ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
UNIVERSITY of WASHINGTON | SCHOOL OF PUBLIC HEALTH

# ENV H 433: Environmental & Occupational Sampling and Analysis - Microbial Contaminants

Winter 2023

## Contact information


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## Teaching Assistants


**Elizabeth Traylor:** trayle@uw.edu
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## Course times and locations

Monday, Wednesday, Friday 8:30-10:20

HSB T-369/375

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## SPH LAND ACKNOWLEDGMENT

The University of Washington acknowledges the Coast Salish people of this land, the land which touches the shared waters of all tribes and bands within the Duwamish, Suquamish, Tulalip and Muckleshoot nations.

## COVID PROTOCOLS AND SAFETY

All UW students are expected to follow state [doh.wa.gov], local [kingcounty.gov], and UW COVID-19 policies and recommendations.

Please be extra conscientious about masking during the first few weeks of the quarter, because we will have a lot of members of the community traveling and can reasonably expect to see a surge in COVID cases.

If you feel ill or exhibit possible COVID symptoms, you should not come to class. If you need to temporarily quarantine or isolate per CDC guidance and/or campus policy, you are responsible for notifying your instructors as soon as possible by email. **If you receive a positive COVID-19 test result, you must report to campus Environmental Health & Safety (EH&S) by emailing covidehc@uw.edu or calling 206-616-3344.**

**Please check your email daily BEFORE coming to class**. If we need to conduct class remotely because the instructor or a guest speaker is complying with UW policies and unable to attend in person, we will send all registered students an email with a Zoom link for remote instruction.

## COURSE DESCRIPTION

This course will review the sampling and analysis of microbiological contaminants in water, air, and on surfaces. Topics covered will include legal considerations, sampling and experimental design, routes of exposure, sources of exposure, standard methods, QA/QC, and data management. This course will be of use for public health professionals, microbiologists, civil and environmental engineers, and environmental scientists.

## COURSE LEARNING OBJECTIVES

After completing this course, students will be able to:

- Recognize the various microbial contaminants in environment/occupational settings and rationale for sampling
- Distinguish between the methods for sample collection/processing in different environment/ occupational settings
- Explain the advantages/disadvantages of using indicator bacteria in environment/occupational settings
- Display appropriate chemical and bio-safety laboratory precautions
- Describe the importance of quality assurance/quality control [QA/QC] procedures
- Analyze and manage scientific data
- Interpret legal/regulatory frameworks microbial sampling
- Write a basic research protocol

## COUNCIL FOR EDUCATION OF PUBLIC HEALTH (CEPH) COMPETENCIES

**D-10-1 Public Health Domains**

- **Role and Importance of Data in Public Health**: Address the basic concepts, methods, and tools of public health data collection, use, and analysis and why evidence-based approaches are an essential part of public health practice
- **Determinants of Health**: Address the socio-economic, behavioral, biological, environmental, and other factors that impact human health and contribute to health disparities (this course covers environmental factors impacts on human health and health disparities)
- **Project Implementation**: Address the fundamental concepts and features of project implementation, including planning, assessment, and evaluation (this course covers: introduction to assessment concepts and features; introduction to evaluation concepts and features)
- **Health Communications**: Address the basic concepts of public health-specific communication, including technical and professional writing and the use of mass media and electronic technology (this course covers technical writing)

**D13-1 Concepts**

- Research methods

## REQUIRED TEXTBOOKS & READINGS

There is no required text for this course. Assigned readings and course materials will be available on the course webpage.

## GRADING

- **Online Safety Trainings (10%):** Students will be responsible for completing two online safety trainings available on the UW EH&S Website: Biosafety Training-Online and Managing Laboratory Chemicals-Online. These must be completed prior to starting work in the laboratory on January 11th.
- **Laboratory Notebooks and Write-Ups (56%):** Students are responsible for maintaining a lab notebook. Students should have instructor or TA sign off on lab book at the conclusion of each laboratory. After each experiment is completed, students will be responsible for individual write-ups addressing questions provided. These should be short (2-3 pages) and will be due the second class period after the lab is complete.
- **Laboratory Quizzes (14%):** Students are responsible for reviewing protocol documents uploaded to the canvas page prior to the first day of each laboratory. There will be a short quiz on canvas based on the protocols to be completed prior to the first day of each laboratory.
- **Final Exam (20%):** Online, open book/notes. The final exam will due by 11:59 pm Thursday March 17, 2022. Once the final exam is started, you will have 2 hours to complete it.

### Grading Criteria

Grades will be assigned according to the scale below.

| % | Gradepoint |
|---|---|
| >95% | 4 |
| 94 | 3.9 |
| 93 | 3.8 |
| 92 | 3.7 |
| 91 | 3.6 |
| 90 | 3.5 |
| 89 | 3.4 |
| 88 | 3.3 |
| 87 | 3.2 |
| 86 | 3.1 |
| 85 | 3 |
| 84 | 2.9 |
| 83 | 2.8 |
| 82 | 2.7 |
| 81 | 2.6 |
| 80 | 2.5 |
| 79 | 2.4 |

| | |
|---|---|
| 78 | 2.3 |
| 77 | 2.2 |
| 76 | 2.1 |
| 75 | 2 |
| 74 | 1.9 |
| 73 | 1.8 |
| 72 | 1.7 |
| 71 | 1.6 |
| 70 | 1.5 |
| 69 | 1.4 |
| 68 | 1.3 |
| 67 | 1.2 |
| 66 | 1.1 |
| 65 | 1 |

### Late assignment policy

It is essential that assignments are turned in on time to facilitate grading in a timely manner. Late assignments without prior approval may be penalized 10% per class period late.

### Student responsibilities

Students are expected to arrive on time and be ready to start right at 8:30 AM. This is critical. Attendance will be taken.

If students must miss a class due to illness, the instructors should be notified as soon as possible. Students should notify instructors of any other absence to discuss possibility of make up work.

Students are expected to come to class prepared (keep up with the readings).

It is absolutely essential that students adhere to appropriate lab safety practices, failure to adhere to safety practices will result in immediate stop of lab practices for the day.

Above all, ask questions.

## COURSE SESSION SCHEDULE

| Date | Topic | Location |
|---|---|---|
| Jan 4 | Introduction/overview, Lab safety | HSB T-369/375 |
| Jan 6 | Sterile technique, Microbiology review, Sampling & experimental design | HSB T-369/375 |
| Jan 9 | QA/QC and regulations | HSB T-369/375 |
| Jan 11, 13 | Lab 1: MPN multiple tube fermentation, Colilert [yes/no] | HSB T-369/375 |
| Jan 16 | **HOLIDAY - Martin Luther King Jr Day** | No class |
| Jan 18, 20 | Lab 1: MPN multiple tube fermentation, Colilert [yes/no] continued | HSB T-369/375 |
| Jan 23, 25, 27, 30 | Lab 2: IDEXX and membrane filtration to detect enterococci/*E. coli.*<br>Jan 25: Lab 1 write-up due | HSB T-369/375 |

| | | |
|---|---|---|
| Jan 30, Feb 1, 3, 6 | Lab 3: Surface sampling for *S. aureus* and methicillin-resistant *S. aureus* (MRSA).<br>Feb 1: Lab 2 write-up due | HSB T-369/375 |
| Feb 8, 10, 13 | Lab 4: *Salmonella* in chicken.<br>Feb 10: Lab 3 write-up due | HSB T-369/375 |
| Feb 15 | Lab 5 Lecture: Airborne Microbial contaminants<br>Lab 6 Lecture: DNA extraction | HSB T-369/375 |
| Feb 17 | Lab 5: Airborne Microbial contaminants (lab groups 1-3)<br>Lab 6: DNA extraction (lab groups 4-7)<br>Lab 4 write-up due | HSB T-369/375<br>Roo 2323 |
| Feb 20 | **HOLIDAY - Presidents' Day** | No class |
| Feb 22 | Lab 5: Airborne Microbial contaminants (lab groups 4-7)<br>Lab 6: DNA extraction (lab groups 1-3) | HSB T-369/375<br>Roo 2323 |
| Feb 24 | Lab 7 Lecture: qPCR | HSB T-369/375 |
| Feb 27 | Lab 7: qPCR (lab group 1) | Roo 2323 |
| Mar 1 | Lab 7: qPCR (lab group 2)<br>Lab 7: qPCR analysis (lab group 1)<br>Lab 5 and 6 write-ups due | Roo 2323 |
| Mar 3 | Lab 7: qPCR (lab group 3)<br>Lab 7: qPCR analysis (lab group 2) | Roo 2323 |
| Mar 6 | Lab 7: qPCR (lab groups 4 & 5)<br>Lab 7: qPCR analysis (lab group 3) | Roo 2323 |
| Mar 8 | Lab 7: qPCR (lab groups 6 & 7)<br>Lab 7: qPCR analysis (lab groups 4 & 5) | Roo 2323 |
| Mar 10 | Lab 7: qPCR analysis (lab groups 6 & 7) | Roo 2323 |
| Mar 13-16 | **Final Exam -** Open Book/Notes<br>Mar 16: Lab 7 write-up due | Online |

### Communication Skills

Communication through writing and speaking is an important transferable skill for all career pathways. Establishing a strong foundation in communication skills will help you be successful throughout your future course work and career. Therefore, this course includes assignments with the goal to help you identify areas of strength and improvement in your communication. If you feel that you could benefit from additional opportunities to improve your writing skills in particular, a list of resources at the UW and others accessible online can be found on the SPH website at https://sph.washington.edu/sites/default/files/inline-files/Writing-Resources-4.3.19.pdf.

## IMPORTANT POLICIES & RESOURCES

### Academic Integrity

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity.

The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the SPH Academic Integrity Policy. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct website.

## Access and Accommodations

Your experience in this class is important to me. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you have already established accommodations with Disability Resources for Students (DRS), please activate your accommodations via myDRS so we can discuss how they will be implemented in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), contact DRS directly to set up an Access Plan. DRS facilitates the interactive process that establishes reasonable accommodations. Contact DRS at disability.uw.edu.

## Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodatio…). Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-requ…).

## Equity, Diversity and Inclusion

Diverse backgrounds, embodiments and experiences are essential to the critical thinking endeavor at the heart of University education. In SPH, students are expected:

1. To respect individual differences, which may include, but are not limited to, age, cultural background, disability, ethnicity, family status, gender, immigration status, national origin, race, religion, sex, sexual orientation, socioeconomic status and veteran status.
2. To engage respectfully in the discussion of diverse worldviews and ideologies embedded in course readings, presentations and artifacts, including those course materials that are at odds with personal beliefs and values.
3. To encourage students with concerns about classroom climate to talk to their instructor, adviser, a member of the departmental or SPH EDI Committee, the Assistant Dean for EDI, or the program's director.

## Classroom Climate

The UW School of Public Health seeks to ensure all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. We encourage students with concerns about classroom climate to talk to your instructor, your faculty or academic advisor, or a member of the departmental or SPH Diversity Committee. Victoria Gardner (vg@uw.edu), SPH Assistant Dean for Equity, Diversity & Inclusion, is also a resource for students with concerns related to equity, diversity, and inclusion.

## Pronouns

According to the UW First Year Programs, being an ally is not just about intention, it's also about behavior. We share our pronouns because we strive to cultivate an inclusive environment where people of all genders feel safe and respected. We cannot assume we know someone's gender just by looking at them. So we invite everyone to share their pronouns. Faculty training and consultation on pronoun use is available for SPH faculty from the Assistant Dean for EDI. Including pronouns on syllabi is optional as we work to develop and provide further training to all teaching faculty.

## Bias Concerns

The Office of the Dean has a student concern policy, a faculty concern policy and standard HR procedures for staff concerns. Our 2018 climate survey states that most people in SPH do not report bias incidents because they do not know where to go. Students are encouraged to report any incidents of bias to someone they feel comfortable with, including instructors, advisers or department staff. They can email dcinfo@uw.edu for immediate follow up. Bias concerns can be anonymously and confidentially reported at this link https://sph.washington.edu/about/diversity/bias-concerns. Data is collected by the Assistant Dean for EDI and the Director of Program Operations for Student and Academic Services and tracked for resolution and areas are identified for further training.

## Safety

Call SafeCampus at 206-685-7233 anytime – no matter where you work or study – to anonymously discuss safety and well-being concerns for yourself or others. SafeCampus's team of caring professionals will provide individualized support, while discussing short- and long-term solutions and connecting you with additional resources when requested.

## Excused Absence from Class

Students are expected to attend class and to participate in all graded activities, including midterms and final examinations. A student who is anticipating being absent from class due to a Religious Accommodation activity needs to complete the Religious Accommodations request process by the second Friday of the quarter. Students who anticipate missing class due to attendance at academic conferences or field trips, or participation in university sponsored activities should provide a written notice to the instructor ahead of the absence. The instructor will determine if the graded activity or exam can be rescheduled or if there is equivalent work that can be done as an equivalent, as determined by the instructor.

## Medical Excuse Notes

Students are expected to attend class and to participate in all graded activities, including midterms and final examinations. To protect student privacy and the integrity of the academic experience, students will not be required to provide a medical excuse note to justify an absence from class due to illness. A

student absent from any graded class activity or examination due to illness must request, in writing, to take a rescheduled examination or perform work judged by the instructor to be the equivalent. Students are responsible for taking any number of examinations for which they are scheduled on a given day and may not request an adjustment for this reason alone.