



MICR*2420 Introduction to Microbiology

Winter 2024

Section(s): 01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 4.00 - January 11, 2024

1 Course Details

1.1 Calendar Description

This course will introduce students to the diversity of microorganisms, including, bacteria, viruses, and fungi, and the impact of microbes on everyday life. The interactions of microorganisms with the biotic and abiotic worlds will be discussed. Topics will include the roles of microorganisms in host-pathogen interactions in disease, the beneficial aspects of microorganisms in bioremediation and food production, and their application in biotechnology.

Pre-Requisites: 4.00 credits including (1 of BIOL*1070, BIOL*1080, BIOL*1090, CHEM*1040)

Restrictions: This is a Priority Access Course. Enrolment may be restricted to particular programs, specializations or semester levels during certain periods. Please see the departmental website for more information.

1.2 Course Description

This course will introduce students to the diversity of microorganisms, including, bacteria, viruses, and fungi, and the impact of microbes on everyday life. The interactions of microorganisms with the biotic and abiotic worlds will be discussed. Topics will include the roles of microorganisms in host-pathogen interactions in disease, the beneficial aspects of microorganisms in bioremediation and food production, and their application in biotechnology.

MICR2420 is a restricted course in Winter 2024.

Students that wish to register for MICR2420 in Winter 2024 but are not permitted to self-enroll via Web Advisor need to contact the BSc academic counsellors (bscweb@uoguelph.ca or call 519-824-4120 Ext. 53788) to enquire about the enrolment procedure and restrictions.

Please do not contact a member of the MICR2420 teaching team as they will not sign waivers ; the academic counsellors will handle ALL enrollment matters.

1.3 Timetable

Lectures are in person only: Mon, Wed, Fri from 10:30 - 11:20 AM, in MACN 105.

- No online or hybrid versions of the lectures will be offered.

Labs: Offered by assigned sections from 2:30 - 5:20 PM on Mon OR Tue in SSC 4101 or 4102.

- Please consult WebAdvisor AND CourseLink to confirm your section, schedule and lab location. You HAVE to attend the lab corresponding to the section you registered for.

1.4 Final Exam

In person: 8:30 am April 15, 2024, location TBD.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	George Van der Merwe
Email:	gvanderm@uoguelph.ca
Telephone:	5198244120 ex 54298
Office:	SSC4443

Instructor:	Emma Allen-Vercoe
Email:	eav@uoguelph.ca
Telephone:	5198244120 ex 53366
Office:	SSC3252

Lab Co-ordinator: Catrien Bouwman
Email: cbouwman@uoguelph.ca
Office: SSC 3504

3 Learning Resources

3.1 Required Resources

Microbiology- An Evolving Science (6th edition) (Textbook)

<https://wwnorton.com/books/9781324033523>

Microbiology - An Evolving Science

Sixth Edition

by Joan L Slonczewski (Author, Kenyon College), John W Foster (Author, University of South Alabama), Erik R Zinser

Online subscriptions and hard copies are available through the Campus Bookstore.

This is a required text. We will discuss its use during the first week of class.

If you have an earlier edition of this text book, it should still serve you well.

3.2 Recommended Resources

A Student Handbook for Writing in Biology by Karin Knisely (Textbook)

Sixth Edition (earlier edition is fine)

Optional but highly recommended for students continuing in the Biological Sciences.

3.3 Campus Resources

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: <http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

If you are concerned about any aspect of your academic program:

* make an appointment with a program counsellor in your degree program.

<http://www.bsc.uoguelph.ca/index.shtml> or

<https://www.uoguelph.ca/uaic/programcounsellors>

If you are struggling to succeed academically:

* There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <https://www.lib.uoguelph.ca/get-assistance>

If you are struggling with personal or health issues:

The Department of Student Wellness provides support through Accessibility Services, Counselling Services, Health Services, Health & Performance Centre and Wellness Education & Promotion: <https://wellness.uoguelph.ca/sws/>

* For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

If you have a documented disability or think you may have a disability:

* Student Accessibility Services (SAS) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see: <https://www.uoguelph.ca/accessibility>

4 Learning Outcomes

Course Goals

This course serves as the foundation of the Microbiology program. It is designed to capture your interest by introducing you to the relevance of Microbiology in everyday life, discussing the global impact of microbes, and by providing an opportunity for hands-on experience with microbes in a laboratory setting. The course learning outcomes and the specific conceptual details associated with those outcomes (in bullet point) are listed below. Specific LOs and concepts will be identified at the beginning of each lecture and collectively will be assessed through the various graded components of the course. The list may be updated periodically during the semester, through deletion or addition, depending upon the pace and depth of coverage of a given topic. Course readings, class discussions and group work will also further develop the broader MCB Program Learning Outcomes (MCB Learning Outcomes) and the University of Guelph learning outcomes (UofG Learning Outcomes).

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. By the end of the course, successful students will
 - Appreciate the roles of cells as the fundamental unit of life and the essential roles of the microbes in the biosphere, biotechnology, the food industry and health and

disease

2. By the end of the course, successful students will

- Demonstrate an understanding of how cells, organelles and all major metabolic pathways evolved from early prokaryotic cells, the differences between the cellular microbes and the viruses and how the evolutionary history and relatedness of cellular life is depicted in the Universal tree of Life

3. By the end of the course, successful students will

- Demonstrate an understanding that the properties and metabolic diversity among eukaryotes, prokaryotes and viruses are a function of the chemical structures of their constituent macromolecules and how their evolutionary history relates to the greater metabolic diversity of the prokaryotes compared to the eukaryotes

4. By the end of the course, successful students will

- Demonstrate an understanding of the interactions of microbes with their environment, and specifically the macromolecular interactions that underlie cellular motility, biofilm formation, quorum sensing, antimicrobial therapy, immune recognition and response, and pathogenesis

5. By the end of the course, successful students will

- Demonstrate an understanding that mutations, recombination and horizontal gene transfer have selected for a huge diversity of microorganisms and the various factors that affect the frequency of genotypes and phenotypes in a population over time

6. By the end of the course, successful students will

- demonstrate an understanding of the scientific method, by describing or assessing the appropriate method of visualization and identification of example microbes, performing experiments using appropriate safety precautions, and microbiological techniques for the isolation, identification and enumeration of representative groups of bacteria using appropriate and accurate mathematical calculations for microbial enumeration and successfully interpreting and communicating scientific

data. Successful students will also have learned key basic bioinformatic skills for the analysis and interpretation of generated data.

5 Teaching and Learning Activities

This course has four main activities:

1. **In-person lectures** will cover specific topics and concepts as outlined in the tentative lecture schedule provided below. Lectures will NOT be recorded and no on-line options are available.

2. Labs exercises will introduce students to basic skills in Microbiology. Labs are offered in SSC4102 and SSC 4101 from 2:30 - 5:20 PM on Mon or Tues. The schedule is as follows:

Sections 0101, 0103, 0105 begin the week of Jan 15/16 2024 - make sure you check your Lab room number.

Sections 0102, 0104, 0106 begin the week of Jan 22/23 2024.

Please consult WebAdvisor for your scheduled lab time and room. The lab has a maximum capacity; please ensure that you attend the lab session you have been assigned (and NOT another). Each section runs labs **every other week** for a total of 5 labs.

3. Students will perform an independent project during the semester that will be examined in the final examination. Details will be provided in class and posted on CourseLink.

4. Assessments will be performed as outlined.

5.1 Lecture

Topics:

The approximate textbook sections are given as a reference to enhance your understanding of the lecture content. No readings from the textbook will be assigned. All information required for the midterms and final exams is taken directly from lectures. This schedule is subject to change.

Lecture	Date	General Topic	
1	January 8	Course Introduction	Dr. van der Merwe
2-3	January 10,12	Short history of Microbiology	Dr. van der Merwe
4	January 15	Microscopy	Dr. van der Merwe
5-6	January 17, 19	Cellular Structures & Functions of Microbes	Dr. van der Merwe
7-11	January 22 - 31	Microbial Diversity	Dr. van der Merwe
12-13	February 2, 5	Microbial Growth & Culture	Dr. van der Merwe
14 - 15	February 7, 9	Metabolic Diversity	Dr. van der Merwe
16-17	February 12, 14	Microbes & Biotechnology	Dr. van der Merwe
18	February 16	Midterm Exam (In Class; MACN 105)	Dr. van der Merwe
	February 19 - 2	Winter break (reading week; no classes)	
19-22	February 26 - March 4	Microbiomes	Dr. Allen-Vercoe
23-25	March 6 - 11	Microbes and the Immune System	Dr. Allen-Vercoe
26-28	March 13 - 18	Infection control, antimicrobials and the antimicrobial resistance crisis	Dr. Allen-Vercoe
29	March 20	Vaccination	Dr. Allen-Vercoe

30	March 22	Bacterial pathogens of note I: Enterohemorrhagic <i>E. coli</i>	Dr. Allen-Vercoe
31	March 25	Bacterial pathogens of note II: <i>Mycobacterium tuberculosis</i>	Dr. Allen-Vercoe
32	March 27	Fungal pathogens of note I: <i>Candida auris</i>	Dr. Allen-Vercoe
33	March 29	Fungal pathogens of note II: <i>Aspergillus fumigatus</i>	Dr. Allen-Vercoe
34	April 1	Viral pathogens of note I: SARS-CoV2	Dr. Allen-Vercoe
35	April 3	Viral pathogens of note II: HIV	Dr. Allen-Vercoe
36	April 5	TBD	Dr. Allen-Vercoe
	April 15	Final Exam (Comprehensive; covers ALL	
	Location TBD;	lecture material AND the Independent	
	in person	Assignment)	

5.2 Lab

Topics: Course Undergraduate Research Experience

Labs exercises will introduce students to basic skills in Microbiology. Labs are offered in SSC4102 and SSC 4101 from 2:30 - 5:20 PM on Mon or Tues. The schedule is as follows:

Sections 0101, 0103, 0105 begin the week of Jan 15/16 - make sure you check your Lab room number.

Sections 0102, 0104, 0106 begin the week of Jan 22/23

Please confirm your lab section, dates and location by consulting WebAdvisor and CourseLink. The lab has a maximum capacity; please ensure that you attend the lab session you have been assigned (and NOT another). Each section runs labs **every other week** for a total of 5 labs.

Bring your lab coat, a permanent ink marker, notebook, and writing utensils to each lab. The lab manual and other lab resources are posted on CourseLink, along with 5 **Pre-Lab** quizzes (worth 1% each). A laptop will be required for Lab 5. Labs will focus on completing a short research project and will include techniques such as streak plating, spread plating, bacterial enumeration, microscopy, Gram staining, PCR, and sequence analysis. There are five Lab Writing Assignments to be completed and submitted to Dropbox, which uses Turnitin plagiarism software. Due dates for Lab Assignments are posted on CourseLink - each assignment is due at 2:30pm one week after each lab.

Labs may be subject to change in extenuating circumstances.

5.3 Method of Presentation

This course is designed to capture students' attention and interest; in the event of further lockdown measures online classroom teaching will be interactive wherever possible, and centered on microbiology as it pertains to everyday life, current affairs and news items.

In-person and Online Behaviour:

Inappropriate behaviour will not be tolerated. Examples of inappropriate behaviour include:

- Posting or stating inflammatory messages about your instructor or fellow students
- Using obscene or offensive language
- Copying or presenting someone else's work as your own
- Adapting information from the Internet without using proper citations or references
- Buying or selling term papers or assignments
- Posting or selling course materials to course notes websites
- Having someone else complete your quiz or completing a quiz for/with another student
- Stating false claims about lost quiz answers or other assignment submissions
- Threatening or harassing a student or instructor
- Discriminating against fellow students, instructors and/or TAs
- Using the course website to promote profit-driven products or services
- Attempting to compromise the security or functionality of the learning management system
- Sharing your user name and password
- Recording lectures without the permission of the instructor

ACADEMIC INTEGRITY

The University of Guelph is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards and must abide by the applicable policies (see Section VIII of the Undergraduate Calendar on "Academic Misconduct").

Final Exam will be in person.

If Covid measures cause a shift to online learning, Respondus with Lockdown Browser and Monitor may be used for Exams in this course.

For educational purposes, instructors impose conditions on assignments that may limit students' permission to collaborate with others or to utilize external sources (including, but not limited to, software, data, images, text, etc.). The use of **Chegg and such like websites is not allowed**. Any permitted utilization must be done with proper references. Instructors may use automated tools: such as **Turnitin** to detect possible cases of plagiarism.

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Midterm	30
Lab	25
Final Exam	45
Total	100

6.2 Assessment Details

Midterm (30%)

Date: Fri, Feb 16, 10:30 AM - 11:20 AM, In Person; MACN 105

The midterm will be administered in person during class time (10:30 AM -11:20 AM; MACN 105) on February 16th and will be composed of multiple-choice questions.

SAS students have to contact the SAS Exam Centre to make reservations for both the Midterm and Final Examinations. This is entirely the student's responsibility and NOT that of the teaching team. There is a deadline for these reservations; please ensure this is completed well in advance of the deadline.

Please note there will **be no make-up** midterms; it will not be possible to reschedule the midterm because of illness or any other absence. Should you miss the midterm for whatever reason, the midterm weighting will automatically be moved to the final exam.

Lab (25%)

Date: , SSC 4101/2

5% - Pre-lab quizzes (5 quizzes worth 1% each, due before each Lab period)

5% - Lab Assignment 1 - due one week after Lab 1

2% - Lab Assignment 2 - due one week after Lab 2

4% - Lab Assignment 3 - due one week after Lab 3

3% - Lab Assignment 4 - due one week after Lab 4

6% - Lab Assignment 5 - due one week after Lab 5

Final Exam (45%)

Date: In Person

The final examination is compulsory and will be comprehensive thereby covering ALL lecture materials BEFORE & AFTER the midterm. Although some lecture and lab content overlap, the final exam will focus on lecture material and **exclude** lab-specific content. In addition, an **independent course assignment will be provided during the first week of class**. This assignment will be examined during the final exam (details provided on CourseLink). There will not be options to reschedule or write the final exam on an alternative date; any requests will be processed as deferred exams as per University policy.

Format examples include: Multiple Choice, True/False, Matching, Fill-in-the-blank, and Short Answer Questions.

7 Course Statements

7.1 Instructor Policies

Grading

1. Lab Writing Assignments - submit via Dropbox before due dates indicated in CourseLink (as a .docx file - you are responsible for ensuring files are formatted correctly). All reports will be subjected to the anti-plagiarism software Turnitin. Reports are to be written independently, and without the use of AI, including ChatGPT. Requests for Lab assignment regrades must be submitted to the lab coordinator (Catrien Bouwman - cbouwman@uoguelph.ca) no later than one week after receiving your grade. The coordinator will regrade the assignment, and the grade may go up or down. For ALL assignments, deductions for late submissions will be 10% per day (the weekend will cost a 20% grade reduction), up to a 30% deduction. After 3 days, the submission will not be accepted. Extensions may be granted on a case by case basis due to illness or other unforeseen events - extensions must be requested before the due date by emailing Catrien Bouwman (cbouwman@uoguelph.ca). Please see CourseLink for more details.

2. Pre-Lab quizzes to be completed online prior to each lab as per posted dates & instructions on CourseLink. Please contact the lab coordinator if you have valid grounds for being unable to complete one or more of these. See below for information on academic consideration.

E-mails

1. Please direct all emails related to lecture material to the relevant instructor. Include the course number (MICR*2420) in the subject line and use proper email format in a clear and concise communication. Consider posting general questions to the CourseLink discussion board, so that all students may benefit from the answer. Questions posted on CourseLink will be given priority for answering over individual emails.

2. Student inquiries will **only** be answered during the working week. Please be courteous: before asking a question, check to see whether the answer you seek is easily available on CourseLink/in the lab manual/other provided course information. Please also use relevant discussion boards as your peers may also be able to help.

Student responsibilities

1. Respectfulness: students are expected to treat classmates, the instructors and teaching staff with respect at all times.

2. Attendance and participation in the scheduled labs are **mandatory**; lab results from each week directly impact the experiments for the following week. Repeated absence from scheduled laboratories and/or failure to hand in lab assignments will result in being given an “Incomplete” grade for the course at the end of the semester. Credit for the course can then only be obtained by repeating the laboratory component of the course in a future semester.

If you cannot complete the online quizzes or Lab Assignment by the posted date please e-mail Catrien Bouwman asap (and before the due date) about making other arrangements.

3. Laboratory preparedness: you *must have read the relevant assigned laboratory exercise in advance of the lab*, and completed the associated online pre-lab quiz.

8 Department of Molecular and Cellular Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.
<http://www.selfregulationskills.ca/>

8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.
(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

9.9 Illness

Medical notes will not normally be required for singular instances of academic consideration,

although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).
