MICR*2430 Methods in Microbial Culture and Physiology

Winter 2024
Section(s): 01

Department of Molecular and Cellular Biology
Credit Weight: 0.50
Version 1.00 - December 21, 2023

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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-Requisites:	MICR*2420
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 taught using a **flipped** format. Students will do assigned textbook readings and watch accompanying "lecture" videos prior to the Tuesday seminar. During class, students will work in groups, using problem-based learning to clarify and deepen their understanding of the concepts. Lab exercises and a team-based case study will further develop comprehension.

My goal is to help you learn, develop your metacognitive skills, and foster your interest in the field of microbiology, while maintaining a focus on kindness, empathy and flexibility. To that end, the following strategies will be used:

1. **Class recordings**: classes will be recorded, edited and posted for streaming by the next day. Streaming from Microsoft Stream can be used for closed-captioning. These are

not meant to substitute for class, and **reliance on these videos *in lieu* of class attendance and participation will adversely affect your learnin**

2. **Labs**: these begin week 1 (Jan. 10-12). Students will be working in pairs, or, with the case study, teams of 5-7, however **students who are feeling ill** are asked to contact Catrien and remain home. Alternate arrangements will be made.
3. **Keeping on track**: given the flipped nature of this course, and the importance of individual preparation for class, weekly tasks (readings & "lecture" videos, along with video lengths) are identified in **Section 5.1** of the course outline. The **Courselink** calendar, announcements, and discussion forums will be used extensively; Dr. K. will check the latter daily. **Weekly reading guides** are provided to help you stay **ahead of the content**, so that you aren't scrambling to read multiple textbook sections and watch multiple lecture videos prior to the seminar on that topic (where you will apply and clarify your knowledge).
4. **Topic quizzes**: 5 non-cumulative quizzes, every ~2 weeks. Online, open for 24h with >3x the required time limit. Best 4 of 5. The seminar following each quiz will be used to go over ALL problem areas identified by the quiz, and correct misconceptions.
5. **Assessments, due dates, and grading schemes will have built-in flexibility.** Each student will have 2 free passes for 48H extension on an individual dropbox submission. Note the student must e-mail Dr. K., the TA and Catrien in advance of the deadline; no documentation or explanations are required. These passes cannot be used for team deadlines.

1.3 Timetable

1. Seminar: Tues 5:30 - 6:50 pm in ROZH 103
2. Labs: Wed, Thurs & Fri. 2:30 - 5:20 in SSC4102 or SSC4101

1.4 Final Exam

In person; April 12/24. Time and location TBA

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2 Instructional Support

2.1 Instructional Support Team

Instructor: Wendy Keenleyside Ph.D.

Email: wkeenley@uoguelph.ca
Telephone: +1-519-824-4120 x53813
Office: SSC 3506

- She/her

Lab Co-ordinator: Catrien Bouwman
Email: cbouwman@uoguelph.ca
Telephone: +1-519-824-4120 x52533
Office: SSC 3504
Office Hours: Meetings can be scheduled upon request.

2.2 Teaching assistants

Graduate students from MCB will be assigned as GTAs to each of the lab sections. These TAs will introduce themselves and provide contact details during the week 1 lab period.

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3 Learning Resources

3.1 Required Resources

Microbiology: Canadian Edition (Textbook)
https://openlibrary.ecampusontario.ca/catalogue/item/?id=0a20e9e2-f721-4c67-b555-097c56f336b2

- **By Keenleyside *et al*. Adapted from Microbiology by Openstax, specifically for MICR2420 and MICR2430.**
- **This is an Open Education Resource (OER): the e-book is free.**

Laboratory Manual (Lab Manual)
Bound, hard-copy lab manual is required and can be purchased from the University Bookstore. Lab report sheets may be downloaded from CourseLink.

Courselink (Website)
https://courselink.uoguelph.ca

The course website will be used extensively and will include all relevant course materials, including lecture videos, some online lab and case study materials, online syllabus topic quizzes, discussion boards, links for additional readings, group drop boxes, and course calendar.

PEAR Tool (Website)
https://www.uoguelph.ca/peartool/user/signon.cfm?destination=index%2Ecfm

UofG online platform for **P**eer **E**valuation **A**ssessment and **R**eview. 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.

3.2 Recommended Resources

Zoom (Website)
https://zoom.us
This will be used for polling throughout each class. **Access is through Courselink.**

PEERWise (Website)
https://peerwise.cs.auckland.ac.nz/at/?uoguelph_ca
This is a free online tool for authoring, answering, commenting on and rating student-authored multiple-choice questions. A site for MICR*2430 F21 will be set up and the class list imported. 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. Dr. K. will provide some introductory/review questions to the MICR*2430 repository, to help you get started and seminar 1 will include a brief discussion of Bloom's taxonomy and what makes good, higher level MCQs. Any good quality, higher Bloom's level questions will be considered for inclusion in the final exam, 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! Students may earn participation marks for their questions.

Team Outlook Calendars (Website)
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.

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4 Learning Outcomes

Course Goals

This course is designed as an active learning course, where students learn the concepts of microbial growth, metabolism, cultivation and ecology, through independent reading, group discussions and online lab exercises which include, in the second half of the semester, a case study and case study teams. Note that the case study will simultaneously cover a majority of the course learning outcomes as well as 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).

- **Content-related** learning outcomes will be posted separately on Courselink, and regularly updated. The content-related LOs all fall under 1 or more of the Course

Learning Outcomes identified in section 4.1. The latter can be viewed as overarching descriptions of the course's scope, while the former are offering-specific, to be used by the intructor AND students when setting/writing and grading the various assessments.

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

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5 Teaching and Learning Activities

5.1 Lecture

Tue, Jan 9, 5:30 PM - 6:50 PM

Topics:	**Introduction to course & review of basic concepts**
References:	See Topic 1 readings and lecture videos in week 2: these MUST be completed PRIOR to next week's seminar (Jan. 16)

Tue, Jan 16, 5:30 PM - 6:50 PM

Topics:	**Topic 1: Growth in the environment & lab.** Group and class discussions
References:	To be done BEFORE this seminar: 1. Sec. 4.1 & 9.3, (review of relevant previous concepts 1.2-1.3, 7.1-7.4) 2. Lecture videos 1-3: **LV1-From ecosystems to media** (~25 min), **LV2- Nutrients** (~33 min) **& LV3 - Autotrophy/diazotrophy** (~18min)

Tue, Jan 23, 5:30 PM - 6:50 PM

Topics:	**Topic quiz #1 debrief**
References:	See Topic 2 readings and lecture videos in week 4: these MUST be completed PRIOR to next week's seminar

Tue, Jan 30, 5:30 PM - 6:50 PM

Topics:	**Topic 2: Growth Kinetics & Enumeration**. Group & class discussions

References: To be done BEFORE this seminar:

1. Sec. 9.2
2. Lecture videos 4-5: **LV4**-**Bacterial cultures & growth curves** (13.5') **LV5**-**Bacterial enumeration** (19')

Tue, Feb 6, 5:30 PM - 6:50 PM

Topics: **Topic quiz #2 debrief**

References: See Topic 3 readings and lecture videos in week 6: these MUST be completed PRIOR to next week's seminar

Tue, Feb 13, 5:30 PM - 6:50 PM

Topics: **Topic 3: The cell membrane & transport.** Group & class discussions

References: To be done BEFORE this seminar:

1. Sec. 3.3
2. Lecture videos 6-8: **LV6-Bacterial cell wall & passive transport** (24'), **LV7-Introduction to active transport** (19'), **LV 8-Active transport – ABC & PTS** (23')

Mon, Feb 19 - Fri, Feb 23

Topics: Winter Break - no classes

Tue, Feb 27, 5:30 PM - 6:50 PM

Topics: **Topic quiz #3 debrief**

References: See Topic 4 readings and lecture videos in week 8: these MUST be completed PRIOR to next week's seminar

Tue, Mar 5, 5:30 PM - 6:50 PM

Topics:	**Topic 4: The Influence of environment on growth.** Group & class discussion
References:	To be done BEFORE this seminar: 1. Sec. 9.4-9.7 (review 3.3, 7.3, 7.4) & case study Ch. 1, 2 & 3 2. Lecture videos 9-11: **LV9-Environmental influences: O_2 & temp** (35'), **LV10-Adaptation to pH** (~31 min) & **LV11-Adaptation to osmotic stress** (14 min)

Tue, Mar 12, 5:30 PM - 6:50 PM

Topics:	**Topic quiz #4 debrief**
References:	See Topic 5 readings and lecture videos in week 10: these MUST be completed PRIOR to next week's seminar

Tue, Mar 19, 5:30 PM - 6:50 PM

Topics:	**Topic 5: The Biochemistry of catabolism.** Group & class discussion
References:	To be done BEFORE this seminar: 1. Ch. 8 introduction, Sec. 8.1-8.5, 10.3, Case study Ch. 2-3 2. Lecture videos 12-15: **LV 12: Central pathways** (36'), **LV13: Intro. To fermentation & redox potentials** (19'), **LV 14: Redox & the Electron transport chain** (30'), **LV 15: Primary & secondary fermentation** (13')

Tue, Mar 26, 5:30 PM - 6:50 PM

Topics: **Topic quiz #5 debrief**

References: See Topic 6 readings and lecture videos in week 12: these are integral to Ch. 2 & 3, as well as the final exam, and MUST be completed PRIOR to the last seminar

Tue, Apr 2, 5:30 PM - 6:50 PM

Topics: **Topic 6: Microbial diversity & ecology.** Group & class discussions

- Make-up class for Good Friday

References: **Topic 6 readings & lecture videos:**

1. Sec. 8.6, 8.7, 10.1, 9.1, 10.6, Case study Ch. 1-3
2. Lecture videos 16-17: **LV 16-Heterotrophs vs lithotrophs** (24') & **LV 17-Phototrophs & the ETC** (27')

5.2 Course Content: Labs

Week/dates	Lab Topic	Readings
1 Jan. 10-12	Exp. 1 - Soil microbiology	Laboratory 1
2 Jan. 17-19	Exp. 1 - soil microbiology results Exp. 2 - Bacterial Physiological Diversity	Laboratory 2
3 Jan. 24-26	Due to Dropbox: Report 1 Exp. 2 - results	Laboratory 3

Week/dates	**Lab Topic**	**Readings**
	Exp. 3 - Comparative counting	
4 Jan. 31- Feb. 2	Due to Dropbox: Report 2 Exp. 3 - results Exp. 4 - Growth curve (online)	Laboratory 4
5 Feb. 7-9	Due to dropbox: Reports 3 & 4 Exp. 5 – Biochemical tests **I**ntroduction to case study & case study teams - Assign Case study Ch. 1 questions	Laboratory 5 & Case Study - Introduction to the Winogradsky Columns
6 Feb. 14-16	Due to dropbox: Team charter Exp. 5 results Exp. 6 – Antimicrobials Ch 1 lab (virtual results)	Laboratory 6 Case Study Ch. 1 & Ch. 1 readings
7 Feb. 28- Mar. 1	Due to dropbox: Reports 5 & Ch. 1 questions Exp. 6 results Ch. 1 team quiz Enrol for Ch. 2 questions on Courselink	Case Study Ch. 1 & Ch. 1 readings

Week/dates	Lab Topic	Readings
8 Mar. 6-8	Due to dropbox: Report 6 & Team effectiveness feedback summary Ch. 2 lab (virtual results) - no scheduled lab session	Case Study Ch. 2 & Ch. 2 readings
9 Mar. 13-15	Due to **PEARTool**: Ch. 2 draft answers Ch. 2 team quiz #1 Assign Ch. 3 questions	Case Study Ch. 2 & Ch. 2 readings
10 Mar. 20-22	Due to **PEARTool**: Ch. 2 reviews Ch. 2 team quiz #2	Case Study Ch. 2 & Ch. 2 readings
11 Mar. 27-29	No labs (due to Good Friday)	
12 Apr. 3-5	Due to dropbox: Ch. 2 & Ch. 3 final answers Ch. 3 team quiz	Case Study Ch. 3 & Ch. 3 readings

- 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 face-to-face seminars + lab sessions and will use a combination of independent reading, lecture videos, laboratory activities, group/team discussions and team work in an interactive case study and

collaborative tests/test questions. **Simple concepts and definitions will be itemized in weekly reading guides and covered through independent reading, laboratory exercise introductions, but will not be covered during class.**

5.4 Teamwork

This is a major component of the course due to the documented advantages of peer discussion and instruction to facilitate deeper learning, as well as being a critical skill in the workplace. Case Study groups of students will be formed. They will work together in the online lab sections and outside of class/lab time on the case study. Teams will be constructed following best practices, using student answers to a survey. Team member accountability will be ensured through an initial "Team Charter" 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.

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6 Assessments

There are **5 non-cumulative** online topic quizzes. While this should lower the stress and anxiety often associated with a bigger stakes midterm, the "cost" of this more flexible (and hopefully kinder) approach is the **much greater responsibility on students to keep up with the assigned readings and content**. The final exam **IS** cumulative, includes lab-related material and the grade can replace that of the topic quizzes when student performance is better than the quizzes. **So in addition to being responsible for keeping on top of the assigned readings and videos, students will also be expected to keep reviewing previously covered material.** To help facilitate this, ungraded practice quizzes for each of the 6 topics are available, however these questions are from our old "textbook reading quizzes" - so they are not higher level, but directly related to the reading guides for each topic.The topics are, however, organized so that there is a logical progression with subsequent topics building on concepts from previous topics, and the case study, which begins after the fall break day, integrates **all** of the course topics.This case study, while done in teams, with tasks parcelled out to team members, relies on peer discussion and instruction, so that everyone learns!

6.1 Marking Schemes & Distributions

Syllabus topic quizzes are best 4/5. Students who do better on the final exam will have the grade weight for the quizzes transferred to the final. Students unable to complete 4 of the 5 quizzes may, at the instructor's discretion, be given an alternative assignment OR have the quiz grade weight transferred to the final exam.

Name	Scheme A (%)	Scheme B (%)
Syllabus topic quizzes	20	0
Lab reports	20	20
Case study	15	15
Participation	5	5

Name	Scheme A (%)	Scheme B (%)
Final exam	40	60
Total	100	100

6.2 Assessment Details

Syllabus topic quizzes (20%)
Date: , Online
Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8, 8, 10, 11

Short non-cumulative quizzes every 2 weeks, consisting of multiple T/F statements that assess the ability to apply and interpret the concepts for that topic; these will include any directly related material **from labs completed to-date.**

The quizzes will consist of multiple T/F, matching and calculation questions, and have a time limit of 20-25 min. Quizzes are available for 24h, beginning at 9:00AM (EST). All quizzes open on a Monday and are followed by a **debrief** of the problem areas in the next day's seminar**.**

1. **Jan. 22-23** - Growth in the Environment and Lab
2. **Feb. 5-6** - Growth Kinetics and Enumeration
3. **Feb. 26-27** - The Cell Membrane and Transport
4. **Mar. 11-12** - Influence of the Environment on Microbial Growth
5. **Mar. 25-26** - The Biochemistry of Catabolism

- These are non-cumulative, online, multiple T/F questions from a test bank. The questions are of an applied nature, to test comprehension, rather than memorization. **Respondus Lockdown will be used, but NOT Respondus monitor.**
- The questions are largely non-googleable, meaning that in addition to protecting academic integrity, students who have not kept up with the material and topic-related tasks will not perform well. To perform well: students MUST have completed ALL work related to that topic prior to the previous week's topic review session, AND followed up to clarify concepts identified through those sessions as problem areas. "Homework" problems are available online, generally 1 for each topic: these are specifically designed to help you study and test yourself, before doing a quiz. They are not graded, and answers are not provided or taken up: you are encouraged to work with others, and seek help from the instructor, when stumped on a particular aspect of the homework.
- **The quizzes will not be released; students who are still concerned following the**

Tuesday debrief (which focuses on problems areas identified by the quiz), are encouraged to meet with Dr. K., in order to review their quizzes in person or online and discuss how to improve.

- Textbook content that is **tested but not covered in class** is the more basic material (e.g. definitions) identified in weekly reading guides and usually also covered in the introductions to lab exercises 1-7.
- There is no Syllabus Topic quiz for the 6th topic, **Microbial Diversity & Ecology**. This topic is itself cumulative with respect to the previously-covered course topics, and will be assessed through the Case Study team quizzes.

Best 4 of 5 grades; each quiz is worth 5%. **No make-up quizzes.** If a student misses more than 1 quiz, the grade weight may be transferred to the final exam, **OR** the student may be required to do a separate assignment (the nature of which will be determined by Dr. Keenleyside), on that topic.

For any student whose cumulative final exam grade exceeds the total quiz grade, marking scheme B will be used. Students who appear at risk after the first 2-3 quizzes will receive an e-mail inviting you to meet with Dr. K. and identify strategies for improvement.

Laboratory reports (20%)

Date: Laboratory exercises 1-6
Learning Outcome: 2, 7, 8, 9, 10, 11, 13
Reports are submitted to Dropbox on Courselink by 2:30 p.m.Eastern Time, on your scheduled lab day, the week immediately following conclusion (collection of results) of that lab exercise. Unless students are using 1 of their 2 free passes for a 48h extension, and barring extreme circumstances, late reports will lose 20% per day and reports will be assessed a grade of zero after 48h.

Case study (15%)

Date: Weeks 5 through 12, In lab, online and outside of lab time
Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8, 8, 10, 11, 12, 13
Various small dropbox or PEARTool due dates associated with preliminary work for each of 3 chapters as well as 2 components related to team accountability (team charter; team effectiveness feedback summary).

Concept questions for each of 3 chapters are divided among team members, researched, discussed and, ultimately, a final word file for each chapter is submitted to the team dropbox. Grading is all-or-none for completion, formatting, specific comments re. improvements resulting from peer review, and evidence of good faith effort only (NOT accuracy).

Comprehension of each chapter, including the virtual labs for Ch. 1 & 2 is assessed through

team quizzes in lab, using IF-AT cards ("scratch & win" cards), or online using break-out rooms and an online team quiz. The instructor and TAs may help guide team discussions when deadlocked or running off-track.

1. Chapter 1 team quiz - **Feb. 28-Mar. 1**
2. Chapter 2 team quizzes - **Mar. 13-15 (**1st attempt) & **Mar. 20-22** (2nd attempt)
3. Chapter 3 - **Apr. 3-5**

Individual case study grades assigned based on the cumulative (team grade) x average score (as %) from the team's distribution of effort assessments. While student grades typically don't change, or change very minimally, **they MAY range between 0.5-1.5x the team grade in the case of a persistent problem with a team member.**

Participation (5%)
Date: Tue, Jan 9 - Tue, Apr 2
Learning Outcome: 12, 13
Reflections:

- The last 5 minutes of each class will be used to give you an opportunity to intentionally think about your thinking and learning from that class. This is a **metacognitive exercise,** requiring each student to write a brief reflection (minimum of 2 sentences) on what you learned/struggled with/were surprised at *etc*. To be submitted **in hard copy** as you leave class. Each is worth 0.5 marks based on evidence of good faith effort; **9 of 12 required for full marks**. Marking is based on evidence of actual reflection and is all or none.

Bonus marks: submission of 10-11 reflections gives an **additional 0.5-1 percent**. Each student may miss (or drop) 1 reflection.

Final exam (40%)
Date: April 12. Time TBA, TBA
Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8, 8, 9, 10, 11
In person, [a]2-stage. Location tba

- Cumulative including lecture content, textbook readings, lab and case study material
- Part A - higher-Blooms level MCQs, including some student-authored questions from PEERWise & part B = short answer
- The short answer question will be provided at least a week prior to the exam and will be a non-googleable (i.e. hypothetical) scenario that combines many of the topics

and concepts, and tests overall comprehension. Students may collaborate on this, however they must **learn** the answer as they will be required to answer the question in the individual stage of the exam, without any aids.

- 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.

[a]**2-stage exam**: the length of the first (individual) stage will be shortened to allow for a second group stage. During the second stage, case study teams will work together to reach consensus on a subset of the MCQs from the individual stage. Grade is calculated to give the highest possible, using either of the following:

1. Only the individual portion of the exam
2. Both stages of the exam combined (85% + 15%)
3. Individual plus the class average from the second stage (when a student is unable to participate in the second stage[b]**;** 85% + 15%)

[b] Students registered with SAS should identify themselves to Dr. K. in order to discuss the possibility of beginning the individual exam **early**, in order to then join their team members for the second stage

6.3 Bonus marks

Students may earn **up to 2% bonus marks** through some combination of the following:

1. Authoring 4 or more questions on PEERWise (each is worth 0.5 marks to a maximum of 2)
2. Answering 8 or more questions on PEERWise (each is with 0.25 marks to a maximum of 2)

- An added advantage of participation on PEERWise is that I will incorporate any **high-level** multiple choice (not T/F) questions in the final exam.

An additional 0.5% bonus marks for obtaining a perfect score on the course outline online quiz (**this closes before seminar 1**).

An additional 0.5-1% for submitting 10-11 reflections.

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7 Course Statements

7.1 Grading

1. **Syllabus topic quizzes** - best 4 of 5. There are no alternative quizzes. Students who MISS more than one will either have the grade weight transferred to the final exam, or may be asked to do an assignment (worth 5%) on the topic. The nature of this assignment will be determined by Dr. Keenleyside. For any student who performs better on the final exam, the total quiz grade will be dropped and the grade weight transferred to the final exam.
2. **Bonus activities** - students may earn up to 2% through authoring, and/or answering, questions on PEERWise (2%) 0.5% for doing the Course outline "Easter egg hunt" quiz in the first week (0.5%), and up to 1% for submitting 11 post-seminar reflections.
3. **Assignments/reports** – lab reports are due by 2:30 pm Eastern Time on your lab day - 1 week following conclusion of the respective lab exercise (dates in Dropbox on Courselink). Each student has **two free passes for 2 - 48h due date extensions**, no questions asked. To claim a free pass, students must e-mail Dr. Keenleyside and cc Catrien and the TA, **in advance of the deadline**, to inform them of their intent. Failing this, mark deductions are **20% per day, with a grade of zero after 48h.** For the case study, all grades are team grades; failure to meet a case study submission deadline results in a grade of zero for the missing concept question answer or Ch. 2 peer review.
4. **Case study -** teams are expected to discuss and agree to early completion of individual tasks, and to discuss openly, honestly and compassionately, any individual challenges that might be impacting team performance. Failing resolution of such challenges, the distribution of effort scores are used to reflect individual team member's case study contributions, with the individual's average score being used to assess individual case study grades. The individual's case study grade may therefore be higher or lower than the net team grade. Only under extreme circumstances, and repeated failure to resolve problems with an individual team member, Dr. Keenleyside may remove the problem student from the team, and the student will either forgo those team marks, or complete the entire case study on their own. Note that the case study is deliberately designed to involve a "divide and conquer" approach to the various tasks - it is far too much for a single individual.

7.2 Emails

1. Pease only use your UofG e-mail account.
2. All questions related to Course/Lab Content should first be posted to the Discussion board on Courselink. Dr. K. and Catrien will regularly check and respond to those posts,

allowing the rest of the class to see the answers.
3. Use email for personal issues and for meeting appointments: these will be prioritized. We're here to help and support you!
4. If you feel you need help with your learning/study skills, please e-mail Dr. K!
5. Questions about any of the online quiz questions will not be answered until after the quiz closes for everyone.
6. Please be patient - replies to e-mails may take 24-48h. Those sent outside of regular weekday hours (8:30 am-4:30 pm Eastern Time) will be answered during the regular work hours.
7. Just as we promise to respond to your e-mails (within the above guidelines), we expect you to answer any e-mail we send to you. These are rare, but always important, and usually time-critical.

7.3 Student Responsibilities

1. **Respectfulness:** let's all do our part to create an environment of mutual respect. 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. For e-mails, this means composing the message as you would to a current or potential employer: start with a salutation ("dear Dr. K./Catrien/etc"...not "hey") and end with your chosen name.
2. **Lab attendance**. **Attendance is mandatory and will be taken during each lab period.** Students not present at that time will be required to do a make-up assignment, the details of which will be given on a case by case basis. Failure to complete this by the given due date will result in a 20% deduction **on the respective lab report**. This 20% will be in addition to any further deductions should the report be handed in after the given due date. Learning the practical skills associated with this field of study is critical for your education and for your safety, however, **if you are feeling unwell**, you are asked to e-mail the lab coordinator (cbouwman@uoguelph.ca) and stay home: a make-up assignment will be given or an alternative provided. STUDENTS WILL ONLY BE PERMITTED TO ATTEND THEIR LAB SECTION, as shown on web advisor.
3. **Laboratory preparedness:** You must have read the relevant laboratory exercise in advance of the lab and watched any associated online lab demonstration videos, prior to attending lab. Preparing flow charts in advance of lab and mapping out what you will be doing will help organize your tasks and 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, a notebook, and a permanent ink marker. If you wear contact lenses, you must also bring safety glasses.
4. **Working in pairs or teams:** 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. Turnitin plagiarism software is used to evaluate submitted reports. Mid-semester, case study teams of ~6 will be announced. These teams will discuss and collaborate on the development of a team charter. After completion of Chapter 1, teams will discuss and provide preliminary feedback ("Team Effectiveness Feedback") on their functioning and determine areas for improvement. It is a team responsibility to openly, honestly, and supportively, resolve their problems or conflicts *****. Upon completion, team members will assign anonymous scores for the distribution of effort among team mates. As described previously, the average scores will be used to assess individual grades based on the team mark. An individual's 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 is a learned and critical skill: it results in a synergy that leads to performance, creativity and productivity that are superior to what a single member working alone can accomplish.

***** In exceptional circumstances, where teams have repeatedly failed to resolve a conflict or problem, Dr. K. may be asked to mediate.

5. **Seminar preparedness:** Seminars are highly interactive. In order to be prepared and get the most benefit, you must have done the assigned readings, filled in the definitions or descriptions of the assumed knowledge names/terms in that week's reading guide, and watched the lecture video(s), **in that order**. Weekly seminars alternate between entirely problem-based learning classes designed to identify gaps in your comprehension prior to the following week's quiz, and topic quiz debriefs, designed to clarify concepts that were poorly understood based on the quiz results. So students are expected to be considerably more independent than in regular lecture courses; your success is highly dependent on your ability to keep up with material, to be prepared for the topic review classes, and to go back to your notes/readings/videos and fill in the missing or erroneous information prior to the quizzes. To help you keep on top of things, use the checklist of weekly tasks. **Textbook readings:** as described earlier in this outline, terms and definitions that are assumed knowledge are identified by their red font in the reading guides: these will not be directly covered in lecture videos or class, they are often also described in the introductions to the various laboratory exercises, and **will be tested**.
6. **Case study team quizzes.** A total of 4, held during scheduled lab periods. **If you require academic accommodation** (i.e. absence due to medical, psychological or compassionate grounds), but are able to participate remotely, you must **A**) notify your team members in advance, and **B**) e-mail Dr. K. & Catrien in advance, cc'ing your team members, agreeing to maintain academic integrity (i.e. consulting ONLY the lab manual, your concept question answers and, for Ch. 1 & 2, lab results and any other

specified and approved resources) and specifying that one of the team members will be responsible for establishing the video link.
7. **Post-seminar reflections:** Contact Dr. K. only if you require academic accommodation for missing more than 2 classes.

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).