MICR*3420 Microbial Diversity and Ecology

F22

Fall 2022
Section(s): C01

Department of Molecular and Cellular Biology
Credit Weight: 0.50
Version 1.00 - September 06, 2022

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1 Course Details

1.1 Calendar Description

The cycling of elements (carbon, nitrogen, sulphur) within ecosystems involves the contributions of diverse microorganisms. This course will study the diversity of predominantly Bacteria and Archaea in selected ecosystems at an organismal level, investigate the metabolic and enzymatic diversity in microbes that contribute to and thrive within these environments, and examine the methodologies used to study the relationships and evolution of microorganisms within an ecosystem.

Pre-Requisites: BIOC*3560, MBG*2040, MICR*2430

1.2 Course Description

This course is designed to be highly interactive. Classes will include problem-based learning using group/team & class discussions, and detailed class analyses and discussions of assigned journal articles (with 1 exception, 1 article *per* topic). The goal is NOT memorization, but comprehension and application (the latter is highly dependent upon the former) and to develop your ability to read and understand the literature. There is also a team project which students will primarily work on outside of class.

My goal is to help you learn and foster your curiosity about this field, while maintaining a focus on kindness, empathy and flexibility throughout the semester. It is my hope that we will be able to work as a team, so that we are ALL successful and finish the semester strong. To that end, the following strategies will be used:

1. **Recordings**: ALL classes will be recorded, edited and posted for streaming by the

next day (they will not be simultaneously streamed). Videos are uploaded to Microsoft Stream, enabling closed-captioning.

2. **Quizzes**: *in lieu* of a midterm, there will be a total of 3 SHORT non-cumulative quizzes, with question choice, and your grade will come from the best 2 of these. These will be written on the last Friday of each month, ***in class***, and time for completion estimated @ 15-20 min. ALL students will have until the end of class for completion, but may leave when done. Answers will be posted after the grading is completed, and areas of difficulty identified by the quiz will be reviewed during the Monday class immediately following the quiz. To give everyone a bit of a break, these 3 Monday classes will be **virtual, *via* Zoom** and any polling will not count towards your participation mark.
3. **Keeping on track**: weekly tasks will be itemized in advance (when possible), using the **Checklist** function of Courselink, **Courselink Announcements**, e-mails when necessary. **Courselink Discussion Forums** have been created for different course components, providing an efficient way of disseminating answers to questions - Dr. K. will check these daily.
4. **Optimizing your performance:** For students who are struggling with the content, Dr. K. is always available to discuss how you can improve, including: strategies for keeping on top of the material; reading the assigned articles more efficiently; strategies for learning; strategies for effective test-writing. In addition, because the grade weight of the quizzes will be transferred to the final if students perform better on the latter, and also because the exam is the ONLY cumulative assessment, students who struggle in the first 2 quizzes will receive an e-mail invitation from Dr. K. to meet and determine ways to improve performance prior to the final exam.
5. **Assigned articles:** most of these contain material related to more than 1 topic, so they will be revisited when relevant, to deepen your comprehension.
6. **Open resource textbook & MICR*2430 review:** the same FREE textbook as used for MICR*2430. You have **4 weeks** from the beginning of classes to **review microbial metabolism & biogeochemical cycling** prior to beginning that topic (concepts from MICR*2430 will be assumed knowledge)
7. **Assessments, due dates, and grading schemes all have built-in flexibility: i**n particular, everyone has two tokens for a 48h extension on a dropbox submission. Note these are to be used for medical, psychological or compassionate reasons, but require no documentation or explanations, just advance notice to Dr. K. These tokens cannot be used for team deadlines.

1.3 Timetable

In person classes:

M, W, F, 10:30-11:20 am in MAC149

Virtual classes *via* Zoom:

Each Monday class immediately following a quiz - for review of problem areas identified in the quiz

1.4 Final Exam

In person, **Dec. 9, 11:30-1:30**. 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
Office Hours:	Mondays *via* Zoom: drop-in for help Please e-mail for individual appointments. These may be in person, or through Teams.

- She/Her

2.2 Teaching Assistants

Teaching Assistant (GTA):	Connor Gianetto-Hill
Email:	cgianett@uoguelph.ca

- He/Him

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3 Learning Resources

3.1 Required Resources

Microbiology: Canadian Edition (Textbook)
https://ecampusontario.pressbooks.pub/microbio/front-matter/preface/

- By Keenleyside ***et al.*** Adapted from Microbiology by Openstax. This is an Open Education Resource (OER): the e-book is free.
- This book provides basic background and review, and will be particularly helpful for reviewing microbial functional diversity (metabolism - from MICR*2430)

Courselink (Website)
https://courselink.uoguelph.ca
Additional materials will be posted on Courselink.

You are expected to check the site regularly for updates and information.

PEARTool (Website)
https://peartool.opened.uoguelph.ca/user/signon.cfm?destination=index%2Ecfm
This is an open education resource developed at the University of Guelph, for Peer Evaluation, Assessment and Review. This will be used for team members' assessments of the distribution of effort at the end of the semester.

3.2 Recommended Resources

Zoom (Website)
https://zoom.us/meetings
This is accessed through "Content" and will be used for hosting group office hours, including the last Monday of each month, when we will have a virtual class for review of problem areas identified by the previous week's quiz.

Students do not need to purchase a Zoom Pro account but do need to register for a free account using their University of Guelph email address and full name as appears on their student card.

LPSN - List of Prokaryotic Names with Standing in Nomenclature (Website)
https://www.bacterio.net
List of Prokaryotic Names with Standing in Nomenclature

Most recent:

Parte, A.C., Sardà Carbasse, J., Meier-Kolthoff, J.P., Reimer, L.C. and Göker, M. (**2020**). List of Prokaryotic names with Standing in Nomenclature (LPSN) moves to the

DSMZ. *International Journal of Systematic and Evolutionary Microbiology*, **70**, 5607-5612; DOI: 10.1099/ijsem.0.004332

- A regularly updated list of all bacterial names that have standing in nomenclature.
- Warning: Content is Biological Material and as such is subject to mutation, evolution and CHANGE

Bergey's manual of systematics of Archaea and Bacteria (Other)
"Bergey's manual of systematics of Archaea and Bacteria" (2015). Whitman, William Barnaby, editor.

- This is an electronic library resource, accessible through the University of Guelph Library
- Descriptions of the taxonomy, systematics, ecology, physiology, etc. of all named prokaryotic taxa.
- E-book replaces 5-volume 2nd second edition (Bergey's Manual of Systematic Bacteriology) completed in 2012.

The Prokaryotes (Other)
"The Prokaryotes" (2006) Vol. 1-7. Falkow, Stanley. editor.; Rosenberg, Eugene. editor.; Schleifer, Karl-Heinz. editor.; Stackebrandt, Erko. editor.

- This is an electronic library resource, accessible through the University of Guelph Library

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4 Learning Outcomes

Learning goals and rationale: To develop a detailed understanding of the relationships and evolution of microorganisms, the intricacies of a microbial community, the concept of a species, and the classification and naming of microorganisms. The course is intended to build on concepts introduced in the 2000-level microbiology courses.

- **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/learning and grading the various assessments.

4.1 Course Learning Outcomes

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

1. Describe the roles of microbes in the biosphere and in specific example ecosystems (e.g. the human gut & the marine environment), the ecological principles that determine microbial community structures.
2. Describe and assess methods for studying and identifying cultured and uncultured microorganisms, and discuss some of the current major bacterial and archaeal clades.
3. Describe, with specific examples, the various metabolic classes of the microbes and illustrate their central roles in the major biogeochemical cycles and in the current Anthropocene era.
4. Describe the relevance of the microbes in the evolution of life on Earth and interpret the information in phylogenetic trees. Describe and evaluate methods for studying the phylogeny of microbes, specifically the bacteria and archaea.
5. Explain, assess and propose, methods for characterizing microbial community structure, function, and diversity.
6. Explore taxonomic strategies and approaches used to identify and classify microorganisms. Discuss the criteria used to define bacterial species and infrasubspecific divisions within species and debate the species concept as it pertains to the bacteria and archaea.
7. Critically analyze the primary and secondary literature and explain these, through written summaries and in-class discussions.
8. Develop and demonstrate team skills through open, regular and respectful communication and cooperation.

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5 Teaching and Learning Activities

Pared down slides will be posted the day before scheduled classes. Each topic has one (in one instance, 2) assigned journal articles which will need to be read and summarized before the class in which it will be critically discussed. All classes will be recorded, edited, and made available for streaming from Courselink (using Microsoft Stream), usually within 24h.

- **Last Monday of each month:** the Monday class will be *via* Zoom and focused

on reviewing problem areas identified by the previous week's quiz.
- In-class activities subject to change, depending upon availability of guest lecturers

5.1 Lecture

Fri, Sep 9, 10:30 AM - 11:00 AM

Topics: **This class is only 30 minutes due to a scheduling conflict - I will be available to say hello and answer questions regarding the course outline or other course-related concerns**

Week 1

Topics: **Topic 1: Evolution of life on Earth**

References: Reading summary #1 due **BEFORE Friday's class** -

- **Assigned reading #1:** Woese, C. (2004). **A New Biology for a New Century.** Microbiol. Molec. Biol. Rev. 68:173-186.
  - This is partly historical and autobiographical and is (IMO) fascinating and beautifully written. However for the purposes of Topic 1, the essential content begins on p. 179 (“Other Guesswork Solutions?”) and continues to the end (p185).
  - Note that, as described under "Assessments" and on Courselink, each assigned reading requires a dropbox submission of a 1-2-page summary ***prior*** to class discussion. However, students earning an UNSAT or SAT may revise and resubmit for SAT or FAN respectively (i.e. part marks or full marks), **prior to the next class**

Week 2

Topics: **Topic 2: Techniques in Microbial Ecology**

References: The following sections from Microbiology: Canadian Edition may provide some background -

- Sec. 10.1 (Microbial Ecology & Metagenomics), Ch. 12 (Mechanisms of Microbial Genetics) & Ch. 13 (Modern Application of Microbial Genetics) Sec. 13.1 & 13.2
- **Assumed knowledge from previous classes:** the structure of DNA, RNA and proteins, basic concepts in DNA replication, transcription and translation in prokaryotes, PCR

Week 3

Topics: **Topic 2 -** continued (Techniques in microbial ecology)

References: Reading summary #2 due **BEFORE Wednesday's class** -

- **Assigned reading #2**: Imachi, H., Nobu, M. K., Nakahara, N., Morono, Y., Ogawara, M., Takaki, Y., Takano, Y., Uematsu, K., Ikuta, T., Ito, M., Matsui, Y., Miyazaki, M., Murata, K., Saito, Y., Sakai, S., Song, C., Tasumi, E., Yamanaka, Y., Yamaguchi, T., Kamagata, Y., … Takai, K. (2020). **Isolation of an archaeon at the prokaryote-eukaryote interface**. *Nature*, *577*(7791), 519–525.

Week 4

Topics:

Monday: quiz debrief (*via* Zoom)

Wed.-Fri. - Topic 3: Microbial metabolism & biogeochemical cycling

References:

Much of this topic is review from MICR*2430 - new concepts will build on the assumed knowledge from that course. BEFORE WE BEGIN THIS TOPIC, please read:

- ***Microbiology: Canadian Edition*** **Ch. 8** (Microbial Catabolism), **sec. 9.1** (autotrophy), **sec 10.3** (Methanogenesis & syntrophy) & **sec. 10.6** (Biogeochemical cycles). Note that you don't have to remember the various parts of these cycles yet ;-) however you should understand how each reaction relates to microbial metabolism, and which is exclusive to the bacterial & archaea domains.

Week 5

Topics:

Topic 3 - continued (Microbial metabolism & biogeochemical cycling)

References:

Reading summary #3 due **BEFORE Wednesday's class** -

- **Assigned reading #3:** Daims, H., Lebedeva, E. V., Pjevac, P., Han, P., Herbold, C., Albertsen, M., Jehmlich, N., Palatinszky, M., Vierheilig, J., Bulaev, A., Kirkegaard, R. H., von Bergen, M., Rattei, T., Bendinger, B., Nielsen, P. H., & Wagner, M. (2015).

Complete nitrification by Nitrospira bacteria. *Nature* , ***528***(7583), 504–509.

Week 6

Topics: **Topic 4: Phylogenetic Diversity of Bacterial & Archaea**

References: Reading summary #4 due **BEFORE Wednesday's class** -

- **Assigned reading #4:** Matsuo et al. (2021) **Full-length 16S rRNA gene amplicon analysis of human gut microbiota using MinION™ nanopore sequencing confers species-level resolution**. BMC Microbiol 21, 35.

Week 7

Topics: **Topic 5: Microbial communities**

References: Reading summary #5 due **BEFORE Wednesday's class** -

- **Assigned reading #5:** Lynch, M. D., & Neufeld, J. D. (2015). **Ecology and exploration of the rare biosphere**. *Nature reviews. Microbiology*, *13*(4), 217–229.

Week 8

Topics: **Topic 5:** continued (Microbial communities)

References: Reading summary #6 due **BEFORE Friday's class** -

- **Assigned reading #6:** Oliphant, K., Parreira, V. R., Cochrane, K., & Allen-Vercoe, E. (2019). **Drivers of human gut microbial community assembly: coadaptation, determinism and stochasticity.** *The ISME journal*, *13*(12), 3080–3092.

Week 9

Topics: **Topic 6: Marine microbial ecology & Our Changing World**

Wednesday: In-class peer review of team FACT sheet drafts

Week 10

Topics: **Topic 6 -** continued (Marine microbial ecology & Our Changing World)

References: Reading summary #7 due **BEFORE Wednesday's class** -

- **Assigned reading #7**: Tiedje, J. M., Bruns, M. A., Casadevall, A., Criddle, C. S., Eloe-Fadrosh, E., Karl, D. M., Nguyen, N. K., & Zhou, J. (2022). **Microbes and Climate Change: a Research Prospectus for the Future**. *mBio*, *13*(3), e0080022.

Week 11

Topics: **Topic 6 -** continued **(**Marine Microbial Ecology and Our Changing World)

Week 12

Topics: **Wednesday:**

- **MiFF: Microbiology Film Festival -** video viewing, peer review & voting

Friday: MiFF awards, exam review

References:

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6 Assessments

The goal of the combined assessments is obviously to provide formative feedback on your abilities and comprehension, but also to help you learn the course material and further develop your learning, analytical, communication and team skills. To reduce the stress and anxiety that assessments and deadlines create, there is considerable flexibility in due dates, and the grading schemes, as well as choice in some of the assessments (e.g. answer 2 of 4 questions). Instead of a single, higher-stakes midterm, you will write a total of 3 short, **non-cumulative** quizzes, each covering no more than 2 topics. Your quiz grade is based on the best 2 of 3. The final exam **IS** cumulative, so students will be expected to keep reviewing previously covered material. Assigned readings and their subsequent discussions should help, as the articles become more complex/multidisciplinary, as the semester progresses and many include content pertaining to more than 1 topic, so will be revisited where relevant. Students who do better on the final compared to the quizzes will automatically have the quiz grade weight transferred to the final exam.

6.1 Marking Schemes & Distributions

For students who perform better on the final exam *vs* the combined quizzes, the grade weight from the latter will be transferred to the final exam.

Quizzes are best 2 of 3 while 5 "FAN" reading summaries of 7 gives full marks; bonus marks of 1.5-6% for SAT/FAN grades on 6 - 7 summaries, and bonus mark of 1% for submitting all 6 reflections.

Name	Scheme A (%)	Scheme B (%)
Reading summaries	15	15
Participation	10	10
Quizzes	20	0

Name	Scheme A (%)	Scheme B (%)
Team project	20	20
Final exam	35	55
Total	100	100

6.2 Assessment Details

Quizzes (20%)
Date: The last Friday of each month, MAC149
Learning Outcome: 1, 2, 3, 4, 5, 6, 7

1. **Friday Sept. 30, 10:30-11:20**
2. **Friday Oct. 28, 10:30-11:20**
3. **Friday Nov. 25, 10:30-11:20**

- Non-cumulative: short, written questions, with choice. On the material from the previous 3-4 weeks, including relevant concepts from assigned readings.
- Best 2 of 3 (each is therefore worth 10% of your course grade).
- Estimated time for completion ~15-20 min. All students have the entire class to complete but may leave once done.

Team Research Assignment (20%)
Date: During the last 1/2 of the semester, Outside of class
Learning Outcome: 2, 3, 4, 7, 8
The purpose of this assignment is: 1) to research and teach each other about some of the major groups of bacteria and archaea, 2) to provide practice in 16S profiling and phylogeny, 3) to generate possible content for a second edition of the OER textbook **Microbiology: Canadian Edition**, and 3) to further develop your research, communication and team skills. Teams of 4-5 will be created and held accountable to each other using the same strategy as in MICR2430 (team charter, team effectiveness feedback summary, assessment of distribution of effort among team members using PEARTool). Individual project grades will be assessed based on the (team grade) x average score (as %) from the team's distribution of effort assessments. Teams will be announced by **Oct. 15**. Each team will pick 1 bacterial or archaeal clade from among a selection provided. Working outside of class, teams will "drill down" to a genus or species of particular importance or interest from within that clade, submitting a draft for student & instructor feedback and revision, a 3 minute video, which will be screened in class, and a final fact sheet, which will be provided to class as study aids for a section of the final exam.

Some details are still being determined, however the following is a general description:

1. **Friday Oct. 14**: qualtrics survey for team-building due
2. **Friday Oct. 21**: team charter due to dropbox
3. **Wednesday Nov. 9 (10:30AM)**: 1-2 page draft description of "adopted" clade and proposed genus/species (with rationale) submitted to dropbox. Content guidelines will be provided. During the Nov. 9 class, teams will use the rubric to review and provide feedback on 1-2 other team's posted submissions and on the clarity & usefulness of the rubrics themselves
4. **Friday Nov. 11 (5PM)**: team effectiveness feedback summary to dropbox
5. **Wednesday Nov. 30**: **MIcrobiology Film Festival (MiFF).** Teams will upload a 3 min. vignette (.mp4, akin to the "Hinterlands Who's Who" vignettes created by the Canadian Wildlife Federation and Environment and Climate Change Canada) to the dropbox. These will be screened in class and students will provide feedback and vote on their favourite video. Votes will be tallied and awards presented in the last class.
6. **Friday Dec. 2**: team Fact Sheets uploaded to dropbox. MiFF awards presented for 1st, 2nd & 3rd place
7. **Monday Dec. 5**: deadline for team member's distribution of effort scores (PEARTool)

The final exam will include a section where students select and describe specific aspects of **2**-**3** clades from the total collection of clades researched by the teams. The final vignettes and Fact Sheets will be made accessible to everyone on Courselink and will provide the relevant content for that portion of the exam.

The list of clades that will be "up for adoption", as well as details on grading, and rubrics, will be provided separately.

Reading Summaries (15%)

Date: Throughout the semester
Learning Outcome: 1, 2, 3, 4, 5, 6, 7
There is generally 1 assigned journal article for each major topic; topic 5 has 2, for a total of 7 assigned readings. Prior to the start of the class in which the article is scheduled to be discussed, a 1-2 page summary is due to the dropbox.

1. Fri. Sept. 16
2. Wed. Sept. 28
3. Wed. Oct. 12
4. Wed. Oct. 19

5. Wed. Oct. 26
6. Fri. Nov. 4
7. Wed. Nov. 16

Reading guides **may** be provided by the instructor to help prevent students from falling down "rabbit holes" of irrelevant details. For each assigned paper, a copy of the reading summary and the article are to be brought to class to help with your participation in the discussion. Assessment for each summary employs specifications grading: each summary will be assigned marks of 0, 1.5 or 3, based on qualities of UNSAT, SAT or FAN (**fantastic!**), respectively. Following the in-class discussion **and prior to the next class**, UNSAT summaries may be revised for part marks (i.e. 1.5), and SAT summaries revised for full marks (i.e. 3). The quizzes AND final exam will include questions related to the major aspects of the assigned readings (as identified in the Content-specific learning outcomes on Courselink).

- **To receive the full 15%, students must receive a total of 5 (of 7) "FAN" evaluations. Each FAN = 3%**

Bonus marks: an extra 1.5 - 6% for submitting 6 or 7 SAT/FAN summaries

Participation (10%)
Date: Thoughout the semester
Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8
Each class will include group/team and class discussions, as well as polling. Student participation will be based on:

1. In-class participation *via* **Zoom polling (5%).**

- **Polling grades:** students will be polled a few times each class, earning one mark per response. The final grade is determined by the percentage of questions answered versus 95% of the total questions polled: grade = #student polls/(#total polls x 0.95). Because **a 95% response rate gives a 100% polling grade**, only those students who require academic accommodation for MORE THAN 1 CLASS need to contact Dr. K.

2. **Reflections (5%)**: a total of 5 (out of a possible 6) 1-page dropbox submissions (5%). These are of 2 types: a) the week *prior* to a quiz, briefly summarizing the major concepts you feel you have a **solid** understanding of, and identifying remaining areas of confusion or questions; b) the week

following a quiz, identifying where you went wrong, any concepts you still need to clarify, and what you might do differently to prepare for the subsequent quiz

- **Bonus mark:** submission of all 6 reflections earns **1 bonus mark**

Final exam (35%)
Date: Fri, Dec 9, 11:30 AM - 1:30 PM, tba
Learning Outcome: 1, 2, 3, 4, 5, 6, 7
Cumulative including the assigned readings and fact sheets from the team project. Exam is entirely short-answer. Students will have some choice in the questions they choose to answer.

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7 Course Statements

7.1 Student responsibilities

1. **Safety:** if you are feeling ill, please e-mail Dr. K. and **do NOT come to class**. Participation marks will not be affected.
2. **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.
3. **Academic integrity:** do NOT copy and paste, e.g. for the reading summaries, then assume you can simply "tweak" the wording. Turnitin will be used to identify plagiarized content, and copy and pasting from a published source then tweaking will inevitably fail to pass scrutiny, and completely circumvents the goals of having you read, develop an understanding of the topic, then communicate that understanding. Don't forget if you get an UNSATSAT on your submission prior to the due date, you have 48h following the in-class discussion, to resubmit for part/full marks, respectively. In addition, it is best 5/7, with an opportunity for bonus marks and tokens for 2x48h extensions. **So plagiarizing is not worth the risk** . If you are struggling with your ability to read the assigned, or project-related articles, please ask for help: I am happy to provide guidance on how to read and

summarize these papers, without getting stuck on the minutiae and spending inordinate amounts of time on digesting & summarizing the article. Note that in the case of obvious cases of plagiarism, an official report will be submitted to the ADA, and there will be no opportunity for submitting a revised summary.

4. **Project teams:** team members will negotiate and sign the terms of a team charter and, after working together for a few weeks, individually fill out, then discuss as a group, their "Team Effectiveness Feedback" assessments. The team as a whole will use the individual results and their discussions to develop a summary and report agreed-upon steps for improving performance. As with work-place teams (which are generally the norm), the development of an effective team requires effort, communication, empathy and skill, but can result in a synergy that leads to superior performance, creativity and productivity compared to what an individual can accomplish. Significant problems within a team should be identified and resolved as agreed in the Team Effectiveness Feedback Summary. If necessary (and as a last resort), teams may request mediation by the instructor.

7.2 Grading

1. **Quizzes** - best 2 of 3. Practice questions will be discussed in class. 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 10%) on the related course content. 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. **Reading summaries** – best 5 of 7, details of format will be provided in class and on Courselink. These are due to the relevant dropbox before the class in which the assigned reading is being discussed (i.e. by 10:30 am Eastern Time)[C]. These are graded as UNSAT, SAT or FAN (aka Fantastic!), earning 0, 1.5 or 3%, respectively. If this initial submission is assigned an UNSAT or SAT, the summary may be revised and resubmitted for a SAT/FAN within 48H of the conclusion of the class in which the paper was discussed.
3. **Reflections:** pass/fail based on evidence of good faith effort. Two types: a) the week ***prior*** to a quiz[C], summarizing the major concepts you feel you have a solid understanding of, and identifying remaining areas of confusion or questions; b) the week ***following*** a quiz[C], identifying where you went wrong, any concepts you still need to clarify, and what you might do differently to prepare for the

subsequent quiz.

4. **Bonus activities** - a maximum of **6 marks** for submission of 7 FAN readings summaries, **1 mark** for submitting all 6 reflections, and **0.5 marks** for each unclaimed tokens following the last due date. A **maximum of 8% on your final grade** may be earned.
5. **Team project -** Project description, due dates and rubrics will be provided separately. All grades are team grades. Teams are expected to discuss and agree to early completion of individual tasks, and to discuss openly, honestly and compassionately, any potential problems with an individual's assigned task. The team effectiveness feedback summary provides teams with an opportunity to reflect upon, and discuss AS A TEAM, how they are performing, and agree upon at least one step to improve performance. At the end of the semester, each team member will provide, through the UofG PEARTool, distribution of effort evaluations. The average assessment of each team member will be used to assess individual grades based on the team mark. The individual grade may go UP or DOWN, relative to the group grade, within limits.
6. **Participation**: a) polling mark = total responses /(total polls - 5[a]) X 5; b) reflections = 1 mark ***per*** 1-page submission[b], based on evidence of good faith effort

a Each student is given a "free pass" for 5 (missed) polls. Note that this would likely be the maximum number of polls for a class

b 5 of 6 required for full marks. Submission of 6 reflections earns 1 bonus mark

c Each student has **two tokens for a 48h extension on an individual dropbox due date - these are to be saved for health, or compassion-related issues that prevent you from submitting a reading summary or reflection by the due date, however no questions will be asked and no documentation will be required.** In the case where a token has been claimed for a reading summary, students have an additional 48H (i.e. 96h after the before-class-discussion due date). It is a STUDENT RESPONSIBILITY to e-mail Dr. K. prior to a missed deadline, to request the use of a token. Absent the use of a token, or e-mail notification about the planned use of a token by the missed due date, a grade of zero will be assigned. Any unclaimed tokens after the last due date earns a 0.5 mark bonus on your grade.

7.3 When You Cannot Meet a Course Requirement

- Please advise the instructor or your team members promptly by e-mail if you encounter difficulties meeting any of the course deadlines and have just cause for accommodation to be made.

7.4 E-mails

- Please only use your UofG e-mail account. When e-mailing Dr. K., please indicate the course about which you are e-mailing (I am teaching more than one), include a salutation ("Dear Dr. K." instead of: "hey"...or nothing at all) and your name at the end. Think of this as practice for e-mailing a prospective employer, reference letter provider, or potential research/grad studies advisor!
- E-mails regarding personal concerns will be prioritized
- 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. If the e-mail requires a response, please respond, just as I will respond to your e-mails.
- All questions related to course content should first be posted to the Discussion board on Courselink. Dr. K. will regularly check and respond to those posts, allowing the rest of the class to see the answers.
- If you feel you need help with your learning/study skills, please e-mail Dr. K!
- Please be patient - replies to e-mails sent outside of regular weekday hours (9 am-5 pm Eastern Time) may take 24-48h.

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

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