



# MICR\*2420 Introduction to Microbiology

Summer 2023

Section(s): 01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - May 09, 2023

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## 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 conducted with in-person lectures and labs.

### 1.3 Timetable

**Lectures:** In-person (RICH 2529) Monday / Wednesday / Friday 11:30 AM - 1:20 PM - See CourseLink and WebAdvisor for more details. First class May 12th.

**Labs:** Starting the week of May 15th -- See CourseLink for more details.

### 1.4 Final Exam

Wednesday June 28, 2023, 11:30 AM - 1:30 PM, RICH 2529

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## 2 Instructional Support

### 2.1 Instructional Support Team

<b>Instructor:</b>	Georgina Cox
<b>Email:</b>	micr2420@uoguelph.ca
<b>Office:</b>	SSC4244
<b>Office Hours:</b>	After each class until 2 PM.
<b>Instructor:</b>	Colin Cooper
<b>Email:</b>	micr2420@uoguelph.ca
<b>Office:</b>	SSC3502
<b>Office Hours:</b>	By Appointment
<b>Lab Co-ordinator:</b>	Catrien Bouwman
<b>Email:</b>	cbouwman@uoguelph.ca
<b>Telephone:</b>	519-824-4120 x52533
<b>Office:</b>	SSC3504
<b>Office Hours:</b>	By appointment

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## 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 ideally be conducted In-person; however, this is subject to change based on University policy. A laptop or tablet will be required for Lab 5 (one per partner is also fine). Please contact the Course Coordinator (Catrien) if you have any question about this.

#### Laboratory Manual (Other)

Available on CourseLink

#### MICROBIOLOGY: CANADIAN EDITION (Textbook)

<https://ecampusontario.pressbooks.pub/microbio/front-matter/preface/>

A free e-textbook developed by U of Guelph Instructor Dr. Wendy Keenleyside.

### 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

Optional

**A Student Handbook for Writing in Biology (Textbook)**

Karin Knisely [Author]

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. <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>

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## 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

Lectures and labs will be held in-person unless University policy changes.

### 5.1 Lecture

**Topics:** Lectures - A rough outline and schedule that is subject to change

<b>Lecture #</b>	<b>Topic</b>	<b>Instructor</b>
1 (May 12th)	Course Introduction	G COX
2 (May 15th)	A short history of Microbiology	G COX
3 (May 17th)	Microscopy & Modern Microbiology	G COX
4 (May 19th)	Cellular Structures and Functions of Bacteria and Archaea	G COX

5 (May 24th)	Microbial Ecology	G COX
6 (May 26th)	Bacterial Growth & Culture	G COX
7 (May 29th)	Biofilms, cell differentiation & environmental influences	G COX
8 (May 31st)	Metabolic Diversity	G COX
Midterm (June 2nd)	MIDTERM EXAMINATION - Covering Lectures 1-8	G COX
9 (June 5th)	Microbial Diversity, Archaea & Eukaryotes	C COOPER
10 (June 7th)	Viruses - Classification and characteristics	C COOPER
11 (June 9th)	Immunology	C COOPER
12 (June 12th)	Microbes in Health & Disease (Bacterial & Viral pathogens)	C COOPER
13 (June 14th)	Vaccines, Antibiotics, & Antimicrobial Resistance	C COOPER
14 (June 16th)	Microbiota	C COOPER
15 (June 19th)	Microbes in the Food and Beverage Industry	C COOPER
16 (June 21st)	Soil Microbiology & Bioremediation	C COOPER
Final Exam (June 28)	Covering Lectures 9-16	C COOPER

## 5.2 Lab

**Topics:**

**Labs**

**References:**

Labs begin May 17/18, there will be 5 weeks of lab. Bring your lab coat, notebook, and writing utensils. Labs will focus on completing a short research project and will include techniques such as streak plating, bacterial enumeration, microscopy, Gram staining, PCR, and sequence analysis. This will be subject to change in extenuating circumstances.

**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.

**5.4 Important Dates**

Midterm exam - in class - June 2 (Lectures 1-8)

Final exam - June 28, 11:30 AM - 1:30 PM, RICH 2529 (Lectures 9-16)

**Please see CourseLink for more details**

**6 Assessments****6.1 Marking Schemes & Distributions**

Name	Scheme A (%)
Independent Study Assignment (ISA)	13
Midterm	30
Lab	27
Final Exam	30
Total	100

**6.2 Assessment Details****Independent Study Assignment (ISA) (13%)**

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

A short written description of an assigned microbe.

See CourseLink for more details.

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

**Midterm (30%)**

**Date:** June 2 11:30 AM to 1:00 PM, In-Class

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

Lectures 1-8

See CourseLink for more details.

**Lab (27%)**

**Learning Outcome:** 1, 4, 6

Lab Assessments worth 27% of Final grade, breakdown is as follows:

Lab Quizzes: 5 quizzes worth 1% each (5% total)

**Lab Reports:**

Lab Report 1 worth 5%

Lab Report 2 worth 7%

Lab Report 3 worth 10%

**Final Exam (30%)**

**Date:** June 28 11:30 AM to 1:30 PM, RICH 2529

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

Lectures 9-16

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## 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 dates provided in Courselink; 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 due on the dates provided in Courselink; 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.

Online lecture quizzes will be available on Courselink at the end of each week starting May



19th. You will have 1 week to complete each quiz and there will NOT be an opportunity to complete these at a later date.

Assessments will be submitted electronically via Dropbox on Courselink, and will be subjected to the anti-plagiarism software Turnitin. Reports are to be written independently, without the use of AI, including ChatGPT. Requests for Lab report regrades must be submitted to the course coordinator no later than one week after receiving your grade. The coordinator will regrade the report, and the grade may go up or down.

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.
2. Unless otherwise stated, students must complete all assessments individually. For example, lab partners may work together in the lab room to accomplish hands-on experiments, but students must work individually on lab quizzes and lab reports.

## **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>)

## 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 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. 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

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).

## 9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

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