ENVH 432

Environmental and Occupational Sampling and Analysis II

Winter, 2015
Canvas website: https://canvas.uw.edu/courses/947049

Course Overview

Instructor: Gretchen Onstad, PhD
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Class schedule:

Lecture:	Mondays, HSB, T478, 2:30-3:20
Laboratory:	Tuesdays and Thursdays, T568-574, 9:30-12:20
Final:	Tuesday, March 17, T478, 4:30-6:20pm

Class Text (optional):

Quantitative Chemical Analysis, 7th or 8th edition, by Daniel C. Harris
On reserve in Odegaard Library and HSB F226.
Fundamentals of Environmental Sampling and Analysis by Chunlong Zhang, Hoboken, N.J: Wiley-Interscience, 2007, available as eBook

Course Description:

This class is the second in a 3 quarter series intended to give students a background and some familiarity with measurement for environmental assessment. The focus of ENVH 432 is detection, sampling, and analysis of chemical hazards in different samples from occupational or environmental settings. This is an introductory course, potentially leading to more specific courses on sampling and analysis of air, water, wastewater, marine samples, soils, and occupational hazards.

Course Learning objectives:

At the end of this course, students should be able to accomplish the following:

1. Identify literature sources of standard methods for environmental and occupational assessment of chemical contaminants, and provide a framework for method selection.
2. Develop and apply a sampling strategy to adequately characterize chemical contaminants in air, water, and solid environmental media.

3. Describe basic concepts in quality control and quality assurance for chemical measurement data.
4. Critically evaluate the reliability of chemical measurement data.
5. Develop analysis plans for measurements of four different chemical contaminants in environmental and occupational samples. Your analysis plans will include selection of appropriate analytical methods and design of appropriate experimental procedures to ensure reliable data
6. Recognize the operating principles, advantages and limitations of several kinds of currently-used semi-quantitative field indicators. Demonstrate proficiency in the use of these devices.
7. Recognize the operating principles, advantages and limitations of several kinds of currently-used field meters for chemical agents. Demonstrate proficiency in the use of these devices.
8. Demonstrate knowledge of the operating principles, advantages and limitations of several kinds of major kinds of laboratory instruments used for chemical analysis, including: FTIR, UV/visible absorption spectrometers, gas chromatographs, atomic absorption spectrometers. Demonstrate proficiency in the operation of these devices.
9. Demonstrate the ability to work effectively and co-operatively as part of a team.
10. Demonstrate competency in technical writing.
11. Describe health hazards associated with at least four important chemical agents found in environmental and occupational settings, and hazards associated with the analytical procedures used to measure those contaminants.

Class organization:

Refer to the class schedule. The course consists of lectures every Monday and lab sessions Tuesday and Thursday. The first lab session is devoted to basic techniques that will be used later in the course: preparation of standards, calibration of equipment. The remainder of the course is comprised of 4 lab modules: air, water, solid media, and airborne particles. Teams of 5-6 students will carry out each module, which typically have a lab preparation session, a field sampling day, a sample prep session and a lab measurement session.

Class assignments that are turned in for grading include article questions, pre-lab quizzes and the written reports for each lab module or experiment (as specified in each module description). However, this is intended to be a hands-on course and requires preparation in the form of collecting information, planning activities, calculating standard amounts or sampling times, and each student is accountable to their team members to have done the needed preparation prior to class. **Please notify the course instructor or TA, if you will not be able to attend a class.**

Grading:

The final grade will be determined as the weighted mean of the components listed below. The weighted average will be converted to a numeric grade between 0 and 4.

1)	quizzes	10%
2)	lab reports	40%
3)	journal article questions	10%

4) class participation 10%
5) final exam 30%

Quizzes (10%):
Quizzes are designed to prepare students for conducting the laboratory experiments. Quiz questions will be emailed to students by the Friday prior to starting each lab module. Most questions can be answered by reading the lab or lecture materials, or additional resources posted on Pages/Resources on the course website.

Lab Reports (40%):
Each lab group prepares a report and receives a collective grade for the modules. Specific roles and responsibilities are outlined in the "Round-robin" handout. Each lab report counts as 10% of the total grade. Individual students can improve their lab report grade (1%) by submitting draft sections and reviewing their peers' sections prior to the final lab report submission.
Reminder: Students are expected to reference all work and give appropriate attribution for all materials cited, including any reference to websites or articles.
Warning: PLAGIARISM, which is the appropriation of another person's ideas, processes, results or words without giving appropriate credit, is considered academic misconduct. More information can be found at http://depts.washington.edu/grading/conduct/index.html Click on link to "Student Academic Responsibility" for a detailed description of plagiarism and other student conduct issues.
Writing Resources: A self-test for plagiarism is available at http://www.wcu.edu/11869.asp and additional resources are posted on the course website under Pages/Plagiarism. The UW Bothell Writing Center provides additional resources for English as a second language (ESL) students: http://www.uwb.edu/wacc/for-students/eslhandbook

Journal Article Questions & Discussion (10%):
Students are expected to read the assigned article (Papers 1-6) and answer questions prior to each lecture. Questions will be incorporated into lectures and occasional group discussions. The practice (Chlorine) Lab in the first week will also fall under this grading category.

Participation (10%):
Students are graded individually on class and laboratory session participation. Ways to earn these points include asking questions in class, actively contributing to laboratory sessions and promoting teamwork in lab groups. Students have an opportunity to evaluate their peers' participation during the review of lab report sections, and this will influence their peers' final participation grade.
Common Courtesy: We expect students attending class to give their full attention to class activities; so please, no use of computers or cell phones, including texting, during class, unless needed for data analysis in lab sessions. Thank you!

Students with Disabilities:
Your experience in this class is important to us, and 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 experience barriers based on a disability or temporary health condition, please seek a meeting with DRS to discuss and address them. If you have already established

accommodations with DRS, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course.

Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu

If you have a disability that is not recognized by Disabled Student Services, please feel free to discuss it with me if you feel it will impact your performance in the course.

Schedule, Winter 2015 (most current version on Calendar menu of course website)

Week	***Lecture Topics***	***Monday*** 2:30-3:20 pm	***Tuesday*** 9:30am-12:20pm	***Thursday*** 9:30am-12:20pm
1: Jan 5	Course Overview and Lab Reports	Overview	Lab Safety & Chlorine Lab	**No class** Survey due
2: Jan 12	QA/QC	Lecture 1 Paper 1 due	Lab 1 Quiz 1 due	Lab 1
3: Jan 19	**No class**	**HOLIDAY**	Lab 1	Lab 1
4: Jan 26	Sample Preparation	Lecture 2 Paper 2 due	Lab 2 Quiz 2 due	Lab 2 Report 1 due Friday
5: Feb 2	Chromatography	Lecture 3 Paper 3 due	Lab 2	Lab 2
6: Feb 9	Spectroscopy	Lecture 4 Paper 4 due	Lab 3 Quiz 3 due	Lab 3 Report 2 due Friday
7: Feb 16	**No class**	**HOLIDAY**	Lab 3	Lab 3
8: Feb 23	Article Discussion	Lecture 5 Paper 5 due	Lab 4 Quiz 4 due	Lab 4 Report 3 due Friday
9: Mar 2	Mass Spectrometry (Dr. Chris Gill)	Lecture 6 Paper 6 due	Lab 4	Lab 4
10: Mar 9	Review	Review Session	No class	Report 4 due Friday

Group Assignments for Labs 1-4 will be posted on Friday, Jan 9th.

Experiment A	particles	gravimetry and nephelometry
Experiment B	gases (CO/CO2)	tubes, DRIs, FTIR
Experiment C	lead in paint	test kit, XRF, AA
Experiment D	disinfection by-products in water	GC and test-kit