Course Syllabus At

Jump to Today



Course Description

This course presents the engineering principles for the selection and design of exposure controls to protect people from chemical, physical and biological agents. The course is intended for graduate students in exposure sciences, occupational health, engineering, and environmental health. The class is broadly organized around modules on the hierarchy of controls, and points of control applied to sources, pathways and receptors. Case study exercises are used to illustrate the application of control techniques in real situations, and integrate the various approaches from the lecture material.

The extended content session (1hr/week, 1 credit) provides more in-depth material related to the use of local exhaust ventilation (LEV) for source controls, particularly in occupational settings. This session expands content on LEV design, and includes material on hoods, air cleaners and fan selection. Students will complete an assignment in which they design a two-branch ventilation system. Students in the regular section (3 credits) receive instruction in the applications of local exhaust hoods for source control, but not in the design of LEV systems.

Learning Objectives

At the conclusion of this course, students will be able to:

- 1. Apply hazard ranking and banding strategies to workplace and environmental exposure scenarios
- 2. Name Federal and State regulation authorities and requirements related to human exposures
- 3. Compute exposure estimates for well-mixed rooms involving dilution ventilation and constant inputs
- 4. Describe HVAC components used for indoor air quality and infection control in health care settings
- 5. Assess the air flow characteristics of a ventilation system and apply this data for system diagnostics
- 6. Select the appropriate type of local exhaust hood for controlling workplace exposures
- 7. Describe criteria for selecting chemical or biological protective clothing
- 8. Describe criteria for selecting protective equipment for physical agents such as noise of laser light
- 9. List the elements and evaluation of a comprehensive respiratory protection program
- 10. Describe the requirements for inventory control and chemical hygiene for hazardous materials

Additional Ventilation Section Learning Objectives:

- 1. Compute exposure estimates for a dilution ventilation situation with variable input conditions.
- 2. Explain principles of fluid mechanics that apply to flow of air or liquids in building ducting and piping systems; describe fluid measurements in terms of pressure drop, flow rate, and velocity.
- 3. Estimate friction losses for flow through ducts using standard tables.
- 4. Specify the components of a single-branch local exhaust ventilation system.
- 5. Specify the components and fan needs of a two branch local exhaust ventilation system.

Textbooks & Study Resources (Books on reserve at Health Sciences Library).

- McDermot H, Ventilation for Contamination Control ACGIH Publications 2001
- American Conference of Governmental Industrial Hygienists. Committee on Industrial Ventilation.
 (2001). Industrial Ventilation: A Manual of Recommended Practice. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists.

Course Grading Policy

Weekly reading assignments will be posted on the canvas website.

Students are responsible for submitting assignments on time and for class readings.

Assigned discussion will be graded for both content and participation.

The final grade consists of the following components:

- Short Assignments (4) + Graded discussion (1) = 50%
- Ventilation lab exercise written report = 10%
- Final project & Case study (individual write up, 30% + group presentation, 10%) = 40%

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 advisor, a member of the departmental or SPH Diversity Committee and/or the program director.

Access and Accommodations

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 or disability.uw.edu (http://depts.washington.edu/uwdrs/). 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.

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 <u>Religious</u>

<u>Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/)</u>. Accommodations must be requested within the first two weeks of this course using <u>the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/)</u>.

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 (http://sph.washington.edu/students/academicintegrity/). 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	Due
Tue Jan 3, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016492&include_contexts=course_1612755)	30pm to 5pm
	Class Outline and Case Studies (Yost) due (https://canvas.uw.edu/courses/1612755/assignments/7925384)	e by 11:55pm
	Case Study Example #1: Lead in metal recycling du (https://canvas.uw.edu/courses/1612755/assignments/7761246)	e by 11:56pm
	Noise Case Study Example (https://canvas.uw.edu/courses/1612755/assignments/7761247)	e by 11:57pm
	Introduction to Exposure Control (Ceballos) due (https://canvas.uw.edu/courses/1612755/assignments/7761252)	e by 11:59pm

Date	Details	Due
Thu Jan 5, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016493&include_contexts=course_1612755)	2:30pm to 5pm
	No Class Cascadia Meeting (https://canvas.uw.edu/courses/1612755/assignments/783636	9) due by 11:59pm
Tue Jan 10, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016494&include_contexts=course_1612755)	2:30pm to 5pm
	Regulatory Mandates (Yost) (https://canvas.uw.edu/courses/1612755/assignments/776125	7). due by 11:55pm
	Chemical Management (2nd Hour) (https://canvas.uw.edu/courses/1612755/assignments/788308	due by 11:59pm <u>6)</u>
Thu Jan 12, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016495&include_contexts=course_1612755)	2:30pm to 5pm
	Substitution/Green Chemistry: finding safer alternatives (Ceballlos) (https://canvas.uw.edu/courses/1612755/assignments/776126	due by 11:59pm 1)

Date	Details	Due
	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016496&include_contexts=course_1612755)	2:30pm to 5pm
Tue Jan 17, 2023	Control Banding (Ceballos) (https://canvas.uw.edu/courses/1612755/assignments/7836370)	due by 11:55pm
	Dilution Ventilation: Case studies on dangers of confined spaces (2nd hour) (https://canvas.uw.edu/courses/1612755/assignments/7860352)	due by 11:56pm
	Assignment 1 - Substitution (https://canvas.uw.edu/courses/1612755/assignments/7761237)	due by 11:57pm
Thu lan 10, 2022	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event id=3016497&include contexts=course 1612755)	2:30pm to 5pm
Thu Jan 19, 2023	Dilution Ventilation: theory and application to confined space (Yost/Cohen) (https://canvas.uw.edu/courses/1612755/assignments/7761245)	due by 2:30pm
Fri Jan 20, 2022	© Case Study - Confined Space Discussion Questions (https://canvas.uw.edu/courses/1612755/assignments/7914715)	due by 11:59pm
Fri Jan 20, 2023	FN Graded Discussion - Xcel Energy (https://canvas.uw.edu/courses/1612755/assignments/7960861)	due by 11:59pm

Date	Details Du
Tue Jan 24, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016498&include_contexts=course_1612755)
	Fluid Mechanics Primer: Density, Viscosity & Fluid Dynamics (https://canvas.uw.edu/courses/1612755/assignments/7761250)
	Bernoulli Equation; Essential Pressure & Flow Relationships due by 11:56pr (https://canvas.uw.edu/courses/1612755/assignments/7761242)
Thu Jan 26, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016499&include_contexts=course_1612755)
	Fan Selection (air cleaners recorded) due by 11:59pr (https://canvas.uw.edu/courses/1612755/assignments/7761235)
	Single & Multi Branch Systems (https://canvas.uw.edu/courses/1612755/assignments/7761260) due by 11:59pr
Tue Jan 31, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016500&include_contexts=course_1612755)
	Assignment 2 - Dilution Ventilation Problem Set (https://canvas.uw.edu/courses/1612755/assignments/7761238)
	Hood Design & Entry Effects; Ventilation Assessment air cleaning and Troubleshooting (https://canvas.uw.edu/courses/1612755/assignments/7761253)

Date	Details	Due
Thu Feb 2, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016501&include_contexts=course_1612755)	2:30pm to 5pm
	More about ACH and Group Project Discussions (https://canvas.uw.edu/courses/1612755/assignments/7836404)	due by 11:59pm
Tue Feb 7, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event id=3016502&include contexts=course 1612755)	2:30pm to 5pm
	By Lab Exercise 1 (MEET AT ROOSEVELT LOBBY) (https://canvas.uw.edu/courses/1612755/assignments/7761255)	due by 11:59pm
Thu Feb 9, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016503&include_contexts=course_1612755)	2:30pm to 5pm
	Lab Exercise 2 (MEET AT ROOSEVELT LOBBY) (https://canvas.uw.edu/courses/1612755/assignments/7761256)	due by 11:59pm
Tue Feb 14, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016504&include_contexts=course_1612755)	2:30pm to 5pm
	Administrative Controls (Ceballos) (https://canvas.uw.edu/courses/1612755/assignments/7836372)	due by 11:59pm

Date	Details	Due
	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016505&include_contexts=course_1612755)	2:30pm to 5pm
Thu Feb 16, 2023	Building Thermal Comfort - system components (https://canvas.uw.edu/courses/1612755/assignments/7854	due by 11:59pm 4137)
	IAQ investigations (https://canvas.uw.edu/courses/1612755/assignments/7836	3365) due by 11:59pm
Fri Feb 17, 2023	Assignment 3 - Ventilation Problem Set (https://canvas.uw.edu/courses/1612755/assignments/7914	due by 11:59pm 4708)
Tue Feb 21, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event id=3016506&include contexts=course 1612755)	2:30pm to 5pm
	Exposure Controls for Physical Agents (https://canvas.uw.edu/courses/1612755/assignments/7767	due by 11:59pm 1248)
	OPEN - Hazard controls in health care (https://canvas.uw.edu/courses/1612755/assignments/7854	due by 11:59pm 4135)
Thu Feb 23, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016507&include_contexts=course_1612755)	2:30pm to 5pm
	Tour of Roosevelt Building HVAC system (ROOSEVELT) (https://canvas.uw.edu/courses/1612755/assignments/776/	due by 11:59pm 1254)
Fri Feb 24, 2023	Ventilation lab - writeup (https://canvas.uw.edu/courses/1612755/assignments/776/	1262) due by 11:59pm

Date	Details	Due
Tue Feb 28, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016508&include_contexts=course_1612755)	2:30pm to 5pm
	Chemical & Biological Agents; Chemical Protective Clothing (Ceballos) (https://canvas.uw.edu/courses/1612755/assignments/77612	due by 11:59pm
Thu Mar 2, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016509&include_contexts=course_1612755)	2:30pm to 5pm
	Respirator Fit Testing & Training (ROOSEVELT) (https://canvas.uw.edu/courses/1612755/assignments/77612	due by 2:30pm
	Respirator Selection & Uses (ROOSEVELT) (https://canvas.uw.edu/courses/1612755/assignments/77612	due by 11:59pm 259)
Fri Mar 3, 2023	Assignment 4 - PPE Selection (https://canvas.uw.edu/courses/1612755/assignments/77612	due by 11:59pm
Tue Mar 7, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event_id=3016510&include_contexts=course_1612755)	2:30pm to 5pm
	Group Presentations - Day 1 (https://canvas.uw.edu/courses/1612755/assignments/77612	due by 11:59pm
Thu Mar 9, 2023	ENV H 557 A Wi 23: Exposure Controls (https://canvas.uw.edu/calendar? event id=3016511&include contexts=course 1612755)	2:30pm to 5pm
	Group Presentation - Day 2 (https://canvas.uw.edu/courses/1612755/assignments/77612	due by 11:59pm
Wed Mar 15, 2023	Individual final report - Instructions	due by 5:55pm

Details Date Due (https://canvas.uw.edu/courses/1612755/assignments/7961770) Assignment - LEV System **Design, Segment 1** (https://canvas.uw.edu/courses/1612755/assignments/7761239) Assignment - LEV System **Design, Segment 2** (https://canvas.uw.edu/courses/1612755/assignments/7761240) Assignment - LEV System **Design, Segment 3** (https://canvas.uw.edu/courses/1612755/assignments/7761241) Exposure Controls in Confined Spaces (Ceballos) (https://canvas.uw.edu/courses/1612755/assignments/7761244)