
- Genetics
- Viruses
- Microbial Diversity, Evolution and Systematics
- Microbial Ecology / Microbial Associations
- Disease / Infection / Infectious Diseases
- Immunology
- Industrial, Food, Forensic and Environmental Microbiology

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

Evaluation and Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Assignments	10%
Term Tests	30%
Final Exam	30%
Assignments and Laboratory Book	10%
Laboratory Reports	10%
Laboratory Exam	10%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

Pass requirements: A passing average (50% or higher) in both the theory and practical components.

Evaluation Notes: A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a "0" on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.4.3 Students with Documented Disabilities
 - Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
 - Policy 2.5.8 Academic Performance
 - Policy 2.5.3 Grade Appeal
 - Policy 2.4.9 Student Concerns Re Faculty
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Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.