

BIOL 4008 (Section 12): Special Topics in Biology – Microbial Ecology

University of Windsor, Winter 2022









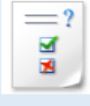







Class: Tuesdays/Thursdays 1:00 – 2:20 PM (in Teams until at least Jan. 31; BB 113 later)

Prerequisites: BIOL 2111 and BIOL 2070 or BIOL 2071

Why learn about microbial ecology?

Microbes are tiny organisms that have a surprisingly large effect on ecosystems and the environment. They dominate and define ecosystems – in fact, they are the sole organisms known to live in the atmosphere and subterranean depths. Humans (and other animals) are part of the microbial ecosystem for various microbes that live in and on us, the human microbiota. Microbes carry out important roles and complex activities in production, consumption and conversion of atmospheric nitrogen, carbon, and oxygen. They affect agriculture, mining, forestry, and aquaculture. We can harness their unique features in bioremediation, water treatment, and production of industrial compounds and materials. They affect us and our planet in vital and numerous ways, and understanding these interactions is valuable for biologists, other professionals, and informed citizens.

Microbial Ecology Winter 2022

What do you need?	 An internet connection is required for access to course materials, online meetings.	 Readings (available at no cost to UWindsor students).	 A working microphone is recommended.	 UWindsor Blackboard, Teams, QIIME & other tools.
Things to do	 Check Blackboard regularly (i.e., several times a week).	 Dedicate approx. 6 - 10 hours most weeks to this course.	 Note important dates in the course.	 Communicate/collaborate with peers.
Learning activities & assessments	 Regular quizzes & small assignments most weeks.	 Big Q in ME: communicate key information on ME topic.	 Carry out collaborative ME research project.	 Final exam and reflection.
Interactions	 Classes will be in Teams (until at least Jan. 31).	 You can use email or Teams to communicate with me and the GAs. I will usually respond within 24 hours (except for most weekends).	 Student interactions in Blackboard, Teams, and Perusall (possibly others).	 We may be able to meet in person later (BB 113).

Winter 2022 note:

We are facing another unusual pandemic term, with considerable uncertainty (e.g., in course format). I'll try to keep you informed as I get more information – thanks for your patience. Regardless of course format, I'll be doing my best to teach, communicate with, challenge and support you. I know that you will also be doing your best in difficult times. Please remember that your health and well-being are more important than this (or any) course.

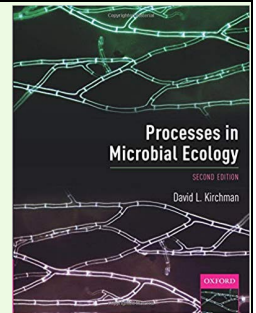
Course resources:

You do NOT need to purchase a textbook for this course. We will examine aspects of microbial ecology using a variety of resources, including material provided in lectures and in the scientific literature.

We will use some material from:

Kirchman, D. L. (2018). Processes in microbial ecology. 2nd ed. Oxford University Press.

Available via UWindsor Library: <https://www-oxfordscholarship-com.ledproxy2.uwindsor.ca/view/10.1093/oso/9780198789406.001.0001/oso-9780198789406>



One of the papers we'll be using early in the course:

Antwis, R. E., Griffiths, S. M., Harrison, X. A., Aranega-Bou, P., Arce, A., Bettridge, A. S., ... and Fry, E. L. 2017. Fifty important research questions in microbial ecology. FEMS Microbiol. Ecol. **93**(5): fix044.

<https://academic.oup.com/femsec/article/93/5/fix044/3098413>

The course Blackboard site will have readings, announcements, and other resources.



Instructor contact information:

Dr. Tanya Noel, Department of Integrative Biology




she/her pronouns



tnoel@uwindsor.ca (tanya.noel@uwindsor.ca goes to same inbox)



Biology 112,  (519) 253-3000 x2705



Office/student hours: M 3-4 PM, F 9-10 AM. Meetings via Teams /Zoom (possibly also on campus, later). I'm happy to set up individual/small group meetings outside scheduled office hours by appointment.

Our lead GA is Emily Varga:  weiler5@uwindsor.ca

For the research project, we will be working with GAs Keta Patel patel14c@uwindsor.ca, Javad Sadeghi sadeghij@uwindsor.ca (& Dr. Heath!).

Classes/lectures in this course: **Our scheduled classes are synchronous**

Teams sessions or **in person** and will be used for discussion, activities/assignments, and sometimes for work on the research project. There will likely be short (mini) lectures in some classes, but we will mostly use class time for things where we benefit from having other people in the same space (even if that space is virtual). I will record class (i.e., videos in Teams, audio from in-person classes) to post in Blackboard. Although attendance will not be mandatory, your participation and presence (when possible!) will be appreciated by myself and others in the class, and you'll likely gain more from being part of the activities than by listening to them later. With all of us spending much of our day in front of screens, I will try to keep most of our Teams classes limited to about an hour. In some classes, a portion of the time will be allocated to work on the team research project. **(In-person classes scheduled to begin the week of Jan. 31.)**



There will be a small number of short **pre-recorded (asynchronous) lectures available for some topics** (links will be in Blackboard).

Course learning objectives

At the end of this course, students will be able to:

- Describe major concepts, methodologies, and issues in microbial ecology (ME) and environmental microbiology (EM), demonstrating detailed knowledge in certain topics (*i.e.*, course topics).
- Describe key aspects of the physical-chemical environment of microbes and explain how microbes interact with abiotic environments.
- Describe interactions of microbes with other microorganisms, animals, plants, and other organisms.
- Describe and discuss current categories of “big questions” in microbial ecology with examples of specific topics/questions in different categories.
- (a) Describe common experimental ME approaches/techniques, including advantages and disadvantages/limitations, when/where these would be appropriate; (b) interpret, analyse and describe/illustrate results/data of these approaches; (c) design and evaluate experiments to study ME questions.
- Explain how microbial phylogeny, systematics, and taxonomy are important in ME/EM.
- Discuss challenges and unique aspects in studying ecology and environmental biology at a microbial level (vs. macro level).
- Gather, summarize, synthesize, interpret, and critically evaluate information (including experiments and data) about ME from a variety of sources (e.g., reviews, primary sources).
- Discuss and debate issues in ME.
- Apply learning from other areas (e.g., genetics, ecology, chemistry) to ME problems, situations, and/or issues.
- Analyze microbial ecology data (e.g., using QIIME, statistics software). [Application, Analysis]
- Communicate ME concepts, research findings and arguments to peers or the public via written, spoken, or other representation (e.g., graphically).
- Work effectively, responsibly, and collegially with peers in and out of class.
- Edit and/or evaluate of classmates’ written work, providing constructive suggestions for improvement.
- Use technology (e.g., Blackboard forums, Google Drive) to share information and work collaboratively.
- Articulate and reflect upon personal and professional goals and ethics relating to ME/EM.

What will we be doing in this course?



We will be doing a lot of different things in this course! We will look at the **fundamentals of microbial ecology, some of the key techniques used in this field, and many of the research questions of current interest.** As microbial ecology is a wide field, and interconnects with a lot of other subdisciplines (in biology and other areas), I’m hoping that you will find some topics that you find particularly interesting or important, and you’ll be able to explore those areas in more depth. You’ll also be developing/building on skills that are important in future studies and the workplace. The course is intensive, but I hope you find your experiences here valuable!

One of the benefits of a small, upper year course is that we have dedicated time for a group of smart and skilled individuals with biology backgrounds and varied experiences to interact and go beyond just listening to an instructor. This course is set up to help you to **develop your skills in thinking critically, reading, writing, collaborating, and presenting**—skills that are useful no matter what your career—in the context of microbial ecology as a subdiscipline of biology. The ability to work with others and communicate scientific/technical information online are also valuable skills.

There are a number of readings, and we will work through early ones together. You may want or need to consult resources outside of those provided in order to understand more complex issues—this is another great skill to develop. If you are struggling with part of a paper or an idea: talk to your fellow students, find and read additional references, and/or contact me. Some of our class time will be dedicated to work on course projects—please use this time to your advantage.

Every one of you will have valuable input and perspectives to contribute! This doesn’t mean every student is expected to speak up in every discussion, but I’d like everyone’s voice to be heard in this course. Contributions do not just include participating in spoken class discussions – it can take the form of discussion board posts, Perusall annotations or chatting in our Teams channel.

As most careers involve some work as part of a team (and you won't usually get to choose who you work with on those teams), it is valuable to gain experience and skills that help you work well in teams. This is also something you could potentially discuss in a job or professional school interview. Students can be anxious about working in teams, often having had bad previous experiences. In classes, team projects may be done under less than optimal conditions, with little time and resources provided to help teams in their planning and interactions. We will discuss methods and resources to help you and your team to be successful, including developing communication strategies, and planning effectively.

What goes into my grade?

Item	Weight
Regular assignments (in-class and online, individual/group, throughout the term)	15%
Regular quizzes [online]	20%
Big Q in ME project (mostly individual; includes components; final summary due Mar. 8)	20%
ME research project (team & individual; includes components throughout later part of term)	25%
Final exam and reflection (April exam period [date/time TBD])	20%

1. Regular assignments

There will be regular short/small assignments each week, usually:

Class assignments are intended to be done during class time. Some will be marked for good faith completion while others will be scored (not necessarily for "correctness" - we will be often focus on thoughtful approaches/arguments, considering evidence, etc.). Some will be individual, others done in pairs/groups. Expect 1-2 of these most weeks (max 1 per class), due shortly after the end of our class time. Alternate assignments will be available if class is missed, due by end of that day.

Reading/discussion assignments (RDAs) will primarily be assignments in Perusall, where students collaboratively annotate readings, posting comments, questions, and responses to others – see pages 7 & 8 for more info. There may be some assignments in other formats (e.g., Blackboard discussion board). Usually one/week, due most Fridays by 11:59 PM.

Maximum points will be listed with/on each assignment, some worth more points than others.

Occasionally, other small assignments will be used (e.g., discussion board introductions). The grade for this component will be calculated out of 90% of the maximum possible points, so missing one or two will not affect your grade.

2. Regular quizzes

Most weeks, we will have Blackboard open-book quizzes designed primarily as review/practise for you and to help me check in on understanding on course concepts/material. Quizzes will open on Thursday evenings and be due by the following Monday at 8:30 AM. You'll have two attempts per quiz, ~10-30 minutes per attempt (depending on length of quiz), and the higher score will be counted. My goal is to have 8 of these, but there may be fewer, depending on how the term goes. You'll be able to see the quiz/your answers after the deadline has passed. Quiz percentages will be averaged. The two lowest/missed quiz scores will be dropped in calculating this part of the grade (so one or two missed quizzes or low scores won't impact your mark).

3. Big Q in ME project

Students will each prepare a summary in lay abstract or graphical abstract format for one of the "50 important research questions in microbial ecology" (from Antwis et al. 2017) to share with the class, along with a reference list. Students will sign up for topics online (one person max per question). More details about this assignment will be in Blackboard.

4. ME research project

This year, we will carry out a research project, in collaboration with the Applied Ecological Genetics class. We will be using high-throughput/Next Generation sequencing and related tools, analyzing data, and preparing a research paper manuscript. Much of the work will be done in teams, with individually generated manuscripts as the final assignment in this component. We will discuss this in class and more information will be available in Blackboard.

5. Final exam and reflection

The final exam will be scheduled by the Registrar's Office. Questions will relate to what we've explored across the course, and reflection on your learning and skill development. While planned to be in-person, it may be online (depending on what happens with COVID). The format and other details will be finalized (and shared in Blackboard) before March. Likely 90 minutes long.

Your health and wellness are important!

If you anticipate issues related to the format or requirements of this course, or encounter problems during the term, please let me know. I would like us to discuss ways to ensure your full participation in the course, and work with you to consider options and plan how to best coordinate accommodations.

Students who require accommodations are encouraged to consult with Student Accessibility Services: <http://www.uwindsor.ca/studentaccessibility/>



University resources (re: COVID-19):

UWindsor Together (<https://www.uwindsor.ca/together/>)

Current Student (<https://www.uwindsor.ca/coronavirus/338/information-students>)

Student Well-being (<https://www.uwindsor.ca/coronavirus/377/wellbeing-portal>)

Student Counselling Centre

<http://www.uwindsor.ca/studentcounselling/>

Room 293 CAW Centre

519-253-3000 ext 4616

Monday – Friday: 8:30 am -12 pm; 1 pm - 4:30 pm.

scc@uwindsor.ca

Full list of UWindsor student support services:

<http://www.uwindsor.ca/156/lots-student-support-services>

Student Health Services

<http://www.uwindsor.ca/studenthealthservices/>

519-973-7002 or ext. 7002

(To make or cancel a Doctor's appt.)

Room 242 CAWSC

Monday-Friday: 9 am- 12 pm; 1 pm - 4 pm

Good2Talk: 24 hour Student Helpline

1-866-925-5454

I want the course to be challenging, but also foster an inclusive, equitable environment supporting your learning, growth, and success. Please talk to me if you have any concerns or questions!

The stuff I have to include – course policies:

- 1. MISSED QUIZ/RDA:** It is anticipated that some students may miss (or choose not to complete) one or two quizzes. For the quizzes and RDA components, the grades will be calculated excluding the two lowest/missed scores in each. Please don't notify me for missing one or two quizzes or RDAs. **If you miss more than two quizzes or RDAs, please let me know** as soon as possible to discuss your circumstances and what options (if any) there are. Note that extensions can't be granted on quizzes as the answers are available after the quiz deadline.
- 2. LATE WORK:** For some assessments it will not be possible to submit late work - (e.g., quizzes, as explained above). For other items, there is a 5% penalty per day for late submission (i.e., low enough to sometimes be worth taking the extra day). Students should begin work early enough to complete assignments before deadlines, considering other commitments (e.g., other course assignments, tests, work shifts), and make plans in case of unexpected circumstances causing delays to avoid last-minute panic. That being said, if you are encountering issues interfering with your ability to complete your academic commitments, please talk to me as soon as possible to discuss options. **There's room for flexibility in many things. Note that with extensions, trade-offs may result (e.g., we may not be able to give you feedback in the timeframe planned to help you with the next/future assignments). For group/team assignments, there are additional factors/individuals who are affected and may need to be consulted.**
- 3. FINAL EXAM CONFLICTS:** Final exam conflicts must be brought to the attention of the Registrar's Office once final exam dates/times are posted. (This must be done well before the final exam period.)
- 4. REMARKING OF GRADED WORK:** If you believe that a written answer on an assignment was marked incorrectly, you can provide your rationale for remarking **within 1 week of the item being made available to you**. Note: Remarkings can result in the mark being raised, confirmed or lowered.
- 5. DISCUSSION OF MARKS/GRADES:** In order to be fair and consistent with regards to the entire class, individual grades are **not** negotiable. Once final grades are posted, there will be no further changes (including "rounding up" or curving) aside from error corrections. It is not possible to provide opportunities for "extra credit" assignments to all students, and it is not appropriate to provide such assignments to individuals. **If there is a clear error in your mark (calculation, clerical, etc.) contact me as soon as possible at tnoel@uwindsor.ca**. It is unlikely that you will receive a response regarding any other mark-related queries.

6. **EMAIL POLICY:** Students should use their uwindsor.ca email address for correspondence relating to the course. (Email from other addresses, such as Hotmail or Yahoo, are likely to be filtered as spam/junk.) It's helpful to have an indication of your email topic in the subject line. The body of the email should have a clearly written message - please include your **full name and student number**. I also teach another course this term, so it helps me if I know the specific course you're in (4008/Microbial ecology). Please check to see if your question has been addressed in class, Teams, or in Blackboard before emailing. In an effort to use my professional and personal time more effectively, I only check email a few times a day during business hours, so you may not get a response right away (particularly if you email in the evening or on the weekend). If your email is urgent, please indicate that in your subject line.
7. **BLACKBOARD AND MS TEAMS PROBLEMS** should be directed to IT services - submit a request through the TeamDynamix support portal: <http://www.uwindsor.ca/its/>
8. Student Evaluation of Teaching forms will be administered online by the university.
9. Grading will use the University of Windsor percentage scale.
10. **FORUM/PERUSALL CODE OF CONDUCT.** Students are encouraged to participate in online forums and a collaborative annotation system.. In my experience, the discussion on course forums and Perusall has typically been polite and respectful, and I hope this will continue. Students are expected to follow the code of conduct in use of the forums:
 - i. **Check to see if your question has already been posted.** (You can **search** the forums – you don't have to read each post!)
 - ii. **Use a clear, informative subject line.** Try to be as specific as possible.
 - iii. **Post comments appropriate to the particular discussion.** Off-topic posts may be moved or deleted.
 - iv. **Be respectful.** Posts containing personal insults/attacks/intimidation/profanity will be deleted. (It is also worth remembering that your instructor reads forum posts!) See the "Student conduct" information in the next section.
 - v. **Post only material relevant to the course/microbiology.** Other posts are likely to be deleted.
 - vi. While it is appropriate to engage in debate/discourse on biological topics, such **discussions should be respectful and evidence-based.** Evidence should be from trusted sources – consult with the library or your instructor if you are not sure! (See: <http://www.yorku.ca/webclass/module4a.html>)
 - vii. Any posts which appear to violate our code of conduct may be edited, moved to a hidden forum or deleted at the discretion of instructors/moderators. If posts give indications of violations of academic honesty or the University student code of conduct, further action will be taken.

I trust every student in this course to comply with all of the provisions of the University's honour code and student code of conduct.

University of Windsor Honour Code:

Students at the University of Windsor consistently strive to attain the highest standards of academic performance. As part of these upmost principles, students of the University of Windsor pursue all endeavours with honour and integrity, and will not tolerate or engage in academic or personal dishonesty.

Student conduct

Students are expected to be familiar with and follow University of Windsor policies regarding conduct and academic integrity.

PRINCIPLES OF THE UNIVERSITY OF WINDSOR STUDENT CODE OF CONDUCT (Senate Policy Excerpt)

The University of Windsor is a community of scholars committed to the motto of: Goodness, Discipline, and Knowledge. As in any community, integrity is the foundation upon which all else is built. Fundamentally, a university is a place where those eager to learn gather to advance knowledge in an open, accepting and friendly manner with a goal to making important contributions to society.

- It is a place where freedom of expression is protected vigorously and uncompromisingly and where civility of expression in word and deed is the code of conduct.
- It is a place where all people are treated fairly without concern to religion, race, colour, national origin, sex, sexual orientation, disability or age.

As such, students are expected to commit to a code of behaviour that stresses respect for the dignity and individuality of all persons, and the rights and property of others. They are expected to practice personal and academic integrity, to take responsibility for their own personal and academic commitments, and to contribute to the University community to gain fair, cooperative and honest inquiry and learning. They are also expected to respect and strive to learn from differences in people,

ideas, and opinions, and refrain from and discourage behaviours which threaten the freedom and respect that every individual deserves.

All students, student groups, and organizations have the responsibility to maintain a high standard of conduct based on these principles. It is important to understand that transgressing the code of behaviour or assisting others in a transgression are equally wrong. Students are expected to be individually responsible for their actions whether acting individually or in a group. All students should know that the Senate Bylaw on Academic Integrity (Bylaw 31) addresses this issue as it relates to academic misconduct and all students should be familiar with the content of this Bylaw. Further, students should know that non-academic misconduct is addressed under the purview of the Board.

<https://lawlibrary.uwindsor.ca/Presto/content/Detail.aspx?ctID=OTdhY2QzODgtNjhiYi00ZWY0LTg2OTU0NmU5NjEzY2JkMWYx&rID=NTk=&qrs=RmFsc2U=&q=KFVuaXZlcnNpdHlfb2Zfv2luZHNvcl9DZW50cmFsX1BvbGljaWVzLkFsbnRleHQ6KFN0dWRlbnQgQ29kZSBvZiBDb25kdWN0KSk=&ph=VHJ1ZQ==&bckToL=VHJ1ZQ==&rtrc=VHJ1ZQ==>

Academic integrity involves avoiding plagiarism, cheating and other ethical breaches. Plagiarism and other forms of academic dishonesty will not be tolerated, and all instances will be reported to the Associate Dean of Science for disciplinary action under Senate Bylaw 31: Student Affairs and Integrity. Tests/exams and lecture recordings in this course are protected by copyright; reproduction or dissemination of their contents or format is strictly prohibited. Students who violate this rule or engage in any other form of academic dishonesty will be subject to disciplinary action.

Use of SafeAssign® Plagiarism-Detection Service in This Course

1. Rationale. The University believes in the right of all students to be part of a University community where academic integrity is expected, maintained, enforced, and safeguarded; it expects that all students will be evaluated and graded on their own individual work; it recognizes that students often have to use the ideas of others as expressed in written, published, or unpublished work in the preparation of essays, papers, reports, theses, and publications. However, it expects that both the data and ideas obtained from any and all published or unpublished material will be properly acknowledged and sources disclosed. Failure to follow this practice constitutes plagiarism. The University, through the availability of SafeAssign®, desires to encourage responsible student behaviour, deter plagiarism, improve student learning, and ensure greater accountability.

2. Procedure. SafeAssign® may be used for student assignments/papers in this course. You will be advised how to submit your papers to SafeAssign® yourself. Note that students' papers that are submitted to SafeAssign® become part of the SafeAssign® database. This assists in protecting your intellectual property. However, you also have the right to request that your paper(s) not be run through the student papers database of SafeAssign®. If you choose to do so, that request must be communicated to me in writing at the beginning of the course, and as an alternative, you must submit your final work along with extensive documentation (dated printouts of your literature/library searches, hand-written and typed drafts, and photocopies of all references).

Graphic on Page 1 modified from design by Nicole Campbell

Illustration on Page 3 by Dominika Boron

Perusall information

To use Perusall, you will need to set up your account/register the first time:

1. Go to perusall.com, click Log in at the top, and then either log in using your Facebook, Twitter, or Google account, or register to create an account using your email address and password. (Please use your uwindsor.ca email.)
2. Select "I am a student" and enter the course code: **NOEL-Q3VLF**
3. Enter your student number when prompted to do so. (This is how we will be able to assign marks for your work so please double-check that your student number is correct.)

If you already have a Perusall account, you can login, click on "Enroll in course" and enter the course code: **NOEL-Q3VLF**

During an assignment, you may find that you get a lot of emails from Perusall. It's recommended that you go into "Notifications" -> "Manage my notifications" and choose which email notifications you want to receive.

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More on Perusall assignments and thoughtful annotations

Perusall is intended to give you practice with readings related to the course, help you understand material better, and communicate. In Perusall, you will be collaboratively annotating articles/text with others in the class. Collaborative annotations (including help you provide and receive from others) will let you work through areas of confusion quickly and will make the process more interesting. While you read, you can receive answers to your questions, help others resolve their questions (helping you learn), and advise the instructor about common areas of confusion and interest.

In an assignment, you'll be given a reading (e.g., a magazine article or scientific paper) to annotate. You can start a new annotation thread by highlighting text, asking a question, or posting a comment; you can also add a reply or comment to an existing thread. Each thread is like a chat with one or more members of your class.

Your goals in annotating each assignment are to understand the material, to stimulate discussion by posting good questions or comments, and to help others by answering their questions. You're not expected to be experts in microbial ecology, but should consider the readings from the standpoint of someone who understands some microbiology. Annotations should be in your own words (though *brief* quotes can be used, using quotation marks and citing the source). You can "mention" a classmate in a comment or question to have them notified, and you'll be notified when peers respond to you. Note: Because there are so many students in the course, Perusall divides students randomly into groups. You'll only be able to see annotations made by students in your group.

Here are some perspectives on characteristics of annotations from previous students:

Thoughtful annotations:	Less effective/less helpful annotations:
<ul style="list-style-type: none"> • Deeply explore points in the readings. • Ask thought-provoking questions relating to the topic. • Provide additional information that is not in the text. • Make connections (e.g., within the article/text or to what we're looking at in class). • Describe clearly, in your own words, things that may not be obvious to others. • Incorporate relevant personal perspectives and experiences to the topic. • Help others, by addressing other people's questions or concerns. • Provide reputable sources of information/evidence (with enough information in a citation so that others can access these sources). • Integrate or apply ideas/concepts in a meaningful way. 	<ul style="list-style-type: none"> • Repeat what other people have said without adding anything. • Restate what is in the text without adding/clarifying. • Agree or disagree with another comment without adding additional information or perspectives. • Copy and paste information from a website or provide too much information from other sources at once (information dump). • Respond to someone without actually addressing the original question/comment. • Paraphrase/summarize without adding value. • Do not provide full reference information after mentioning/suggesting a source.

Annotations should reflect effort in reading and in discussion. We usually expect to see at least five good annotations that demonstrate this in an assignment. (Just having the minimum number of annotations may not guarantee full points if some or all of your comments/questions don't add to the discussion, or if they're all in the same area of the reading.) You can add more than that, within reason ... 20 annotations per assignment is probably too many, unless a lot of them are superficial/short comments or questions (which is fine - it is OK to chat with your peers). In a few cases, we may specify fewer than 5 comments as a minimum.

We review annotations you submit in an assignment. Based on the overall body of annotations for an assignment, you will receive a score. **High-quality annotations demonstrate exceptionally thoughtful, thorough reading of the entire assignment, and provide insight and/or resources that help other readers. For full marks, at least the minimum number (usually 5) high-quality annotations are required, and annotations should be clear, well-written, and relevant.** Lower scores will be earned if fewer than the minimum number of such annotations are submitted, there are issues with writing (e.g., several grammar/spelling errors), information sources are not appropriate/cited, or other problems. Scores will be posted in Blackboard, with feedback for scores below the max points.

Thanks for reading!