

Some information about BIOL 3150 (Microbiology) from the course director.

The big questions driving this course are:

- What do you need to know about microbiology as an upper-year biology 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 those 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.

If/when you encounter problematic concepts – you can:

- talk to your fellow students (in lab, in Moodle, in study groups)
- seek and read additional reference sources
- talk to me in class
- give input in Moodle quizzes/surveys

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

Square archaea – bugs with an unusual shape and lifestyle

- Cell structure/function
- Growth/environmental factors
- Themes in microbiology

What's in a name? Should we ban the term "prokaryote"?

- Systematics/taxonomy
- Evolution
- Themes in microbiology

Symbioses – examples of bacteria and microbes living together

E.g. One or more of:

Legumes and *Rhizobium*

Squid and bioluminescent *Vibrio fischerii*

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

- Regulation (chemotaxis, quorum sensing)
- Human-microbe interactions
- Evolution

BIOL 3150 4.0 – Microbiology W2010 Course Outline

Calendar description:

Fundamentals of microbiology; microbial organisms; microbe-host interactions; microbial genetics and evolution; microorganisms and human disease; environmental and applied microbiology. Three lecture hours, three lab hours. One term. Four credits. Prerequisites: SC/BIOL 2020 4.00; SC/BIOL2021 4.00; SC/BIOL 2040 4.00. Degree Credit Exclusion: SC/BIOL 3150 3.00.

Learning objectives:

Upon successful completion of BIOL 3150 4.0, students will 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.
- design simple microbiological experiments.
- predict the outcome of microbiological experiments.
- 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.
- carry out microbiological laboratory activities with safety, reliability and a good understanding of aseptic technique.
- discuss and debate current issues relating to microbiology.
- effectively and collegially work with others in the microbiology laboratory and class setting.

Course director:

Dr. Michael Gadsden, Room 3042 Stephen Quinlan Bldg (Seneca@York). Email: mgadsden@yorku.ca, 416-491-5050 ext 3247

Class: Lecture = Tues/Thurs 10 – 11:20 am SLH B

Laboratory:

The laboratory exercises have been designed to support and develop concepts from the lectures, text and related scientific literature. The exercises will also:

- introduce aseptic techniques and basic microbiological methodology,
- provide opportunities to observe and practise microbiological concepts, and determine the importance of microorganisms in the environment, food industry, and in human health.

Please see the lab manual (available in the bookstore) for more details.

Lab director: Amber Couzens (microlab@yorku.ca).

Website: The BIOL 3150 Moodle site will include announcements, course materials, resources and a discussion forum. <http://moodle.yorku.ca> or <https://moodle08.yorku.ca/moodle/>

Text/Readings: Brock Biology of Microorganisms by M.T. Madigan, et al. 12th Edition. Prentice-Hall. (The 11th or 10th Edition is fine.). There will be copies of the text on reserve (2 h) in the Steacie Library. 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.

Evaluation:

Midterm 1: 15% **Feb 2nd**

Midterm 2: 15% **March 11th**

Laboratory: 32% (22% from laboratory submissions/performance; 10% from questions asked on midterms and final exam on lab-related material **)

Project: 13% (will include components)

Final exam: 25%

** Tests include 2 sections: [1] questions for the lecture material [2] lab-related items. Marks from each section will count towards midterm/final lecture marks and laboratory marks respectively.

Details regarding the midterm/exam format, project components and mini-assignments and activities will be provided in class.

Accommodation Statement:

Students who feel that there are extenuating circumstances that may interfere with their ability to successfully complete the course requirements are encouraged to discuss the matter with the Course Director as soon as possible.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods are encouraged to consult with the Office for Persons with Disabilities (OPD) and ensure that requests for appropriate accommodations are arranged with the Course Director early in the term.

Academic integrity:

Students are expected to be familiar with and follow York University's policies regarding academic integrity. Please consult the lab manual and website below for more details:

<http://www.yorku.ca/academicintegrity/students/index.htm>

Student information sheet – please see:

<http://www.yorku.ca/secretariat/senate/committees/ccas/documents/Course%20Outline%20-%20Student%20%20Info%20Sheet%20-%20March%2027-06.htm>

Planned course topics:

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

- History of microbiology
- Themes in microbiology
- Cell structure/function of bacteria and archaea
- Bacterial growth
- Environmental factors affecting growth of bacteria and archaea
- Evolution/systematics/taxonomy of bacteria and archaea
- Genetics/genomics of bacteria
- Bacterial regulation/signal transduction (e.g. chemotaxis, quorum sensing)
- Control of bacterial growth
- Human-microbe interactions
- Epidemiology
- Applied microbiology
- Social impact of microbiology

Policies:

1. If you miss a test with a legitimate documented reason, you must bring in acceptable documentation **PROMPTLY!** Only a "York Attending Physician's Statement Form" (can be downloaded as part of the Petitions Package or obtained from me) 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. Your final exam mark will be used for the missed test grade. If the final is missed, you must write a deferred exam as scheduled by the department.
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, major lab reports 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*". 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 midterms (or other major components) will likely be required to petition to write a deferred exam.