ENV H 553 A Wi 18: Environmental Exposure Monitoring Methods

Jump to Today ✎ Edit

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

ENV H 553 A: Environmental Exposure Monitoring Methods - Winter 2018

4 credits, graded, SLN 14518

Instructor:

Christopher D Simpson, Professor & Academic Degree Leader

DEOHS

Health Sciences Building F-225B

(206) 543-3222

simpson1@uw.edu

Office hours by appointment

Time: Mondays + Wednesdays at 12:30p - 1:20p and Friday 11:30a - 1:20p

Location: Health Sciences Building: Room T474 on Mondays & Wednesdays ; Room BB1404 on Fridays

Brief Description:

A key element in maintaining a healthy human environment is Exposure Monitoring for contaminants. This course will emphasize developing a thorough understanding of the principles and methods for determining the intensity of exposure to contaminants in air and on surfaces, in food and drinking water, and for measurement of exposure markers in human specimens. In addition, procedures for interpretation and application of results will be explored, in the context of making decisions regarding the hazard magnitude and choice of methods for control.

Course Objectives:

At the end of the course, students should be able:

1. To describe the strategy and rationale for environmental sampling and exposure monitoring, including the selection of appropriate sampling methods.

2. To demonstrate the application of principles and techniques for sampling air and contaminated surfaces, food, drinking water, and human specimens to exposure monitoring.

3. To choose and explain the proper chemical and physical analytical methods to be applied to these samples.

4. To implement standard methods of validation and evaluation to determine the strengths and limitations of each sampling and analytical method, and to decide whether results are sensible within those limitations.

5. To identify and describe the standard published references in environmental sampling and analysis for assessment of human exposure.

Course Texts:

Zhang, C. Fundamentals of Environmental Sampling and Analysis. Hoboken, NJ: John Wiley & Sons, 2007.

Electronic access to this text:

http://washington.eblib.com/patron/FullRecord.aspx?p=287305 (http://washington.eblib.com/patron/FullRecord.aspx?p=287305)

Ramachandran, G. Occupational Exposure Assessment for Air Contaminants. Boca Raton, FL: Taylor & Francis, 2005.

http://washington.eblib.com.offcampus.lib.washington.edu/patron/FullRecord.aspx?p=264072 (http://washington.eblib.com.offcampus.lib.washington.edu/patron/FullRecord.aspx?p=264072)

Supplemental References:

Artiola JF, et al, Eds. Environmental Monitoring and Characterization. Amsterdam: Elsevier Academic Press, 2004. http://www.eng.uerj.br/~fariasol/disciplinas/Monitoramento%20Ambiental.old/Environmental%20Monitoring%20and%20Characterization.pdf (http://www.eng.uerj.br/~fariasol/disciplinas/Monitoramento%20Ambiental.old/Environmental%20Monitoring%20and%20Characterization.pdf)

Clesceri LS, Greenberg AE, Eaton AD, eds. Standard Methods for the Examination of Water and Wastewater, 20th Edition. Washington, DC: APHA, AWWA, and the Water Environment Federation, 1998. http://www.mwa.co.th/download/file_upload/SMWW_1000-3000.pdf (http://www.mwa.co.th/download/file_upload/SMWW_1000-3000.pdf)

Gilbert RO. Statistical Methods for Environmental Pollution Monitoring. New York: John Wiley & Sons, 1987. http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/303d_policydocs/205.pdf (http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/303d_policydocs/205.pdf)

Keith LH, ed. Principles of Environmental Sampling, Second Edition. Washington, DC: American Chemical Society, 1996.

Leidel NA, Busch KA, Lynch JR. Occupational Exposure Sampling Strategy Manual. Cincinnati, OH: National Institute for Occupational Safety and Health, 1977. https://www.cdc.gov/niosh/docs/77-173/pdfs/77-173.pdf (https://www.cdc.gov/niosh/docs/77-173/pdfs/77-173.pdf)

McDermott HJ. Air Monitoring for Toxic Exposures. Second Ed. New York: Wiley Interscience, 2004. http://uwashington.worldcat.org/title/air-monitoring-for-toxicexposures/oclc/56733897/viewport (http://uwashington.worldcat.org/title/air-monitoring-for-toxicexposures/oclc/56733897/viewport)

National Research Council. Exposure Science in the 21st Century: A Vision and a Strategy. Washington, DC: National Academy Press, 2012. https://www.nap.edu/read/13507/chapter/1 (https://www.nap.edu/read/13507/chapter/1)

Course Requirements:

1. Reading assignments and class participation: Students should read the assignments prior to the scheduled class and be familiar with the background for each topic scheduled. Reading assignments will come from the required texts and provided handouts.

2. Homework problems: Problem sets will be assigned, generally weekly, and are to be completed by each student independently except where specific instructions to the contrary are provided. Homework will be graded and returned in a timely fashion.

3. Examinations: Two mid-term quizzes will be given during class on the dates indicated in the course schedule. Each of these will address material covered since the previous quiz. The final examination is scheduled during examination week, and will be cumulative in its coverage.

Basis for Grading:

The final grade will be determined as the weighted mean of scores on the homework and exams. The weighting factors are:

Homework	40%
Mid Term Quizzes	15% each
Final Exam	30%

Students with Disabilities:

Access and Accommodation

Your experience in this class is important to me. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs 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), you are welcome to contact DRS at 206-543-8924 or **uwdrs@uw.edu** (mailto:uwdrs@uw.edu) or **disability.uw.edu** (http://disability.uw.edu/) . 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. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

Academic Integrity **http://sph.washington.edu/students/academicintegrity/** (http://sph.washington.edu/students/academicintegrity/)

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.

Course Summary:

Date	Details	
Wed Jan 3, 2018	**ENVH553A - Lecture 1 - Introduction; Role of Exposure Assessment in Risk Assessment and Risk Management** (https://canvas.uw.edu/calendar?event_id=1077548&include_contexts=course_1200791)	12:30pm to 1:20pm
Fri Jan 5, 2018	**ENVH553A - Lecture 2 - Elements of Exposure Assessment: Concentration, Intake Rate, Deposition & Uptake Fraction** (https://canvas.uw.edu/calendar?event_id=1077536&include_contexts=course_1200791)	11:30am to 12:20pm
	ENVH553A - Lecture 3 - Characteristics of Contaminant Concentration: volume fraction, mass fraction, mass/volume, units (https://canvas.uw.edu/calendar?event_id=1077540&include_contexts=course_1200791)	12:30pm to 1:20pm
Mon Jan 8, 2018	**ENVH553A - Lecture 4 - Characteristics of Particles: Size and Size Distributions** (https://canvas.uw.edu/calendar?event_id=1077535&include_contexts=course_1200791)	12:30pm to 1:20pm
Wed Jan 10, 2018	**ENVH553A - Lecture 5 - Characteristics of Particles, continued** (https://canvas.uw.edu/calendar?event_id=1077552&include_contexts=course_1200791)	12:30pm to 1:20pm
Fri Jan 12, 2018	**ENVH553A - Lecture 6 - Contaminant Properties: Phase Equilibrium** (https://canvas.uw.edu/calendar?event_id=1077551&include_contexts=course_1200791)	11:30am to 12:20pm
	ENVH553A - Lecture 7 - Contaminant Properties: Phase equilibria (cont)., and Interphase transport (https://canvas.uw.edu/calendar?event_id=1077547&include_contexts=course_1200791)	12:30pm to 1:20pm
Mon Jan 15, 2018	**UW HOLIDAY** (https://canvas.uw.edu/calendar?event_id=1077555&include_contexts=course_1200791)	12am
Wed Jan 17, 2018	**ENVH553A - Lecture 8 - Contaminant Properties: Interphase transport, part 2** (https://canvas.uw.edu/calendar?event_id=1077534&include_contexts=course_1200791)	12:30pm to 1:20pm
	Problem set #1 (https://canvas.uw.edu/courses/1200791/assignments/4055791)	due by 11:59pm
Fri Jan 19, 2018	**ENVH553A - Lecture 9: Interaction with Electromagnetic radiation** (https://canvas.uw.edu/calendar?event_id=1077519&include_contexts=course_1200791)	11:30am to 12:20pm
	ENVH553A - Lecture 10 - Contaminant Properties: density, viscosity, dielectric strength, polarity (https://canvas.uw.edu/calendar?event_id=1077546&include_contexts=course_1200791)	12:30pm to 1:20pm

Mon Jan 22, 2018	ENVH553A - Lecture 11 Compartment Properties: Volume and Flow Rate (Part 1) (https://canvas.uw.edu/calendar?event_id=1077550&include_contexts=course_1200791)	12:30pm to 1:20pm
Wed Jan 24, 2018	ENVH553A Lecture 12 Compartment properties: Volume and FLow rate (part 2) (https://canvas.uw.edu/calendar?event_id=1077549&include_contexts=course_1200791)	12:30pm to 1:20pm
	Problem set #2 (https://canvas.uw.edu/courses/1200791/assignments/4068962)	due by 11:59pm
Fri Jan 26, 2018	ENVH553A Lecture #13 Sampling methods: Integrating versus Continuous; Extractive vs in situ (https://canvas.uw.edu/calendar?event_id=1077531&include_contexts=course_1200791)	11:30am to 12:20pm
	ENVH553A Lecture 14 Particle methods: Particle motion in air (https://canvas.uw.edu/calendar?event_id=1077532&include_contexts=course_1200791)	12:30pm to 1:20pm
Mon Jan 29, 2018	study session (https://canvas.uw.edu/calendar?event_id=1077530&include_contexts=course_1200791)	12:30pm to 1:30pm
Wed Jan 31, 2018	ENVH553A: Quiz #1 (https://canvas.uw.edu/calendar?event_id=1077533&include_contexts=course_1200791)	12:30pm to 1:20pm
	Mid term quiz #1 (https://canvas.uw.edu/courses/1200791/assignments/4083021)	due by 1pm
Fri Feb 2, 2018	ENVH553A Lecture #15 Particle methods: Filtration (https://canvas.uw.edu/calendar?event_id=1077539&include_contexts=course_1200791)	11:30am to 12:20pm
	ENVH553A: L#16 Particle methods: Impaction (https://canvas.uw.edu/calendar?event_id=1077529&include_contexts=course_1200791)	12:30pm to 1:20pm
Mon Feb 5, 2018	ENVH553A: Lecture #17 Particle methods - Optical, Electric, Diffusive (https://canvas.uw.edu/calendar?event_id=1077544&include_contexts=course_1200791)	12:30pm to 1:20pm
Wed Feb 7, 2018	ENVH553A: Lecture # 18 Monitoring nanoparticles (https://canvas.uw.edu/calendar?event_id=1077528&include_contexts=course_1200791)	12:30pm to 1:20pm
Fri Feb 9, 2018	ENVH553A: Lecture #19: gas methods - Absorption & diffusive samplers (https://canvas.uw.edu/calendar?event_id=1077538&include_contexts=course_1200791)	11:30am to 12:20pm
	ENVH553A: Lecture # 20 Gas Methods: Adsorption and Diffusion (https://canvas.uw.edu/calendar?event_id=1077545&include_contexts=course_1200791)	12:30pm to 1:20pm
	Problem Set #3 (https://canvas.uw.edu/courses/1200791/assignments/4085060)	due by 11:59pm
Mon Feb 12, 2018	ENVH553A: Lecture # 21 Gas Methods - Optical/Spectroscopy (https://canvas.uw.edu/calendar?event_id=1077525&include_contexts=course_1200791)	12:30pm to 1:30pm
Wed Feb 14, 2018	ENVH553A Lecture #22: Gas Methods - Electrochemical (https://canvas.uw.edu/calendar?event_id=1077537&include_contexts=course_1200791)	12:30pm to 1:20pm
Fri Feb 16, 2018	ENVH553A: Chromatography (https://canvas.uw.edu/calendar?event_id=1077521&include_contexts=course_1200791)	11:30am to 1:20pm
	Problem set #4 (https://canvas.uw.edu/courses/1200791/assignments/4093261)	due by 11:59pm
Mon Feb 19, 2018	UW HOLIDAY (https://canvas.uw.edu/calendar?event_id=1077553&include_contexts=course_1200791)	12am
Wed Feb 21, 2018	Lecture #32: Sampling of surfaces and Dermal sampling (https://canvas.uw.edu/calendar?event_id=1077522&include_contexts=course_1200791)	12:30pm to 1:20pm
Fri Feb 23, 2018	Lecture #29: Mass spectrometry (https://canvas.uw.edu/calendar?event_id=1077520&include_contexts=course_1200791)	12:30pm to 1:20pm
	Lecture #30: Mass spectrometry cont. (https://canvas.uw.edu/calendar?event_id=1077523&include_contexts=course_1200791)	12:30pm to 1:20pm
Mon Feb 26, 2018	study session (https://canvas.uw.edu/calendar?event_id=1077524&include_contexts=course_1200791)	12:30pm to 1:20pm
Wed Feb 28, 2018	ENVH553A: Quiz #2 (https://canvas.uw.edu/calendar?event_id=1077542&include_contexts=course_1200791)	12:30pm to 1:20pm
	ENVH553A: Sampling and analysis methods for microbiological agents	

Fri Mar 2, 2018	(https://canvas.uw.edu/calendar?event_id=1077527&include_contexts=course_1200791)	11:30am to 1:20pm
Mon Mar 5, 2018	ENVH553A: Lecture #31 Data Quality (https://canvas.uw.edu/calendar?event_id=1077543&include_contexts=course_1200791)	12:30pm to 1:20pm
Wed Mar 7, 2018	ENVH553A: Study session (https://canvas.uw.edu/calendar?event_id=1077541&include_contexts=course_1200791)	12:30pm to 1:20pm
Thu Mar 15, 2018	Final exam (https://canvas.uw.edu/calendar?event_id=1100312&include_contexts=course_1200791)	8:30am to 10:20am
	Final Exam (https://canvas.uw.edu/courses/1200791/assignments/4063741)	due by 8:30am