



MICR*2420 Introduction to Microbiology

Summer 2021

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 3.00 - June 01, 2021

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 be offered in an alternate format for Summer 2021. Students require a computer and internet connection to complete the coursework, and do not have to visit campus for any reason.

1.3 Timetable

Lectures: Online, posted Monday / Wednesday / Friday by 11:30 AM - See CourseLink for more details.

Labs: Online, starting the week of May 11 -- See CourseLink for more details.

1.4 Final Exam

June 30 11:30 AM - 1:30 PM - Remote

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Colin Cooper Dr.
Email:	micr2420@uoguelph.ca
Office:	Virtual
Lab Co-ordinator:	Rohan Van Twest
Email:	rvantwes@uoguelph.ca
Office:	Virtual

3 Learning Resources

3.1 Required Resources

Computer with internet access (Equipment)

A computer with internet access and a webcam are required for the course. Testing will be conducted online with Respondus Lockdown software.

Labratory Manual (Other)

Available on CourseLink

Courselink (Website)

The course website will be used extensively and will include all relevant course materials, discussion boards, links for additional readings & a course calendar.

3.2 Recommended Resources

Microbiology an Evolving Science (Textbook)

<https://wnorton.com/books/9780393419962>

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

Fifth Edition

Highly recommended

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. <http://www.learningcommons.uoguelph.ca/>

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.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 a remote 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. 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. • 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. • 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. • 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. • 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. **SCIENTIFIC METHOD** By the end of the course, successful students will:
 - Describe or assess the appropriate method of visualization and identification of example microbes

- Describe experiments using appropriate safety precautions, and microbiological techniques for the isolation, identification and enumeration of representative groups of bacteria, archaea and fungi
- Use appropriate and accurate mathematical calculations for microbial enumeration
- Successfully interpret and communicate scientific data

5 Teaching and Learning Activities

These **lectures** are virtual (online) approximate dates and are subject to minor alteration.

Please see CourseLink for more details.

5.1 Lecture

Topics:	Lecture	
<u>Lecture #</u>	<u>Topic</u>	<u>Textbook chapters & sections</u>
1-2	Introduction. Relevance of Microbes in society, health, industry, tree of life	Ch. 1
3	Microscopy	Ch. 2
4-6	Specific characteristics of bacteria, archaea. Comparison to eukaryotic microbes.	Ch. 3, 4 & 5
6-7	Viruses, bacteriophages. Size/structure, unique properties, how they grow	Ch. 6
9-11	Applied microbiology: bioremediation, biocontrol, vaccines, antibiotics &	Ch. 10, Ch. 15, Sec. 19.5

antibiotic resistance

12-13	Microbial Associations – biofilms, quorum sensing, symbioses, human microflora	Sec. 4.1, 4.2/12.7, 10.2
14-17	Microbes in health and disease - innate vs. acquired immunity, Koch's postulates, characteristics of a pathogen, select infectious diseases – diagnosis, treatment, control, resistance	Select Sections & subsections from Ch. 16-27
Final		Final Exam (Cumulative)

5.2 Lab

Topics: Labs

<u>Week</u>	<u>Lab Topic</u>	<u>Readings</u>
1	Rules & regulations, biosafety; aseptic techniques, streak plate isolation, brightfield microscopy, yeast cellular morphology, Gram's stain	Week 1
2	Culturing microorganisms, preparation of tryptic soy agar (TSA), direct isolation with selective and differential media, enrichment and isolation of <i>Halobacterium</i> , efficacy testing of hand washing & alcohol-based gel disinfection of hands	Week 2
3	Pour plate count, enrichment and isolation of bacteriophage from soil	Week 3
4	Bioluminescence of <i>Aliivibrio fischeri</i> , bacterial swimming and swarming motility, complete <i>Halobacterium</i> isolation	Week 4

5.3 Method of Presentation

This course is designed to capture students' attention and interest; as such teaching will be interactive wherever possible, and centered on microbiology as it pertains to everyday life, current affairs and news items. The lab component consists of videos, movie & still images of lab techniques and results. Classes will include Powerpoint slides, and recorded lectures.

5.4 Important Dates

Midterm exam - in class - June 4

Final exam - in class - June 30

Please see CourseLink for more details

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
PeerWise	5
Midterm	25
Lab	20
Final Exam	40
Independent Study Assignment	10
Total	100

6.2 Assessment Details

PeerWise (5%)

Learning Outcome: 1, 2, 3, 4, 5, 6
See CourseLink for more details.

Independent Study Assignment (ISA) (10%)

Learning Outcome: 1, 2, 3, 4, 6
See CourseLink for more details.

Note: Written assignments will be monitored with anti-plagiarism software.

Midterm (25%)

Date: June 4 11:30 AM to 1:00 PM, Online

Learning Outcome: 1, 2, 3, 4, 6

See CourseLink for more details.

Lab (20%)

Learning Outcome: 1, 4, 6

Lab data sheets for each of the 4 labs are written up and submitted

- 5% pre-lab online quizzes
- 5% lab quizzes
- 10% lab exercises
- See CourseLink for more details

Final Exam (40%)

Date: June 30 11:30 AM to 1:30 PM, Online

Learning Outcome: 1, 2, 3, 4, 5, 6

Remote. See CourseLink for more details.

7 Course Statements

7.1 Instructor Policies

Grading

1. Midterm - Covering the first half of the course.
2. Assignments/reports - lab reports are due on the TBD due date; the time for submission of other assignments will be announced. For ALL assignments/reports, 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.
3. Quizzes - Lab quizzes are written at dates TBD; please contact the demonstrator if you have valid grounds for being unable to complete one or more of these – you may be able to write the quiz later, or simply drop that particular quiz from the lab quiz grade – however this requires documentation. Case study quizzes are on dates TBD; please contact the instructor if you have valid grounds for academic consideration.

Please see CourseLink for more details.

E-mails

1. Student inquiries will not be answered on nights, weekends or holidays. In addition, e-mail inquiries for which the answer is easily available by checking the lab manual, course outline or other information on the CourseLink site may not be answered at all.
2. Student e-mails to the instructor should be respectful, and ending with your name as it is show in WebAdvisor (no nicknames please). Use only your @uoguelph.ca account for correspondence.

Student responsibilities

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

7.2 Recording of Lecture Materials

By enrolling in a course, unless explicitly stated and brought forward to their instructor, it is assumed that students agree to the possibility of being recorded during lecture, seminar or other "live" course activities, whether delivery is in-class or online/remote.

If a student prefers not to be distinguishable during a recording, they may:

1. turn off their camera
2. mute their microphone
3. edit their name (e.g., initials only) upon entry to each session
4. use the chat function to pose questions.

Students who express to their instructor that they, or a reference to their name or person, do not wish to be recorded may discuss possible alternatives or accommodations with their instructor.

7.3 Online Behaviour

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

- Posting inflammatory messages about your instructor or fellow students
- Using obscene or offensive language online
- 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 online
- 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

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>)

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 book their exams at least 7 days in advance and not later than the 40th Class Day.

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 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

9.10 Illness

The University will not normally require verification of illness (doctor's notes) for fall 2020 or

winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.
