# Course Outline Form: Fall 2017

## General Information

**Course Code: ENVS3290**

**Course Title: Waterborne disease ecology**

**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 water.

**Credit Weight: 0.5**

**Academic Department (or campus): School of Environmental Sciences**

**Campus: Main Campus**

**Semester Offering: Fall 2017**

**Class Schedule and Location:**

Lectures: MINS 017, Tuesdays and Thursdays 11:30 – 12:50

Labs: Graham Hall 3308, Tuesdays or Wednesdays 2:30 – 4:20

## Instructor Information

Instructor Name: Marc Habash

Instructor Email: mhabash@uoguelph.ca

Instructor Phone and Extension: 519-824-4120 ext. 52748

Office location and office hours: ECBL Rm. 3238, by appointment

## GTA Information

GTA Name: Andrea Roebuck

GTA Email: aroebuck@uoguelph.ca

GTA office location and office hours: N/A

## Course Content

### Specific 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:

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 methods and data analysis to evaluate the water quality of unknown water samples

### Lecture Content:

General Lecture topics:

1. General aspects of waterborne microorganisms
2. General characteristics of bacteria, viruses, and parasites
3. Microbial communities/structure
4. Microbial diversity in aquatic ecosystems
5. Evolution: General aspects in microorganisms
6. Environmental change affecting waterborne diseases
7. Biological pollution (agriculture, wastewater)
8. Climate change
9. Chemical pollution (pharmaceuticals, xenobiotics)
10. Waterborne diseases (*Vibrio cholera*, Enteric viruses, *Cryptosporidium parvum*)
11. Historical perspective of select human waterborne diseases
12. Impact of environmental change on waterborne diseases
13. Changes in microbial diversity and genetic evolution in response to changing environments, e.g. development of antimicrobial resistances
14. Implications for drinking water quality, i.e. water-borne pathogens, in developed and developing nations
15. Regulations for water (regional, national, international)
16. Methods of detection of water-borne pathogens from different aquatic environments
17. Traditional methodologies
18. Molecular techniques
19. Immunological techniques
20. Methods of prevention and current methodologies for clean water

### Labs:

Approximate Schedule of Labs/Seminars

|  |  |
| --- | --- |
| Week | Labs (2 hours per week) |
| 1 | No lab during first week of class |
| 2 | Introductory Lab:   * Outline of labs * Aseptic technique * Use of equipment specific to labs * Biosafety |
| 3 | Traditional Water Testing: Membrane filtration – Direct Count |
| 4 | Examine results from Lab #2  Introduce PCR and primer design  Lab assignment: Find journal article with primers for assigned microorganisms |
| 5 | DNA Isolation Lab |
| 6 | No Lab |
| 7 | PCR Lab  Use primers and genomic DNA from labs 3 and 4 |
| 8 | No Lab |
| 9 | Lab – Mock water crisis |
| 10 | Lab – Mock water crisis continued |
| 11 | Lab – Mock water crisis continued |
| 12 | Lab – Mock water crisis completed |
| 13 | No Lab |

### Seminars:

No seminars

### Course Assignments and Tests:

| **Assignment or Test** | **Due Date** | **Contribution to Final Mark (%)** | **Learning Outcomes Assessed** |
| --- | --- | --- | --- |
| Topic Selection for Term Paper | Oct. 1 | 5 | 2, 3 |
| Midterm exam | Oct. 12 | 15 | 1, 2, 4 |
| Submission of Term Paper for Peer review | Nov. 2 | 0 | 2,3 |
| Peer review of Term Paper | Nov. 16 | 15 | 3 |
| Final Term Paper | Dec. 1 | 20 | 2, 3 |
| Mini Lab Assignments (4) | Day after assigned | 10 | 4 |
| Lab Report | Nov. 27 | 15 | 4, 5 |
| Final Exam | Dec. 12 | 20 | 1, 2, 4 |

Additional Notes (if required):

Information for each component of the Term Paper (topic selection, peer-review, and final submission), Mini Lab Assignments, 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 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.

### Final examination date and time: Dec. 12, ,2017 8:30 am – 10:30 am

### Final exam weighting: 20%

## Course Resources

### Required Texts:

There is no required text. Journal articles, book chapters, and/or case studies needed for the course will be made available to students in class, via Courselink, or at the Library Reference Desk.

### Recommended Texts:

There is no recommended text. Journal articles, book chapters, and/or case studies needed for the course will be made available to students in class, via Courselink, or at the Library Reference Desk.

### Lab Manual:

Materials for the labs will be provided in class and on Courselink.

### Other Resources:

None

### Field Trips:

None

### Additional Costs:

Students will be required to bring a notebook, lab coat and safety glasses for the labs.

## Course Policies

### Grading Policies:

Due dates are final for all assignments, however, extensions may be granted in exceptional cases. Please contact the instructor as soon as possible, i.e. prior to the due date, to discuss a possible accommodation.

### Course Policy on Group Work:

The following assignments will be prepared and submitted as groups:

* Lab report

Group members will be assigned the same grade for these assignments. Students should notify the instructor as soon as possible if any issues with distribution of effort does occur, so they can be resolved prior to the submission of the assignment. If the issues persist, the instructor may request each group member submit a distribution of effort (DOE). The DOEs may be used by the instructor to adjust the grade of individual group members where the DOE between group members is not balanced.

### Course Policy regarding use of electronic devices and recording of lectures:

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

## University Policies

### Academic Consideration:

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml).

### Academic Misconduct:

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.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml).

### Accessibility:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the [Student Accessibility Services website (http://www.uoguelph.ca/csd/)](http://www.uoguelph.ca/csd/).

### Course Evaluation Information:

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](https://courseeval.uoguelph.ca/) **for more information.**

### Drop period:

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III (Schedule of Dates) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml).

## Additional Course Information