1 Course Details

1.1 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.

Pre-Requisites: (ENVS*2080 or ENVS*2320 or [MBG*2040, (BIOL*2060 or MICR*2420)]

1.2 Course Description

This course examines waterborne diseases (bacterial, protozoan, and viral) as a function of environmental 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, detection of waterborne pathogens, microbial evolution, microbial physiology, water regulations and protection of drinking and recreational waters.

1.3 Timetable

Lectures: Tuesdays and Thursdays 11:30 – 12:50
Labs: Tuesdays 3:30 – 5:20

1.4 Final Exam

Dec. 11, 2020 (11:30 am - 1:30 pm)

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

___________________________________________________________________________________________________________________

2 Instructional Support

2.1 Instructional Support Team

| Instructor: | Marc Habash |
| Email: | mhabash@uoguelph.ca |
| Telephone: | +1-519-824-4120 x52748 |
| Office: | ECBL 3238 |
| Office Hours: | By appointment |

2.2 Communicating with Your Instructor

During the course, your instructor will interact with you on various course matters on the course 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 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.
- **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 Teams (or alternate platform being used by your instructor). Video meetings depend on the availability and are booked on a first
come first served basis.

2.3 Netiquette Expectations

The course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply. Inappropriate behaviour will not be tolerated. Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students;
- Using offensive language;
- Copying or presenting someone else's work as your own;
- Adapting information from the Internet without using proper citations or references;
- Buying or selling term papers or assignments;
- Posting or selling course materials to course notes websites;
- Having someone else complete your quiz or completing a quiz for/with another student;
- Stating false claims about lost quiz answers or other assignment submissions;
- Threatening or harassing a student or instructor;
- Discriminating against fellow students, instructors, and/or TAs;
- Using the course website to promote profit-driven products or services;
- Attempting to compromise the security or functionality of the learning management system; and
- Sharing your username and password.

3 Learning Resources

3.1 Required Resources

Class and Lab Materials (Readings)

**Lecture materials:** 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.

System and Software Requirements (Software)

This course will use a variety of technologies including:
• CourseLink (main classroom)
• Teams (via Office 365)
• Respondus LockDown Browser

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/
https://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

**Teams (via Office 365)**

Office 365 Teams is a collaboration service that provides shared conversation spaces to help teams coordinate and communicate information. This course will use Teams for one on one meetings with your Instructor and for class lecture and lab sessions. It is recommended that you use the desktop version of Teams. As a student you are responsible for learning how to use Teams and its features.

For Teams Support visit the CCS website for more information.

https://www.uoguelph.ca/ccs/services/office365/teams
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
4 Learning Outcomes

This course examines the interaction of the environment and emerging/re-emerging waterborne disease on human health. The emphasis will be on human pathogens (including bacterial, viral, and protozoan). By the end of this course successful students will be able to:

4.1 Course Learning Outcomes

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

1. **Outcomes for lecture material:**

   1. Describe three representative waterborne pathogens of global significance within the context of their microbiology, evolution, effect on human physiology, and water treatment
   2. Explain how the interaction between waterborne pathogens and the environment directly impacts human health
   3. Create written work investigating an issue related to waterborne disease through critical assessment of current research

**Outcomes for laboratory exercises and material:**

   1. Describe culture-based and culture-independent methods used in evaluating water quality and the detection of waterborne pathogens
   2. Use culture-based and culture-independent water quality data to analyze and evaluate the water quality of unknown water samples

5 Teaching and Learning Activities
For this course offering all course content (lectures and labs) will be delivered remotely. 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 at least one week before their discussion in class. Students will be expected to review the materials ahead of class. Lectures and labs will be conducted via Microsoft Teams. For the synchronous lectures, Tuesdays will be utilized to review the relevant materials and will be followed with a question/answer session. Thursdays will be utilized for small group discussions of the materials. For the small group discussions, students will be randomly assigned to a different group each week these activities are scheduled.

5.1 Lecture Topics

General aspects of waterborne microorganisms

1. General characteristics of bacteria, viruses, and parasites
2. Microbial communities/structure - biofilms
3. Microbial diversity in aquatic ecosystems

Evolution: General aspects in microorganisms

a. Vertical Evolution
b. Horizontal Gene Transfer

Environmental change affecting waterborne diseases

a. Biological pollution (agriculture, wastewater)
b. Climate change
c. Chemical pollution (pharmaceuticals, xenobiotics)

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

a. Historical perspective of select human waterborne diseases
b. Impact of environmental change on waterborne diseases
c. Changes in microbial diversity and genetic evolution in response to changing environments, e.g. development of epidemics
d. Implications for drinking water quality, i.e. water-borne pathogens, in developed and developing nations
e. Regulations for water (regional, national, international)

Methods of detection of water-borne pathogens from different aquatic environments
Traditional methodologies
b. Molecular techniques
c. Immunological techniques

Methods of prevention and current methodologies for clean water

5.2 Teaching Labs

<table>
<thead>
<tr>
<th>Week</th>
<th>Lab #</th>
<th>Lab Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 6</td>
<td>1</td>
<td>Traditional Water Testing: Membrane filtration – Direct Count</td>
</tr>
<tr>
<td>Oct. 20</td>
<td>2</td>
<td>Primers and PCR</td>
</tr>
<tr>
<td>Oct. 27</td>
<td>3</td>
<td>DNA extraction and PCR</td>
</tr>
<tr>
<td>Nov. 3</td>
<td>4</td>
<td>Mock water crisis</td>
</tr>
<tr>
<td>Nov. 10</td>
<td>5</td>
<td>Mock water crisis continued</td>
</tr>
<tr>
<td>Nov. 17</td>
<td>6</td>
<td>Mock water crisis continued</td>
</tr>
</tbody>
</table>

6 Assessments

6.1 Marking Schemes & Distributions

<table>
<thead>
<tr>
<th>Assignment or Test</th>
<th>Due Date</th>
<th>Contribution to Final Mark (%)</th>
<th>Learning Outcomes Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic Selection for Term Paper</td>
<td>Sept. 30</td>
<td>5</td>
<td>2, 3</td>
</tr>
<tr>
<td>Check-in Quiz</td>
<td>Oct. 15</td>
<td>10</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Submission of Term Paper for Peer review</td>
<td>Oct. 30</td>
<td>0</td>
<td>2, 3</td>
</tr>
</tbody>
</table>
6.2 Assessment information and 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 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.

6.3 Dropbox Submissions
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/

6.4 Late Policy

If you choose to submit assignments to the Dropbox tool late, 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.
6.5 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.

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

https://webadvisor.uoguelph.ca

7 University Statements

7.1 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.

7.2 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

7.3 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-regregchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

7.4 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.

7.5 Accessibility
The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

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

7.6 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

7.7 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.

7.8 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

7.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of
course offerings and academic schedules. Any such changes will be announced via
CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19
website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by
email.

7.10 Illness

The University will not normally require verification of illness (doctor’s notes) for fall 2020 or
winter 2021 semester courses. However, requests for Academic Consideration may still
require medical documentation as appropriate.