ENVS*3290 - Waterborne Disease Ecology

Fall 2023 Course Outline
Section: 01
Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn**.**

Calendar Description

This course examines emerging and re-emerging waterborne diseases (bacterial, protozoan, and viral) as a function of environmental change (including chemical and biological pollution and climate change). Waterborne diseases, in freshwater and marine ecosystems, will be examined from historical and contemporary issues as they relate to public and environmental health from regional, national, and international perspectives. Topics presented within the course will include current waterborne diseases of humans and aquatic fauna, detection of waterborne pathogens, microbial evolution, microbial physiology, water regulations and protection of drinking water.
Prerequisite(s): (ENVS*2080 or ENVS*2320 or [MBG*2040, (BIOL*2060 or MICR*2420)]
Department(s): School of Environmental Sciences

Lecture Schedule

TuTh 11:30am-12:50pm in MCLN*101 (9/7 to 12/15)

Lab / Seminar Sections

Day	Time	Location	Sections
Friday	9:30am - 11:20am	Graham Hall 3309	01
Friday	12:30pm - 2:20pm	Graham Hall 3309	02

Instructor Information

Marc Habash
Email: mhabash@uoguelph.ca

Additional Support

Communicating with Your Instructor

During the course, your instructor will interact with you on various course matters on the ENVS*3290 Courselink website using the following ways of communication:

- **Announcements:** The instructor will use **Announcements** on the Course Home page to provide you with course reminders and updates. Please check this section frequently for course updates from your instructor.

- **Ask Your Instructor Discussion:** Use this Courselink discussion forum to ask questions of your instructor about content or course-related issues with which you are unfamiliar. If you encounter difficulties, the instructor is here to help you. Please post general course-related questions to the discussion forum so that all students have an opportunity to review the response. To access this discussion forum, select **Discussions** from the

Tools dropdown menu. If the instructor does not respond to your question within 24 hours, do send an email to the instructor indicating a question is pending in **Discussions**.

- **Email:** If you have a conflict that prevents you from completing course requirements, or have a question concerning a personal matter, you can send your instructor a private message by email. The instructor will attempt to respond to your email within 24 hours.

- **Video Call:** If you have a complex question you would like to discuss with your instructor, you may book a video meeting on Zoom (or alternate platform being used by your instructor). Video meetings depend on the availability and are booked on a first come first served basis.

Learning Resources

Required Resources
Lecture Materials: There no required textbook for the course. Journal articles, book chapters, websites and/or case studies needed for the course will be made available to students in class via Courselink.

Lab Manual: Materials for the labs will be provided via Courselink.

Course Resources
Lab Materials: Students will be required to bring a notebook and lab coat for all labs. Safety glasses and gloves (non-latex) will be provided for the course.

Software: In the event of a disruption to in-person teaching, Zoom will be the software used for virtual classes/meetings.

Campus Resources
If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor (https://www.uoguelph.ca/uaic/programcounsellors/) in your degree program. If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons (https://www.lib.uoguelph.ca/using-library/spaces/learning-commons/) including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

Library Course Reserve (Ares)

For this course, you will be required to access course reserve materials through the University of Guelph McLaughlin Library. To access these items, select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve.
For further instructions on accessing reserve resources, visit How to Get Course Reserve Materials (https://lib.uoguelph.ca/find/course-reserves-ares/how-get-course-reserve-material/).
If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:
Tel: 519-824-4120 ext. 53621 | Email: libres2@uoguelph.ca | Location: McLaughlin Library, First Floor, University of Guelph

Course Learning Outcomes

1. Explain how the interaction between waterborne pathogens and the environment can directly impact human health
2. Describe three representative waterborne pathogens of global significance including their microbiology, evolution, effect on human physiology, methods for their detection, role of water treatment, and approaches for protecting human health
3. Create written work investigating an issue related to waterborne disease through critical assessment of current research
4. Describe culture-based and culture-independent methods used in evaluating water quality and the detection of waterborne pathogens
5. Use culture-based and culture-independent methods and data analysis to evaluate the water quality of unknown water samples

Lab / Seminar Schedule

1. Sept. 8
   No lab during first week of class

2. Sept. 15
   Lab #1: Introductory Lab/Discussion of Term paper assignment

3. Sept. 22

No lab scheduled

4. Sept. 29
   Lab #2: Traditional Water Testing: Membrane filtration – Direct Count (Need to submit Lab and Biosafety certificates by this lab)

5. Oct. 6
   Lab #3: Detection of pathogens and fecal indicators by Molecular Assays: Introduce PCR and Primers Lab

6. Oct. 13
   Lab #4: DNA Extraction Lab

7. Oct. 20
   Lab #5: PCR Lab

8. Oct. 27
   No labs scheduled on this date

9. Nov. 3
   Lab #6: Mock Water Crisis - Initial Lab

10. Nov. 10
    Lab #7: Mock Water Crisis - Continued

11. Nov. 17
    Lab #8: Mock Water Crisis - Continued

12. Nov. 24
    Lab #9: Mock Water Crisis - Completed

13. Dec. 1
    No lab scheduled on this date. Mock Water Crisis Report due.

Teaching and Learning Activities

Lecture Topics

General aspects of waterborne microorganisms

- General characteristics of bacteria, viruses, and parasites

- Describing a pathogen

- Microbial growth, survival and communities/structure

Evolution and waterborne diseases

- Vertical Evolution

- Horizontal Gene Transfer

Environmental change affecting waterborne diseases

- Biological pollution (agriculture, wastewater)

- Climate change

Methods of detection of water-borne pathogens from different aquatic environments

- Traditional methodologies

- Molecular techniques

Waterborne diseases (*Vibrio cholera*, Rotavirus, *Cryptosporidium parvum*)

- Historical perspective of select human waterborne diseases

- Impact of environmental change on waterborne diseases

- Changes in microbial diversity and genetic evolution in response to changing environments, e.g. development of epidemics

- Implications for drinking water quality, i.e. water-borne pathogens, in developed and developing nations

- Methods for preventing and protecting humans against waterborne illnesses, for example:

  - Water treatment

  - Vaccines

  - Other methods

- Regulations for water (regional, national, international)

Assessment Breakdown

Description	Weighting (%)	Due Date
Topic selection for term paper	5%	Sept. 22
Term paper for peer review	0%	Oct. 27
Peer review of term paper	15%	Nov. 7
Final term paper	20%	Nov. 17
Mini lab assignments (4)	15% (4 x 3.75%)	#1 - Oct. 2 #2 - Oct. 11 #3 - Oct. 16 #4 - Oct. 23
Mock Water Crisis Final Report	15%	Dec. 1
Check-in Test	15%	Oct. 31
Final Exam	15%	Dec. 9

Final Exam

Date: Dec 9

Time: Sa 8:30am-10:30am

Location: TBA *Please see Web Advisor closer to the date of scheduled final for location.*

To understand rules and regulations regarding Examinations students are encouraged to read Student's Responsibilities (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/examinations/)

If the student is unable to meet the final exam requirements due to medical, psychological or compassionate circumstances they are encouraged to review Student's Responsibilities in the Academic Consideration, Appeals and Petitions (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/) section of the Academic Calendar.

Grading Schemes

There is a grading scheme in this course in order to minimize the effect of poor performance on the Check-in Test/Final Exam. The scheme will supersede the grading distribution indicated in the Assessment Breakdown section so that the highest grade will be selected automatically.

Check-in Test/Final exam Total: 30%

- Best of Check-in Test/Final Exam weighted 20%
- Worst of Check-in Test/Final Exam weighted 10%

Last Day to Drop Course

The deadline to drop Fall 2023 courses without academic penalty is the last day of classes: December 01

After this deadline, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

Assignments should be submitted electronically via the online **Dropbox** tool. When submitting your assignments using the **Dropbox** tool, do not leave the page until your assignment has successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully.

The system will also email you a receipt. Save this email receipt as proof of submission.

Be sure to keep a back-up copy of all of your assignments in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommend you save your assignments to a cloud-based file storage (e.g., OneDrive), or send to your email account, so that should something happen to your computer, the assignment could still be submitted on time or re-submitted.

It is your responsibility to submit your assignments on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. Remember that **technical difficulty is not an excuse not to turn in your assignment on time.** Don't wait until the last minute as you may get behind in your work.

If, for some reason, you have a technical difficulty when submitting your assignment electronically, please contact your instructor or CourseLink Support.

http://spaces.uoguelph.ca/ed/contact-us/

Late Assignment

If an assignment is submitted late to the **Dropbox** tool, the full allocated mark will be reduced by 10% per day after the deadline for the submission of the assignment to a limit of three (3) days at which time access to the **Dropbox** folder will be closed.

Extensions will be considered for medical reasons or other extenuating circumstances. If you require an extension, discuss this with the instructor as soon as possible and well before the due date. Barring exceptional circumstances, extensions will not be granted once the due date has passed. These rules are not designed to be arbitrary, nor are they inflexible. They are designed to keep you organized, to ensure that all students have the same amount of time to work on assignments, and to help to return marked materials to you in the shortest possible time.

Course Standard Statements

Course Policies
General Course Offering Information

For this course offering all course content (lectures and labs) will be delivered in-person, unless a change to remote delivery is announced by the University of Guelph. For both in- person and remote delivery, students are strongly recommended to frequently log into the class site on Courselink to obtain relevant materials and course announcements. Lecture and lab materials will be provided asynchronously before their discussion in class. Students will be expected to review the materials ahead of class. If remote learning is required, lectures and labs will be conducted via Zoom.

General Information for Lab Sections

Attendance to the labs is required. Please only attend the lab section in which you enrolled, if a change is needed discuss this with the instructor no later than the first lab. If a lab needs to be missed, do notify the instructor and lab group members so accommodations can be organized - e.g. sharing of data for lab assignments. Labwork will be conducted in groups (2 or 3 students per group), this will be finalized by Lab #2. Students are expected to bring a lab coat and lab notebook to each lab. Safety glasses and non-latex gloves will be provided. Students are expected to review lab materials (background materials, methods - pdfs and videos) prior to attending the lab. Prior to Lab #2, students are expected to complete the online Biosafety and Lab safety courses offered by Environmental Health and Safety at the University of Guelph and present the certificates of completion to the instructor. If these have been completed previously and it is within 12 months, students do not need to re-do the courses, but do need to show the certificate of completion to the instructor.

Assessment Information and Use of Turnitin

Information for each component of the Term Paper (topic selection, peer-review, and final submission), Mini Lab Assignments, Check-in Quiz and the Lab Report will be made available to students in class and on Courselink.

In this course, your instructor will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.

All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments for the various components of the Term Paper through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.

Grades and Feedback

Unofficial assessment marks will be available in the **Grades** tool of the course website.

Your instructor will attempt to have grades posted online within 2 weeks of the submission deadline, if the assignment was submitted on time. Once your assignments are marked you can view your grades on the course website by selecting **Grades** from the **Tools** dropdown menu on the navbar. Your course will remain open to you for seven days following the last day of the final exam period. At least 20% of your final grade will be graded by the 40th day of class.

University of Guelph students can access their final grade by logging into WebAdvisor (using your U of G central ID).

https://webadvisor.uoguelph.ca

Course Technology Requirements
System and Software Requirements (Software)

This course will use a variety of technologies including:

- CourseLink (main classroom)
- Zoom

To help ensure you have the best learning experience possible, please review the list of system and software requirements.

https://opened.uoguelph.ca/student-resources/system-and-software-requirements

CourseLink System Requirements

You are responsible for ensuring that your computer system meets the necessary system requirements. Use the browser check tool to ensure your browser settings are compatible and up to date. (Results will be displayed in a new browser window).

http://spaces.uoguelph.ca/ed/system-requirements/ https://courselink.uoguelph.ca/d2l/systemCheck

CourseLink

This course is being offered using CourseLink (powered by D2L's Brightspace), the University of Guelph's online learning management system (LMS). By using this service, you agree to comply with the University of Guelph's Access and Privacy Guidelines. Please visit the D2L website to review the Brightspace privacy statement and Brightspace

Learning Environment web accessibility standards.

http://www.uoguelph.ca/web/privacy/ https://www.d2l.com/legal/privacy/ (http://www.d2l.com/legal/privacy/) https://www.d2l.com/accessibility/standards/ (http://www.d2l.com/accessibility/standards/)

Technical Support

If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support.

Email: courselink@uoguelph.ca

Tel: 519-824-4120 ext. 56939

Toll-Free (CAN/USA): 1-866-275-1478

Support Hours (Eastern Time):

Monday thru Friday: 8:30 am–8:30 pm

Saturday: 10:00 am–4:00 pm

Sunday: 12:00 pm–6:00 pm

Zoom

Zoom is a collaboration service that provides shared conversation spaces to help teams coordinate and communicate information. This course will use Zoom for one on one meetings with your Instructor and for class lecture and lab sessions, when remote access is required. It is recommended that you use the desktop version of Zoom. As a student you are responsible for learning how to use Zoom and it's features.

For Zoom Support visit the Open Ed Student Portal on the UofG website for more information.

https://opened.uoguelph.ca/instructor-resources/web-conferencing-options#Zoom

Technical Skills

As part of your learning experience, you are expected to use a variety of technologies for assignments, lectures, teamwork, and meetings. In order to be successful in this course you will need to have the following technical skills:

- Manage files and folders on your computer (e.g., save, name, copy, backup, rename, delete, and check properties);
- Install software, security, and virus protection;
- Use office applications (e.g., Word, PowerPoint, Excel, or similar) to create documents;
- Be comfortable uploading and downloading saved files;
- Communicate using email (e.g., create, receive, reply, print, send, download, and open attachments);
- Navigate the CourseLink learning environment and use the essential tools, such as Dropbox, Quizzes, Discussions, and Grades (the instructions for this are given in your course);
- Access, navigate, and search the Internet using a web browser (e.g., Firefox, Internet Explorer); and
- Perform online research using various search engines (e.g., Google) and library databases.

Contact your course instructor if you need support with any of the above.

Library Access (Other)

As a student, you have access to the University of Guelph's library collection, including both physical and electronic materials. For information on checking out or couriering physical library items, accessing electronic journals and returning items to the library, visit the library's website.

If you are studying off campus and would like to access the library's electronic resources, use the Off Campus Login and login using your Single Sign On credentials or using your last name and library barcode.

https://www.lib.uoguelph.ca/ (http://www.lib.uoguelph.ca/)

https://www.lib.uoguelph.ca/campus-login (http://www.lib.uoguelph.ca/campus-login/)

Standard Statements for Undergraduate Courses

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 discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/) is outlined in the Undergraduate Calendar.

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 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (https://www.uoguelph.ca/sas/)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/).

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.

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 undergraduate students 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 the Undergraduate Calendar - Dropping Courses (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/).

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (https://wellness.uoguelph.ca/). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (https://wellness.uoguelph.ca/navigators/) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (https://wellness.uoguelph.ca/shine-this-year/). The Student Wellness team are here to help and welcome the opportunity to connect with you.

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).

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.

Resources

The Academic Calendars (http://www.uoguelph.ca/registrar/calendars/?index) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/)