

Department of Biology Course Outline

Introduction to Medical Microbiology BIOL 2905 3.0 Section M Winter 2025

Course Description

Medical microbiology for students interested in nursing and other health fields. This course is an introduction to concepts of medical microbiology, human-microbe interactions, mechanisms of microbial diseases, control of microbial growth, immunology and epidemiology. Three lecture hours. One term. Three credits.

Lectures are in-person. However, some lectures **may** be delivered remotely using Zoom. All lectures are recorded and posted on the eClass page when they become available. **The quality of the recordings cannot be guaranteed though!** If a recording fails or is not possible due to technology problems, human error, or any other reason, the course instructor will not be able to re-record the material. It is expected that students attend the live lectures and participate and that all lectures are watched as **they contain information that may not be covered in reading sources.**

Prerequisites

Prerequisite: At least 30 credits towards a degree program; six credits from the following: SC/BIOL 1000 3.00, SC/BIOL 1001 3.00, SC/BIOL 1010 6.00; SC/NATS 1610 6.00, SC/NATS 1650 6.00, SC/NATS 1660 6.00, SC/NATS 1670 6.00, SC/NATS 1675 6.00, SC/NATS 1680 6.00, HH/KINE 2011 3.00, HH/KINE 2031 3.00; or permission of the instructor. Course credit exclusions: SC/BIOL 2900 3.00, SC/BIOL 3150 3.00 (prior to Fall 2016), or SC/BIOL 3150 4.00. Note: Not eligible for Biology credit towards a Biology or Biochemistry program.

Course Instructors and Contact Information

Course Director: Dr. Nezeka Alli

Email: nezeka3@yorku.ca

Office hours: Thursday, 1:30 PM – 2:30 PM via Zoom (Registration required, see eClass)

Schedule

One three-hour lecture: **Wednesday 2:30 PM – 5:30 PM, LSB 106.**

Evaluation values and dates

COMPONENT	GRADE VAUE	DATE
MIDTERM 1	20%	Feb 5, 2:30 PM – 3:30 PM, Lecture to follow
MIDTERM 2	20%	Mar 12, 2:30 PM – 3:30 PM, Lecture to follow
GROUP ASSIGNMENT/ESSAY(S)/ACTIVITIIES	15%	See eClass
ECLASS QUIZZES AND IN CLASS ACTIVITIES	10%	See eClass
FINAL EXAM	35%	To be determined by the Registrar Office

** Tests include Multiple Choice and Short answer.

Details regarding the midterm/exam format, project components and mini-assignments and activities will be posted on eClass.

***Course Activities (Quizzes, online exercises like Edpuzzles, and any related text book assignments)** are varied and designed to support your learning. If used properly, they can be a significant help to a) keep you on track and up to date with text readings, b) help you understand the material, c) identify what you do not understand, and d) improve your learning. I use evidence-based teaching strategies, which means you do activities that research has shown are effective for improving and supporting your learning.

Online reading quizzes encourage you to do the readings, help you recall what you have read, and prepare you for the week's lectures.

Important Dates

Test Dates are listed under "Evaluation" above.

Assignment specifics and dates will be discussed in class.

The assignment information will be found on the course eClass site under "Assignments".

Classes Start: **Week of January 6**

Last date to drop a course without receiving a grade (also see Financial Deadlines): **March 14**

Course Withdrawal Period (withdraw from a course and receive a grade of "W" on transcript – see note below): **March 15 - April 4**

This part is new "You may withdraw from a course using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as "W". The withdrawal will not affect your grade point average or count towards the credits required for your degree."

Reading Week: **February 15-21 (no classes)**

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at [Undergraduate Fall/Winter 2024-2025 Important Dates | Registrar's Office | York University](#)

Resources

Microbiology Fundamentals: A Clinical Approach by M.K. Cowan and J. Bunn, 4th Edition

Additional readings (e.g. review and primary research articles) will be assigned during the course.

Articles will be available via the instructor or the York libraries. Students are expected to read relevant sections of the text and readings prior to class. Some assignments will also require additional research and reading of scientific literature.

Learning Outcomes

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

- ✓ explain major concepts, methodologies and issues in microbiology, demonstrating detailed knowledge in certain topics (i.e. listed course topics).
- ✓ gather, review, evaluate and interpret microbiology information (in reviews, primary sources and mass media articles).
- ✓ **apply learning from other areas (e.g. biochemistry, genetics) to microbiological problems/situations.**
- ✓ solve basic microbiological problems.
- ✓ analyze microbiological situations/techniques.
- ✓ Predict the outcome of microbiological tests and symptoms.
- ✓ identify problems and suggest possible solutions in terms of microbiology and society.
- ✓ communicate (orally and in writing) microbiological concepts clearly to peers and a scientific audience.
- ✓ Understand microbiological laboratory techniques and procedures with reference use, application, limitations, safety, reliability along with a good understanding of aseptic technique.
- ✓ discuss and debate current issues relating to microbiology.
- ✓ effectively and collegially work with others in the microbiology class setting.
- ✓ Understand the variety of potential employment avenues
- ✓ Understand the methodology, limitations, and application of DNA analysis in a Health Care environment
- ✓ Connect the basic function of the Human immune system to pathogen detection
- ✓ Learn the positive impact of microbes in society and on/in Human physical and mental health
- ✓ Describe the importance of the human microbiome to human health, illustrating key concepts with specific examples.
- ✓ Describe general characteristics of and requirements for microbial growth.
- ✓ Explain and evaluate different modes of controlling microbial growth using physical, chemical and pharmaceutical methods. Identify which form of growth control is most appropriate for a given context.
- ✓ Describe, and illustrate with examples, the biological basis of antibiotic resistance.
- ✓ Discuss the impact of resistance in the medical setting, and potential solutions.
- ✓ Describe how microorganisms infect their host, cause disease and are transmitted, using common human pathogens as examples.
- ✓ Explain what epidemiology is and the role of nurses in the epidemiology of microbial infection.
- ✓ Explain the general principles of innate and adaptive immunity.
- ✓ Use terminology associated with medical microbiology correctly and appropriately in the work environment.
- ✓ For several infectious diseases in humans, identify the pathogen, and in general terms describe its biology, mode of infection and transmission, how it causes disease, symptoms, treatment and prevention.
- ✓ Effectively communicate fundamental microbiological concepts to peers, patients and the general public.
- ✓ Work effectively and collegially with others in the class setting.

Course Content

Planned course topics: May be changed by Course Director

In the context of particular issues/cases/problems, we will explore key aspects of:

- History of microbiology and Biology Background
- Microbe Characteristics
- Cell structure/function of Eukaryotes, Bacteria, and Archaea
- Bacterial growth
- Environmental factors affecting growth of bacteria and archaea
- Immunology basics
- Testing for microbes
- Biopharmaceutical applications and background as applied to microbes
- Hospital versus communities strain and importance
- Mechanism of Antibiotic action and use
- Evolution/systematics/taxonomy of bacteria and archaea
- Genetics/genomics of bacteria and other cell types
- Bacterial regulation/signal transduction (e.g. chemotaxis, quorum sensing)
- Control of bacterial growth
- Human-microbe interactions
- Epidemiology
- Applied microbiology
- Social impact of microbiology
- **All the above will be taught in context with Pathogenicity, various therapies, and benefit of the Human microbiota**

A more detailed Outline can be found on the course Moodle website.

Experiential Education and E-Learning

Students will be expected to search resources in Literature and on the internet to comment/discuss the latest microbiological trends in Healthcare. A guest speaker currently working in Healthcare may address the class to relate real life experience.

Other Information

Some information about BIOL2900 (Microbiology) from the course director.

The main questions driving this course are:

- What do you need to know about microbiology as an upper-year Nursing student?
- What do you need to know about microbiology as an informed citizen?

→ Some notes about this course:

- You'll learn about key issues and concepts in microbiology by dealing with **real world**, current issues/examples.

- The textbook is a good resource to help you learn, but you will need to delve into additional reference sources. (We **won't be** marching linearly through the textbook, by the way. You'll need to use the index and table of contents.)

- Class time should be focused on interesting/complicated/problematic topics, rather than material that is easy to learn (e.g. from reading the text).

- **To deal with complex issues, you will need to be able to apply and integrate information, and use problem-solving skills.**

- I'll happily share the resources I've got, but you'll need to seek, read and understand all resources.

- Please ask me for guidance – I'm here to help you learn. I'll try to highlight what I think students might have trouble with anyhow, but you can (and should) direct me to concepts you find problematic so that we can explore them in class.

- NOTE! Topics can change based on Microbes in the news or if a specific issue has brought up by a student that is relevant to the course - for instance something encountered in your rotations

→ If/when you encounter problematic concepts – you can:

- talk to your fellow students (After class, in eClass, in study groups)
- seek and read additional reference sources

- Ask questions of me in class
- give input in Moodle quizzes/surveys
 - BEWARE of WhatsApp!!

What will we do in class?

Specific examples or issues will be reviewed/discussed in class in the context of real-world problems, news stories, issues and/or recent research reports. Class time will provide an opportunity to discuss and explore aspects of topics that might be more difficult to learn on your own. Thus, it will be most effective if you have read the appropriate portions of the textbook and other recommended references prior to class. Confusing or problematic aspects can be brought up ahead of time or in class. (Mini assignments/activities may be based on these topics, or others.) We may also have some guest experts in some classes.

A few example topics are listed below, with the themes that will be used in understanding and discussing the particular item/issue. **We will look at additional topics, and even the example topics are subject to change.**

Bugs in the news – what are those crazy “germs” up to now?

- Microbiology in the news

Antibiotic resistance – Superbugs (e.g. Vancomycin resistance)

- Cell structure/function

- Evolution

- Genetics

- Control of microbial growth

- Epidemiology

- Microbiology in the news

- Social impact

Cell Structure and Lifestyle

- Cell structure/function

- Growth/environmental factors

- Themes in microbiology

- Humans and pathogenic bacteria (e.g. *S. aureus*)

- Regulation (chemotaxis, quorum sensing)

- Human-microbe interactions including knowledge of the Human immune system and reactivity to invading pathogens from all three Domains.

Course Policies

1. If you miss a test or exam with a legitimate documented reason, you must bring in acceptable documentation **PROMPTLY (within 1 week)!** **Only the current version of the "York Attending Physician's Statement Form"** (can be downloaded as part of the Petitions Package) **OR a similarly detailed** doctor's note (i.e. not a form stating that the student visited a clinic) will be accepted for medical excuses. All documentation supporting your excuse for missing a test must be received by me **within 1 week** of the missed test. **YOU MUST ALSO CONTACT ME ON THE DAY OF THE TEST/EXAM NOTIFYING ME THAT YOU WILL NOT BE ATTENDING – JUST AS YOU WOULD AT A JOB. Your final exam mark will be used for a missed test grade.** If the final is missed, you must write a deferred exam (if granted) as scheduled by the department. Late assignments will be assessed a 10% penalty (of the total grade value) a day for a maximum of 5 days late (including weekends). After that it will not be accepted. **If an extension** has already been granted then late assignments **will not** be accepted after the extended due date. **NOTE! If you miss BOTH tests, you CANNOT write the exam or pass this course.**
2. The tests and final exam will include written questions. If you believe that an answer on a test was marked incorrectly, you must submit your (written) rationale and paper for remarking within 1 week of the test being made available to you (if you completed your test in ink). **Note: *Remarking can result in the mark being raised, confirmed or lowered.***
3. In order to be fair and consistent with regards to the entire class, individual grades are not negotiable. **Contact me about marks ONLY if there is a clear error in your mark** (calculation, clerical, etc.) as soon as possible. It is highly unlikely that you will receive a response regarding any other mark-related queries.

4. Students who do not write the final exam, but have completed all midterms, and project assignments by the scheduled dates, must contact me for permission to write a deferred exam (i.e. sign the Deferred Standing Agreement form). It is Senate Policy that "*Normal requests for deferred standing must be **communicated within one week following a missed examination**, or on the last day to submit course work whichever comes first*". Please check out the Registrar's Office Deferred Standing FAQs: (http://www.registrar.yorku.ca/services/ds_faq.htm) for more details.

Students who have missed one or more of the midterms (or other major components) will likely be required to petition to write a deferred exam. Students who miss both test and the scheduled exam CANNOT pass the course since their evaluation cannot be directly comparable to their peers with respect to a timely examination of the material.

5. Your Exam grade will replace your lowest Test grade. If you miss a test, the exam will replace that missed grade. If you miss both tests, you cannot write the exam or pass this course.

Course Policies – cont'd

E-mail Policy

We will try to respond to email within two working days, but this is not always possible. We may also answer your question in the next class meeting or by course announcement if appropriate.

In order to ensure a prompt, useful response please follow these guidelines:

- Use your @my.yorku.ca email address. Email from other sources may be filtered out and not reach the intended recipient.
- SUBJECT LINE - Include the course code, **course section** and brief indication of topic. Example: BIOL2900A – question regarding final exam.
- Include your **name** and **student number** at the end of each message. Otherwise we don't know who you are and cannot really respond.
- You are in a professional environment – please use full sentences and proper grammar, beginning your message with "Dear ..."
- Most of the answers to your questions are in this syllabus or on the website. Please consult both before emailing biol2900.

What to do for a Missed Midterm Exam

- You must email me **on the day** of missing the test (the sooner the better) to alert me that you were unable to attend.
- You do not need to provide documentation for a missed test although the email (above) is required. Additional documentation is appreciated. **If you miss both tests, you cannot pass the course.**
- If you miss the Exam and then the deferred, you will absolutely require strong supporting documentation to be granted another deferred. Generally, the second deferred is not automatically granted and you MUST petition to write another deferred exam.
- Not all situations can be accommodated - schedule confusion, sleeping in, missing the bus, personal endeavors (including a job), and busy lives are not considered acceptable reasons.

What to do for a Missed Final Exam

- If you miss the final examination, you must submit a Deferred Standing Agreement Form (DSA), together with appropriate documentation (see above section), to the Course Director or the Biology Undergraduate Office. The course director may grant deferred standing or may request that you petition for deferred standing.
- The format of the deferred final exam may be different from the original final exam. It may include an essay, short answer, multiple choice, or a mix of these options.

How to use the Discussion Forum

You are encouraged to participate in the online Moodle forum to discuss course concepts, organize study groups, and ask questions relating to microbiology. Please follow the following code of conduct when using the Moodle forum:

- Check to see if your question has already been posted.
- Use a clear, informative subject line.
- Post only material relevant to BIOL 2900

- Be respectful and professional, following the York University Student Code of Conduct <http://www.yorku.ca/oscr/codeofrr.html> and the Policy on Academic Honesty. Inappropriate posts will be deleted.
- If you notice any inappropriate threads please email biol2900@yorku.ca

Policy for Recording Lectures

Photographs or video recordings of any portion of the lectures (including slides) **are not permitted**. Images and material presented are subject to Canadian copyright law.

Audio recordings are permitted provided they are used **only** as a personal study aid. They may not be sold, passed on to others or posted online. The lectures are the intellectual property of the professor and cannot be distributed without permission. Lectures can only be recorded from your seat.

How to submit a Reappraisal Request

If you believe that a major course evaluation component (test/exam) was graded incorrectly, you may request a grade reappraisal for the work. For reappraisals you must submit a written rationale for the request that is based on academic grounds, together with the material to be regraded, to the Course Director within one week of the material being made available to you. If it is determined that you have provided sufficient academic grounds, the material will be regraded by the instructor.

Note: Regrading can result in the grade being raised, confirmed or lowered.

In order to be fair and consistent with regards to the entire class, individual grades are not negotiable. We cannot provide “extra credit” assignments.

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <http://www.glendon.yorku.ca/counselling/personal.html>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student

Client Services, Student Services Centre or online at
http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf (PDF)

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>