Introduction to Microbiology
BIOL 2253 WI01

Instructor: Dr. Melanie Coombs
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Office hours: M 1-3 pm or by appointment
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Note: *Please note that your emails to me should only come from your Acadia email address. Other email addresses may get lost in my junk mail.*

Lecture:
MWF, KCIC 012,
10:30 - 11:20 am

Lab: Not applicable

Evaluation	Percentage	Date
Test 1	25%	Feb 3
Test 2	25%	Mar 10
Moodle quizzes	20%	weekly
Final exam (Full term)	30%	Scheduled by the registrar

Part 1: Course Information

Course Description

This course introduces the interactions of bacteria, archaea, protists, fungi, and viruses with the human environment, including the important roles of these microbes in production and spoilage of food and beverages, in benefitting human health, in causing human disease, and in shaping the human immune system. This course cannot be used for program credit by BIOL, ENVS, NUTR, or NURS majors.

Prerequisite(s): BIOL 1113/1123 or BIOL 1813, with a minimum grade of C-; CHEM 1013 is highly recommended. **Antirequisite(s):** Credit can only be obtained for one of BIOL 2053, BIOL 2253, or BIOL 2453.

Course Textbook

MICROBIOLOGY with Diseases by Body System, 5th edition, Robert Bauman (ISBN-13: 9780135891018)

Supplemental Textbook

Prescott's Microbiology, 11 or 12th edition, Willey JM, Sherwood LM, Woolverton CJ, McGraw-Hill

Student Learning Outcomes

1. Understand the diversity of microbes.
2. Understand the microbial growth and metabolism.
3. Understand the diversity of microbial replication.
4. Understand the immune response to microbes.
5. Understand major mechanisms for anti-microbial drugs.

How to Meet the Learning Outcomes

1. Come to lectures on a regular basis, take notes, and ask for clarification when something is unclear.
2. Take part in weekly class activities. These will give you insight as to how well you understand the information being presented. A phone, tablet or laptop will be needed for class activities to measure understanding/retention weekly.
3. Access the course Moodle page each week. Lecture images, course outline and contact info will be available on Moodle (https://moodle.acadiau.ca).

4. Reading the textbook each week.
5. Study on a regular basis (for each hour of lecture students should be spending 1-3 h studying, on a regular basis).
6. Complete tests (2 tests, 1 final exam) and practice quizzes.

Part 2: Course Plan

Note: The instructor reserves the right to amend the course plan with reasonable notice, and in consultation with the class.

Lecture:
Jan 6 – Introduction to microbiology, discussion of course and expectations
Jan 8 – History of microbiology (Ch 1)
Jan 10 – Cell structure and function (Ch 3)
Jan 13 – Cell structure and function (Ch 3)
Jan 15 – Microscopy and staining (Ch 4)
Jan 17 – Microbial metabolism (Ch 5)
Jan 20 – Microbial metabolism (Ch 5)
Jan 22 – Microbial nutrition and growth (Ch 6)
Jan 24 – Microbial nutrition and growth (Ch 6)
Jan 27 – Microbial genetics (Ch 7)
Jan 29 – Microbial genetics (Ch 7)
Jan 31 – Recombinant DNA technology (Ch 8)
Feb 3 – **Test I (material covered in class Jan 6 – Jan 31, 2025, inclusive)**
Feb 5 – Controlling microbial growth in the environment (Ch 9)
Feb 7 – Controlling microbial growth in the body (Ch 10)
Feb 10 – Controlling microbial growth in the body (Ch 10)
Feb 12 – Characterizing and classifying bacteria, eukaryotes, viruses, and prions (Ch 11, 12, & 13)
Feb 14 – Characterizing and classifying bacteria, eukaryotes, viruses, and prions (Ch 11, 12, & 13)
Feb 17 – **Heritage day – No Class**
Feb 19 – **Winter study break – No Class**
Feb 21 – **Winter study break – No Class**
Feb 24 – Infection, Infectious diseases and Epidemiology (Ch 14)
Feb 26 – Immunity (Ch 15 & 16)
Feb 28 – Immunization and immune testing (Ch 17)
Mar 3 – Immunization and immune testing (Ch 17)
Mar 5 – Microbial diseases of the skin and wounds (Ch 19)
Mar 7 – Microbial diseases of the skin and wounds (Ch 19)
Mar 10 – **Test II (material covered in class Feb 5 – Mar 7, 2025, inclusive)**
Mar 12 – Microbial diseases of the nervous system and eyes (Ch 20)
Mar 14 – Microbial diseases of the nervous system and eyes (Ch 20)
Mar 17 – Microbial cardiovascular and systemic diseases (Ch 21)
Mar 19 – Microbial diseases of the respiratory system (Ch 22)
Mar 21 – Microbial diseases of the respiratory system (Ch 22)
Mar 24 – Microbial diseases of the respiratory system (Ch 22)
Mar 26 – Microbial diseases of the respiratory system (Ch 22)
Mar 28 – Microbial diseases of the digestive system (Ch 23)
Mar 31 – Microbial diseases of the digestive system (Ch 23)
Apr 2 – Microbial diseases of the urinary and reproductive systems (Ch 24)
Apr 4 – Microbial diseases of the urinary and reproductive systems (Ch 24)

Part 3: Assessment and Grading

Grading scheme

A+: 90-100	B+: 77-79	C+: 67-69	D+: 57-59	F: <50
A : 85-89	B : 73-76	C : 63-66	D : 53-56	
A-: 80-84	B-: 70-72	C-: 60-62	D-: 50-52	

Part 4: Course Policies

Students need to contact the instructor with a valid reason for missing a test in advance of the test. Students will also need to fill out a Declaration of Cause form to the Registrar. Make-up tests for poor performance, will not be provided as an option. In the event that you have a *valid* excuse for missing either of the tests, the weight from the missed test(s) will be distributed to the final exam. Missed tests without a valid excuse from the registrar will result in a mark of zero. University policies on missing classes, etc. can be found here:

https://registrar.acadiau.ca/RecordsandOtherRequests.html

Attend Class (Lectures)

Students are expected to attend all class sessions as listed above. Studies have shown, that students who take notes by hand (rather than typing on a computer) perform significantly better in their ability to retain information. While you will be using laptops or tablets during lectures, please limit their use to classroom material only. Using them for other purposes (i.e. social media) will negatively impact your ability to learn.

Graded Moodle quizzes

20% of your final mark will be based on your final grade in weekly quizzes in Moodle. These quizzes will help your understanding of concepts. You will be able to re-try the quizzes an unlimited amount of times up until the deadline (approximately 1 week after posted). The highest grade attained will be used. Please note quizzes will occur regularly each week and you will be responsible for completing them on time. A missed quiz will result in a '0'. Once the quiz closes you will not be allowed to submit the quiz, and there will be no make-up for the quizzes unless you have contacted me in advance describing the valid reason for requesting an extension.

BONUS Moodle in-class live quizzes/activities

Participation in in-class live quizzes/**activities** will be recorded and result in a proportion of a bonus mark which will give you up to an additional 3% on your final grade. These live quizzes/**activities** will help your understanding of concepts. Please note **these quizzes/activities may occur** in **any** class. There will be no make-up for the live in-class bonus quizzes/**activities**.

Late assessments

Late assessments of any kind are not accepted after the deadline. A late assessment will result in a grade of '0' unless there is a discussion (in advance of the deadline) with me describing the valid reason for requesting an extension.

Part 5: University Policies

University policies are available in the Acadia University Academic Calendar or through the Registrar's website: https://registrar.acadiau.ca/welcometotheregistrarsoffice.html

Equity, Diversity and Inclusion

Acadia University is committed to becoming a culturally safe and anti-oppressive community. This can only be achieved where there are simultaneous efforts to eliminate all forms of discrimination and harassment from our campus community, including the elimination of all discrimination, harassment and violence based on one's identity, including but not limited to, gender, race, class, ethnicity, sexual orientation, disability, gender identity, gender expression, and Indigeneity. The policy against harassment and discrimination, and resources for students who believe they may have experienced, or witnessed, discrimination or harassment, are available here: https://www2.acadiau.ca/student-life/equity-judicial/equity.html

Last Drop Day

Last day to drop a course and receive a "W". Please check the Acadia University calendar dates, which are available here: https://registrar.acadiau.ca/AcademicCalendars.html

Inform Your Instructor of Accommodations

Acadia University is dedicated to improving access to campus life for all students with disabilities. While we attempt to ensure that all courses are accessible, we recognize that there are barriers that need to be addressed on an individual basis. Students who require accommodations to complete coursework or otherwise fully participate in class should contact Accessible Learning Services directly as soon as possible. https://www2.acadiau.ca/student-life/accessiblelearning.html

The Use of Animals in Teaching and Research

The use of animals in teaching and research at Acadia University is done in accordance with guidelines on the care and use of animals published by the Canadian Council on Animal Care (CCAC). For more information on the CCAC, please visit their website at http://www.ccac.ca

Commitment to Integrity

It is standard practice in Biology to check exams and assignments for cheating and plagiarism. Cheating in the class and/or lab, including plagiarism, will not be tolerated. Please read the appropriate sections of the current Acadia University Academic Calendar: https://registrar.acadiau.ca/AcademicCalendars.html

Information on copy-write and course content from Acadia University is available through the Vaughan Memorial Library: http://libguides.acadiau.ca/c.php?g=433650&p=5027078

The spoken and written course content (including the syllabus, handouts, lectures, presentations, labs, assignments, quizzes, tests, and exams) are the intellectual property of the instructor and may only be copied for personal use. Sharing these materials or uploading them where they may be accessed by others is a violation of copyright. If you wish to make audio, video, or photographic recordings in class, you must first obtain the consent of the instructor and of any other persons (e.g., guest speakers, other students) who may be captured in such recordings. In the case of personal use by students with disabilities, the instructor's consent shall not be unreasonably withheld.

Acadia is a Scent-Free Campus

In consideration of the difficulties that exposure to scented products causes individuals with sensitivities and allergies, all students, faculty, staff, employees of any companies working on university property, visitors, and guests of Acadia University, or of members of the University community are asked to refrain from wearing scented personal care products such as perfumes / aftershave, lotions, hair spray and deodorant. In addition, users of tobacco and cannabis are asked to be aware that odours associated with product use may impact individuals with sensitivities and allergies. Acadia University in consultation with its contracted cleaning staff, have agreed to use products that do not leave residual odors that may cause difficulties for individuals with sensitivities and allergies.

Part 6: Program Learning Outcomes

Foundations of knowledge		Course specific examples	Proficiency 1-Introduction 2-Reinforcement 3-Proficient **NA-not applicable**
Scientific method, inquiry and hypothesis testing	Find, understand and apply information from the literature; understand how to use the scientific method to examine problems from different perspectives	Discuss discovery of penicillin to explain the scientific method.	2
Historical concepts and contributions by important figures	Explain foundational concepts in biology, Two-eyed Seeing, and ethical implications of scientific discoveries	Several foundational discoveries are discussed and their implications for foundational changes made in society and medical practices including scientists known to have historically faced challenges.	2
Biodiversity and ecology	Understand the genetic, taxonomic and ecosystem levels of biodiversity; focus on SW Nova including the Acadian Forest and Bay of Fundy ecosystems	Highlight the biodiversity of microbes with an emphasis on how to identify biodiverse microbes. Biodiversity in structural characteristics, genetic, metabolism and disease are explored.	2
Genetics and evolution	Understand the chemical basis of heredity, genetics and genomics; integrate concepts across disciplines to understand evolution	The role of microbial genetics in pathogenesis and resistance to antibiotics is discussed with an emphasis on operons, mutations and horizontal gene transfer.	2
Human and environmental health	Understand form and function in health and disease within a One Health framework, integrating human and environmental health	Role of microbes as pathogens and impact on health.	2
Lab and field skills			
Experimental design	Gain experience in applying the scientific method	NA	NA
Safety	Work safely and productively in lab and field settings	NA	NA
Lab skills	Gain experience with basic and advanced lab techniques and understand their application in research, health science and industry	NA	NA
Field skills	Gain experience in basic and advanced field skills and understand their application in ecology, conservation biology and environmental change	NA	NA
Data acquisition, analysis and interpretations	Collect data, present results both qualitatively and quantitatively, and interpret outcomes in light of the literature	NA	NA
Statistical analysis	Use R and or other programs to analyze biological data	NA	NA
Professional skills			
Ethical practices	Demonstrate ethical conduct, apply principles of academic integrity and understand the principles of EDI in science	Historically society has not recognized contribution of scientists from underrepresented groups. Several of these figures are highlighted and discussed.	2
Collaboration and group work	Work effectively in groups within and across disciplines	Students work in groups during activities.	2
Critical thinking	Analyze and evaluate information to make science-based decisions	Work through steps to identify a pathogen.	2
Computer proficiency	Use common and discipline- specific software	NA	NA
Scientific communication	Communicate science effectively to both scientific and general audiences	NA	NA