



# MICR\*2430 Methods in Microbial Culture and Physiology

Winter 2019

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - December 17, 2018

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## 1 Course Details

### 1.1 Calendar Description

This course uses a hands-on approach to investigate microbial growth and factors that impact growth and the interactions of microbes with biotic and abiotic environments. This course will explore the ecological diversity of microorganisms of selected environments. Students will develop a wide range of microbiology-related laboratory skills.

**Pre-Requisite(s):**

MICR\*2420

**Restriction(s):**

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 Timetable

- Seminars Tues. 11:30 - 12:50 pm, MAC149
- Labs Wed., Thurs. & Fri. 2:30-5:30 pm, SSC4102
  - Labs begin Jan. 9-11

### 1.3 Final Exam

Date, time and location TBA. Please see WebAdvisor for the latest information.

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## 2 Instructional Support

## 2.1 Instructional Support Team

**Instructor:** Dr. Wendy J Keenleyside  
**Email:** wkeenley@uoguelph.ca  
**Office:** SC1 3506

**Office Hours:**

- Group office hours – tba.
- Included in topics for discussion in these office hours (in addition to course concepts):
  - Strategies for deeper learning
  - More effective studying
  - Reading for comprehension
  - Team skills – these will be particularly useful during the case study
- Individual meetings by appointment
- Online through courselink chat function prior to midterm and final exam

**Lab Co-ordinator:** Rohan Van Twest  
**Email:** rvantwes@uoguelph.ca  
**Office:** SC1 4113

## 2.2 Teaching Assistant(s)

**Teaching Assistant:** Joshua Chun  
**Email:** jchun01@uoguelph.ca

**Teaching Assistant:** Victoria Petruccelli  
**Email:** petruccv@uoguelph.ca

**Teaching Assistant:** Avery Robinson  
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**Teaching Assistant:** Laura Seidel  
**Email:** seidell@uoguelph.ca

**Teaching Assistant:** Jacob Wilde  
**Email:** jwilde@uoguelph.ca

**Teaching Assistant:** Madison Wright  
**Email:** mwrigh09@uoguelph.ca

## 3 Learning Resources

### 3.1 Required Resource(s)

**Microbiology: Canadian Edition (Textbook)**

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

- By Keenleyside *et al.*, 2019. Adapted from Microbiology by OpenStax
- This is an Open Education Resource (OER). The electronic version is free. Students who wish to have a hard copy may speak to Dr. Keenleyside about how to order a printed version.

**Laboratory Manual (Lab Manual)**

CASH ONLY - exact change please!

Available for purchase in SSC 2302 the following days and times:

- Monday, Jan. 7: 9:30am – 11:30am & 1pm – 3pm
- Tuesday, Jan. 8: 9:30am – 11:30am & 1pm – 3pm
- Wednesday, Jan. 9: 9:30am – 11:30am & 1pm – 3pm

If you miss these deadlines, the price increases and purchase must be made from the MCB admin. suite - ***see e-mail or poster for details.***

**Courselink (Website)**

The course website will be used extensively and will include all relevant course materials, including lecture videos, online quizzes, discussion boards, group lockers, links for additional readings, group drop boxes and a course calendar will provide all relevant information on due dates.

**Lab schedule & Information Handout (Notes)**

Detailed, colour-coded breakdown of weekly lab and case study activities, due dates, marking schemes, (specifically for the case study). This will also be posted.

**REEF Polling (Equipment)**

You will be required to purchase a subscription to REEF Polling by iclicker, to allow participation in class polling. This cloud-based platform allows you to use your laptop or digital device to respond to MCQs, short answer or targeting questions. The subscription is purchased from the Bookstore. Hand-held iClickers will NOT be used.

**PEARTool (Website)**

<https://www.uoguelph.ca/peartool/user/signon.cfm?destination=index%2Ecfm>

This is an Open Education Resource (OER). It is a UofG online platform for Peer Evaluation, Assessment and Review. This will be used for the peer evaluation component of the Case Study Ch. 2 concept questions, and for the final anonymous evaluation of the distribution of effort among team members.

**PeerWise (Website)**

<https://peerwise.cs.auckland.ac.nz/docs/>

This is also an OER. It is a platform for online tool for authoring, answering, commenting on and rating student-authored multiple-choice questions. A site for MICR\*2430 W19 will be set up and the class list imported as soon as the add deadline has passed. You will need to create an account (assuming you have not used the tool before) and then select the course. The tool is simple to use but instructions for creating, and for answering, questions, are provided in text as well as video on the PeerWise site and criteria for high quality MCQs will be discussed in class. Any good quality, higher level questions, will be considered for inclusion in the midterm and final exams, with no upper limit! So you will derive double benefits from authoring and answering/providing feedback on, other questions: you will be learning as you do both, and you raise the likelihood that you will know some questions AND THEIR ANSWERS on the midterm and final exam! Participation can also be used to make up for missed REEF polling and seminar reading quizzes, to a limit.

### 3.2 Recommended Resource(s)

#### Team Outlook Calendars (Other)

Once case study teams have been created, members are encouraged to establish a shared team calendar to ensure all established and internally-agreed upon deadlines and meeting dates are readily accessible.

## 4 Learning Outcomes

The learning outcomes for this course are listed below; these will be assessed through the various graded components of the course. All of the learning outcomes will be taught, modelled and assessed. The material in this course will also further develop the broader MCB Program Learning Outcomes (including Problem solving & Critical thinking, Communication, Professional & Ethical behaviour) and the University of Guelph learning outcomes (including Critical & Creative Thinking, Literacy, Communicating & Professional & Ethical Behaviour). Note that the case study that is introduced in the lab, and on which you will work in teams, over the second half of the semester, will simultaneously cover a majority of the LOs as well as the broader MCB & UofG LOs.

### 4.1 Course Learning Outcomes

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

1. Demonstrate an understanding that chemical transformations of biological molecules are catalyzed by enzymes organized in metabolic pathways, and that these pathways are regulated
2. Understand and appreciate the metabolic diversity among eukaryotes, prokaryotes and archaea
3. Be able to describe how thermodynamically unfavourable processes occur
4. Understand that the properties of cells are a function of the chemical structures of their constituent macromolecules and be able to describe some of the macromolecular interactions essential to cell function
5. Appreciate the roles of cells as the fundamental unit of life and the role of the

prokaryotes in the evolution of eukaryotic cells, their organelles, and the major metabolic pathways

6. Demonstrate an understanding of communication within and between cells and their environment
7. Demonstrate an understanding of the molecular structure, function and regulation of genes and genomes and be able to explain, with examples, how environmental factors may affect the frequency of genotypes and phenotypes in a population
8. Successfully design and explain experiments for the isolation, identification and enumeration of microbes or assess such proposals
9. Perform experiments using appropriate safety precautions, and microbiological techniques for the isolation, identification and enumeration of representative groups of bacteria and fungi
10. Use appropriate and accurate mathematical calculations and statistical analyses and assess the reliability of data using biological and technical replicates
11. Successfully interpret and communicate scientific data in laboratory reports, group assignments and tests
12. Through open and regular communication between team members, learn to become an effective research team, understand the essential difference between a group and a team, and further develop team skills
13. Demonstrate a good work ethic by setting goals, meeting deadlines and working cooperatively and responsibly with team members

## 5 Teaching and Learning Activities

### 5.1 Seminars

Seminar #	Seminar Topic # and description	Readings
S1-S2 (Jan. 8-15)	Introduction to course format, goals & expectations  1. Cellular composition and nutrition:	<b>Miyatsu <i>et al.</i> 2018. Microbiology: Canadian Edition</b> Ch. 7 & Sec. 9.3 & lab manual

	<p>molecular composition of bacterial cells; macronutrients, micronutrients, growth factors; growth media, oligotrophy vs copiotrophy, diazotrophy</p>	
<p>S2-S3 (Jan. 15-22)</p>	<p>2. Microbial growth and enumeration: batch culture &amp; growth curve; continuous culture; cellular enumeration methods</p>	<p><b>Microbiology</b> Sec. 9.1 &amp; lab manual</p>
<p>S3-S4 (Jan. 22-29)</p>	<p>3. The cell membrane and transport: fluid mosaic membrane; diffusion, primary and secondary transport systems</p>	<p><b>Microbiology</b> Sec. 3.3 &amp; lab manual</p>
<p>S4-S5 (Jan. 29-Feb. 5)</p>	<p>4. Environmental influences on microbial growth: temperature, water activity and salt, pH,</p>	<p><b>Microbiology</b> Sec. 7.3-7.4 &amp; 9.4-9.7 &amp; Ch. 14</p>

	oxygen	
S6 Feb. 12	2-stage midterm  ~15 min. discussion on learning teams & the “Team Charter” follows	
Feb. 18- 22	BREAK WEEK	NO SEMINARS
S7 – S10 (Feb. 26-Mar. 5, 12)	5. The biochemistry of catabolism: review of energy and entropy, energy carriers; electron transfer, energy acquisition in bacteria and archaea	<b>Microbiology</b> Sec. 8.1-8.5 & Case Study
S10 - S12 (Mar. 19, 26, Apr. 2)	6. Microbial diversity and ecology: microbes in ecosystems, biogeochemical cycling	<b>Microbiology</b> Sec. 8.6-8.7, & Sec. 10.1, 10.3 & 10.6

- These are approximate dates and subject to minor alteration

- 2-Stage Midterm: Individual (shortened) test followed by group test with IF-AT cards, the latter involving 10 MCQs from individual test and done in case study teams

## 5.2 Labs

Week	Lab Topic	Readings
1 Jan. 9-11	Exp. 1 - Soil microbiology: growth media, isolation and enumeration techniques, enrichment cultivation	Laboratory 1
2 Jan. 16-18	Exp 1: results Exp. 2 - Bacterial physiological diversity: effect of environmental & nutrient conditions on growth, enrichment cultivation	Laboratory 2
3 Jan. 23-25	Exp. 2: results Exp. 3 - Water quality testing: diagnostic media and tests for identification and enumeration of coliforms, fecal coliforms & enterococci	Laboratory 3
4 Jan. 30-Feb. 1	Exp. 3: results Exp. 4 - Comparative cell counting: viable plate counting & direct microscopic counting; sign up for Ex. 5 sampling time  Winogradsky columns: experimental ecosystems - macroscopic observations	Laboratory 4  Laboratory 7
5 Feb. 6-8	Exp. 4: results Exp. 5 – Batch culture & the growth curve: viable plate counting & optical density for E. coli growth curve	Laboratory 5  Laboratory 7



	<p>Winogradsky columns: experimental ecosystems - microscopic &amp; macroscopic observations</p> <p>Introduction to team members</p>	
6	Exp. 5: results	Laboratory 6
Feb. 13-15	<p>Exp. 6 – Microbial catabolism &amp; diagnostic tests part 1: oxidase, catalase, KOH, nitrate, O-F, extracellular enzymes</p> <p>Introduction to Case study – column observations in teams; team charter discussions</p>	<p>Laboratory 7</p> <p>W18 Lab Schedule &amp; Information</p>
Feb. 20-22	Break week	
7	Exp. 6 – Microbial catabolism & diagnostic tests part 2: CHO fermentation, peptone iron agar, urease; results part	Case Study Ch. 1
Feb. 27-1 Mar. 1	Case study Ch. 1 & Lab Exercise: Triclosan pollution, selection of triclosan resistance; column observations in teams	
8	Ch. 1 – Submit Ch. 1 answers to dropbox; Lab Ex. conclusions & team discussion; Concept questions team discussion & IF-AT quiz	Case Study Ch. 2
Mar. 6-8	Case study Ch. 2 & Lab exercise: Microbial catabolic & physiological diversity, isolations from Winogradsky columns; sign-up on Courselink for Ch. 2 concept Qn	
9	Ch. 2 – Ch. 2 PEARTool submissions; Lab. Ex. conclusions & team discussion	Case Study Ch. 2
Mar. 13-15		

10 Mar. 20-22	Ch. 2 – Lab. Ex. conclusions & team discussion; concept questions team discussion/IF-AT quiz	Case Study Ch. 2
11 Mar. 27-28	Lab exam - individual bell-ringer + team written component	NA
12 Apr. 3-5	Case study Ch. 3 – concept questions team discussions & IF-AT quiz	Case Study Ch. 3 Laboratory 7

- Case study readings are given in the case study, published in the course manual. Other readings are provided via link or pdf on Courselink

### 5.3 Method of Presentation

- Students will learn the techniques and concepts through seminars & lab sessions and will use a combination of independent reading, lectures, laboratory exercises, online reading quizzes, group/team discussions (online and face-to-face), team work on an interrupted case study, REEF polling questions and collaborative tests/test questions.
- Seminars will be highly interactive, employing a combination of short lectures, followed by group discussions on problems, classroom polling and follow-up discussions. Simple concepts and definitions will be itemized and covered through independent reading, laboratory exercise introductions, and reading quizzes, but will not be covered during class.
- Seminars will be recorded and made available following the seminar.

### 5.4 Team Work

This is a major component of the course due to the documented advantages of peer discussion and instruction to facilitate deeper learning. Prior to the midterm, students will work in the lab in pairs, and will form ad hoc groups for group discussions in the seminar. Immediately prior to the midterm, students will be introduced to their team members, and will write the group component of the 2-stage midterm, in their teams. They will continue to work together in the lab and online/outside of class time, on the case study, the group component of the lab exam, and the 2-stage final exam. Seminars will continue to involve ad hoc groups

for discussions/problem solving. Teams will be constructed following best practices, using student answers to a Qualtrics survey administered weeks 4-5. While attempting wherever possible to combine 3 preexisting lab pairs, in instances of odd lab numbers, 1 or more pairs will be split. Team member accountability will be ensured through a Team-written “Team Charter”, an initial “Team Effectiveness” group report, and finally, through anonymous peer evaluations using the UofG PEARTool. The average scores from those anonymous assessments will be used to assign individual case study grades from the team grade.

## 5.5 Important Dates

- Jan 8 - Seminar 1: Introduction to course, topic 1
- Jan 9-11 - First lab period: lab exercise 1, LQ1
- Jan 23-25 - Lab Report I due @ 2:30
- Feb 6-8 - Lab Reports II AND III due @ 2:30 & teams announced
- Feb 12 - 2-stage midterm
- Feb 13-15 - Lab Report IV due @ 2:30
- Feb 18-22 - Break Week
- Feb 27-Mar 1 - Lab Report V due @ 2:30 & Signed Team Charter due @ 2:30
- Mar 6-8 - Case study Ch. 1 concept questions final answers due to dropbox by 900 AM of lab day; IF-AT quiz in lab
- Mar 8 - 40<sup>th</sup> class day – drop deadline
- Mar 13-15 - Lab Report VI due @ 2:30, Draft Ch. 2 submissions due to PEARTool by 9:00 AM of lab day & Team Effectiveness Feedback due by 2:30 of lab period to dropbox
- Mar 19 - Ch. 2 concept question reviews due to PEARTool by 9:00AM
- Mar 20-22 - Case study Ch. 2 concept questions final answers due to dropbox by 9:00AM; IF-AT quiz in lab
- Mar 27-29 - Lab exam
- Apr 3-5 - Case study Ch. 3 concept questions final answers due to dropbox by 9:00am of lab day; IF-AT quiz in lab & Team distribution of effort assessments due via PEARTool by 11:59pm

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## 6 Assessments

### 6.1 Marking Schemes & Distributions

Midterm grade weight transferred to final exam if a) final exam grade is higher, or b) student is given academic accommodation for a missed midterm

Name	Scheme A (%)	Scheme B (%)
Midterm	10	0

Name	Scheme A (%)	Scheme B (%)
Final exam	30	40
Case Study	20	20
Laboratory reports	15	15
Laboratory exam	15	15
REEF Polling	3	3
Seminar reading quizzes	3	3
Pre-lab quizzes	1	1
Lab quizzes	1	1
Lab skills tests	1	1
Lab flow charts	1	1
Total	100	100

## 6.2 Assessment Details

### Midterm (10%)

**Date:** Tue, Feb 12, In class

**Learning Outcome(s):** 1,2,3,4,6,7,8,10,11

- Course content: Seminars 1-4 and textbook readings
- 8.5% individual + 1.5% group = 10%
- Consists of individual, followed by group tests using IF-AT cards (<http://www.epsteineducation.com/home/>). Because of the nature of the 2-stage exams, **students writing in SAS need to talk to Dr. Keenleyside ASAP.**
- Group components will be written in case study teams and grade will only be used if it is no lower than the individual grade.
- Individual midterms will not be handed back but multiple opportunities to view the midterms and answer keys will be provided.
- Textbook content that is tested but not covered in class is the more basic material (e.g. definitions) identified in the posted reading guides and usually also covered in the introductions to lab exercises 1-6.

### REEF Polling (3%)

**Date:** Seminars 1-12

**Learning Outcome(s):** 1,1,2,2,3,3,4,4,5,6,7,8

- Each lecture will include multiple polling questions which, depending upon the difficulty level, may be polled, discussed, then re-polled, prior to revealing answers.
- 1 mark per question (participation rather than accuracy), for an estimated semester total of 45-50 marks.

**Bonus Activities: PeerWise Participation (0%)**

**Due:** Tue, Jan 8 - Fri, Apr 5

**Learning Outcome(s):** 1,2,3,4,5,6,7,8

- 1.5-2.0% bonus mark on final grade possible
- Free online platform for student-authored MCQs on course material: [https://peerwise.cs.auckland.ac.nz/at/?uoguelph\\_ca](https://peerwise.cs.auckland.ac.nz/at/?uoguelph_ca)
- Can be used to recover lost marks from classroom polling. This bonus grade will be added onto the 3% polling grade, which will be allowed to exceed 100%. 1 mark per authored PEERWise question, 0.5 marks per PEERWise question answered, to a maximum of 10 marks

**Seminar Reading Quizzes (3%)**

**Date:** Seminars 2-5 & 7

**Learning Outcome(s):** 1,2,3,4,5,7

- Textbook reading on the upcoming seminar
- Online, available Thurs-Tues, on that Tuesday's textbook readings.
- These focus on the basic principles only.
- A reading guide of relevant terms, concepts and processes will be provided in advance.
- 45-60 min. for each of 2 attempts, best mark counts = an estimated semester total of ~80 marks.
- Lowest of 5 quizzes dropped

**Pre-lab Quizzes (1.5%)**

**Date:** Weeks 1-6

**Learning Outcome(s):** 1,2,4,7,8,10

- Course Content: Laboratory exercises 1-6
- Online, available Mon-Fri, on that week's lab. 30 min. for each of 2 attempts, best mark counts

**Laboratory Quizzes (1.5%)**

**Date:** Weeks 1-4, 6 & Lab periods

- Safety; Dilutions; biochemical tests (from lab manual)
- Written during 1<sup>st</sup> few minutes of lab period; see posted file “F17 Lab Schedule & Information” for details on specific topics and dates

### **Laboratory Reports I-VI (15%)**

**Date:** Weeks 3, 5-7 & 9 lab periods

- Course content: Laboratory exercises
- Due at beginning of lab; due dates identified in “Important Dates” (below), the posted “F17 Lab Schedule & Information” file and in the Courselink calendar

### **Laboratory Skills Tests (1.5%)**

**Date:** Weeks 3, 5-7 & 9

**Learning Outcome(s):** 9

Course Content: Streak for isolated colonies, Gram stain and focus microscope

### **Flow Charts (1.5%)**

**Date:** Weeks 1-9

**Learning Outcome(s):** 8

- Course content: Labeled diagram showing flow of that day’s lab procedures
- Must be shown to TA during lab

### **Case Study (20%)**

**Date:** Weeks 7-12

**Learning Outcome(s):** 1,2,3,4,5,6,7,8,9,10,11,12,13

- Course Content: Case study “Delicate Balance, Deadly Obsession”
- Individual grades assigned based on the (team grade) x average score (as %) from the team's distribution of effort assessments

### **Laboratory Exam (14%)**

**Date:** Week 11 lab period

**Learning Outcome(s):** 1,2,4,7,8,9,10,11

- Course content: Techniques/ concepts from lab exercises & case study material covered to date
- Individual bell-ringer + written (in case study teams)

### **Final Exam (30%)**

**Date:** TBD, TBD

**Learning Outcome(s):** 1,2,3,4,5,6,7,8,11,12,13

- Course Content: Cumulative including textbook readings, lab and case study material
  - 25.5% individual + 4.5% group = 30%
  - Consists of individual, followed by group tests using IF-AT cards (<http://www.epsteineducation.com/home/>).
  - Individual includes MCQs & a take-home final exam question (short answer)
  - Group components will be written in case study teams and grade will only be used if it is no lower than the individual grade.
  - Because of the nature of the 2-stage exams, students writing in SAS need to talk to Dr. Keenleyside ASAP.
  - Textbook content that is tested but not covered in class is the more basic material (e.g. definitions) identified in the posted reading guides and usually also covered in the introductions to lab exercises 1-6 and the case study questions.
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## 7 Course Statements

### 7.1 Grading

- Midterm - students who MISS the midterm write a 40% (cumulative) final exam. For students who DO write the midterm, but perform better on the final, the midterm grade will be dropped and the grade weight transferred to the final exam.
- Assignments/reports – lab reports are due by 2:30 pm on the due date; the time for submission of case study assignments is identified in the posted "Lab Schedule & Information" file (usually 9:00am either on the day of the seminar or the lab period). For lab reports, deductions for late submissions will be 10% per day (the weekend counts as a 20% grade reduction), up to a 30% deduction. After 3 days, the submission will not be accepted.
- Quizzes - pre-lab quizzes (PLQs) are online, available beginning Monday for that week's lab, and students are expected to complete all 6. Each quiz has a 30-minute time limit and two attempts are given with the best mark counting. Students who fail to write 1 or more of these must provide documentation in support of academic consideration in order to obtain an adjustment to their distribution of marks. Lab quizzes (LQs) are written at the beginning of lab periods 1-4 & 6. Students with valid grounds for being unable to complete one

or more of these must talk with the lab coordinator about either writing the quiz at another time, or, provided with appropriate documentation, may have that quiz dropped from the calculation of the lab quiz grade. Reading quizzes are online, available Thurs-Tues, on that Tuesday's textbook readings. Students who fail to write 1 or more of these may make up the marks via PEERwise participation; students who miss more than 1 must provide documentation in support of academic consideration in order to obtain an adjustment to their distribution of marks.

- Collaborative tests (midterm & final exams) - the individual grade will contribute 100% of that grade item if higher than the collaborative component. Students who choose to write the individual component only will similarly have that count as 100% of that grade item. Students registered with SAS may a) write early so that they can join the class for the collaborative portion, or b) do the "group" component individually and use, as their 15% group mark, whichever of the following 3 is highest: i) their individual mark, ii) their "group" mark from the IF-At card or iii) the class average of the group test.

## 7.2 Student Responsibilities

- Respectfulness: students are expected to treat teammates, classmates, the instructor and teaching staff with respect at all times. In class, this means paying attention, not talking while the instructor or another student is talking, not sending or receiving text messages or phone calls once class has started.
- Lab attendance is mandatory. If you cannot attend a laboratory session, and have valid grounds, please e-mail the lab coordinator to provide your documentation and enquire about making up the missed activities. Academic accommodations for instances where a student cannot meet a course requirement, are discussed below.
- Laboratory preparedness: You must have read the relevant laboratory exercise in advance of the lab, and completed the online quiz for that week, prior to coming to the lab. A flow chart for what you will be doing in the lab is to be provided for grading at the beginning of the lab. These flow charts will ensure you finish in less than the scheduled 3h. You must bring with you: closed-toed shoes, a lab coat, your lab manual, an elastic band for long hair, and a notebook. If you wear contact lenses, you must also bring safety glasses.
- Working in pairs: Lab partners are expected to work collaboratively, to communicate effectively with each other and the GTAs/lab coordinator, and to hand in independent lab reports.



- Case study teams; Following the midterm, teams of 6-7 will negotiate and sign the terms of a team charter and will discuss and provide preliminary feedback (“Team Effectiveness Feedback”) and final anonymous distribution of effort evaluations of their team members. The team as a whole will use the individual results of the early evaluation to identify and report their agreed-upon steps for improving performance. Team performance is therefore the responsibility of the team as a whole and problems should be discussed honestly, respectfully and, where relevant, with compassion. In the unlikely event that problems with 1 or more individuals remain unresolved after all reasonable attempts have been made by the team, Dr. Keenleyside will act as mediator in a team meeting. In the extreme situation that mediation also fails to correct the problem, the student(s) at fault will be "fired" from the team and will be required to complete the remaining case study on their own: in 5 years, this has never happened. The average scores from the distribution of effort analysis for each team member will be used to assess individual grades based on the team mark. This grade may go UP or DOWN, relative to the group grade, within limits. As with work-place teams (which are the norm, even if you are a CEO), the development of an effective team requires effort, communication and skill but results in a synergy that leads to performance, creativity and productivity that are superior to what a single member working alone can accomplish.
- Seminar preparedness: Seminars are highly interactive. In order to arrive prepared, you must have done the assigned readings and reading quiz. Reading guides will be provided in advance of each week’s seminar, and you will be expected to learn basic definitions on your own, and have some familiarity with the concepts that will be covered. Names, terms and definitions for which you will be responsible but which will not be directly covered in class will be identified in the reading guides, and are covered in the textbook and generally in the introductions to the various laboratory exercises.
- REEF polling: students are expected to resolve any connectivity issues with their device immediately and inform the instructor when such issues arise. These issues may be due to Bluetooth interference, having multiple browser windows open (causing a slow connection with the REEF server) or the wireless function of the device. REEF provides online tips for connectivity problems. If you cannot attend a single seminar, PEERwise grades can compensate. If you must miss more than one seminar and have valid grounds, please e-mail the instructor to provide your documentation. Academic accommodations for instances where a student cannot meet a course requirement, are discussed below.

## 7.3 Emailing

- Student enquiries will not be answered on nights, weekends or holidays. In addition, e-mail enquiries for which the answer is easily available by reading the lab manual, course outline or other information on courselink will not be answered. Finally, questions about any of the online quiz answers will not be answered until after the quiz closes for everyone, and only if the answer cannot then be resolved by examining your own answers against the marking key.
  - E-mails must be sent from their UofG account, include your full name and the course about which you are enquiring. Respectfulness extends to the tone/style of the email; you wouldn't begin an e-mail to a future employer or someone you were asking for a reference letter with 'Hey', their first name, nor a complete absence of a salutation. Please extend the same courtesy to your instructor.
  - Students are expected to monitor their UofG e-mail accounts routinely - this is the official means of communication at UofG, and given the team aspect of this course, the instructor may e-mail reminders or enquiries.
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# 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.uoguelph.ca/~ksomers/>
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# 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 regulations and procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

## 9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

## 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.

More information: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

## 9.6 Academic Misconduct

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 discourages misconduct. 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.

The [Academic Misconduct Policy](#) is detailed in the Undergraduate Calendar.

## 9.7 Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate 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 which apply to undergraduate, graduate and diploma programs.

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