

ENV H 557 A Wi 17: Exposure Controls

[Jump to Today](#)

 [Edit](#)



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

ENV H 557 A: Exposure Controls - Winter 2017

3 credits, graded, SLN 14516

Instructor:

Michael G Yost, Professor & Department Chair

DEOHS

Health Sciences Building - DEOHS Chair's Office

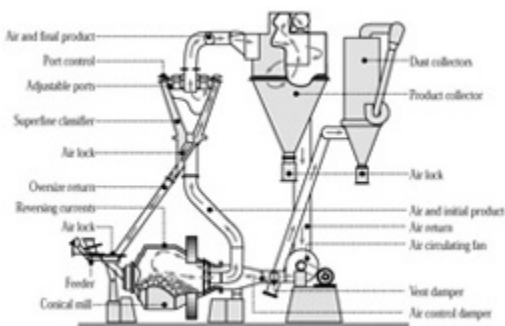
(206) 685-7243

airion@uw.edu

Office hours by appointment

Time: Mondays + Wednesdays at 1:30p - 3:20p

Location: Health Sciences Building E-216



<https://canvas.uw.edu/courses/1022517>

[Course Description](#)

















[Class Books](#)


















[Course Information and Contacts](#)

[Course Learning Objectives](#)

[Grade Policy](#)

Course Summary:

Date	Details	
Tue Jan 3, 2017	 UW Winter Quarter BEGIN (https://canvas.uw.edu/calendar?event_id=966468&include_contexts=course_1099266)	12am
Wed Jan 4, 2017	 Regulatory Mandates (https://canvas.uw.edu/calendar?event_id=966460&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Hazard Ranking & Hierarchy of Controls (https://canvas.uw.edu/calendar?event_id=966462&include_contexts=course_1099266)	2:30pm to 3:20pm
Mon Jan 9, 2017	 Fluid Mechanics Primer Part I (https://canvas.uw.edu/calendar?event_id=966458&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Fluid Mechanics Primer Part II (https://canvas.uw.edu/calendar?event_id=966457&include_contexts=course_1099266)	1:30pm to 3:20pm
	 The Bernoulli Equation (https://canvas.uw.edu/calendar?event_id=966456&include_contexts=course_1099266)	1:30pm to 2:30pm
Wed Jan 11, 2017	 Chemical and Biological Agents (https://canvas.uw.edu/calendar?event_id=966459&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Chemical Safety Management (https://canvas.uw.edu/calendar?event_id=966461&include_contexts=course_1099266)	2:30pm to 3:20pm
Mon Jan 16, 2017	 UW HOLIDAY - MLK Day (https://canvas.uw.edu/calendar?event_id=966467&include_contexts=course_1099266)	12am
Wed Jan 18, 2017	 Case Study 1A: Times Beach MO (https://canvas.uw.edu/calendar?event_id=966455&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Case Study 1B: Spray Buffers in California (https://canvas.uw.edu/calendar?event_id=966466&include_contexts=course_1099266)	1:30pm to 3:20pm
Mon Jan 23, 2017	 Chemical Protective Clothing (Gerry Croteau) (https://canvas.uw.edu/calendar?event_id=966465&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Case Study 2: Confined Spaces (https://canvas.uw.edu/calendar?event_id=966454&include_contexts=course_1099266)	2:30pm to 3:20pm
Wed Jan 25, 2017	 Dilution Ventilation - Led by Marty Cohen in the Field Group Lab at 4225 Roosevelt Way NE (https://canvas.uw.edu/calendar?event_id=966453&include_contexts=course_1099266)	1:30pm to 3:20pm
Fri Jan 27, 2017	 Discussion of Case Study 1B: Spray Buffers and Pesticide drift (https://canvas.uw.edu/courses/1099266/assignments/3524129)	due by 5:01pm
Mon Jan 30, 2017	 Local Exhaust Ventilation: Essential pressure & flow relationships; hood design & entry effects (Meet in E216) (https://canvas.uw.edu/calendar?event_id=966449&include_contexts=course_1099266)	1:30pm to 3:20pm

Wed Feb 1, 2017	 Local Exhaust Ventilation: Assessment & Troubleshooting; Lab Exercise 1 (Roosevelt Building) (https://canvas.uw.edu/calendar?event_id=966451&include_contexts=course_1099266)	1:30pm to 3:20pm
Thu Feb 2, 2017	 Discussion of Case Study 2: Confined Spaces (https://canvas.uw.edu/courses/1099266/assignments/3524128)	due by 11:59pm
Mon Feb 6, 2017	 Local Exhaust System: Single Branch System Design (https://canvas.uw.edu/calendar?event_id=966448&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Vent Design - Multi Branch Systems (https://canvas.uw.edu/calendar?event_id=966447&include_contexts=course_1099266)	2:30pm to 3:20pm
Wed Feb 8, 2017	 LEV: Lab Exercise 2 (ROOSEVELT BUILDING) (https://canvas.uw.edu/calendar?event_id=966450&include_contexts=course_1099266)	1:30pm to 3:20pm
Fri Feb 10, 2017	 Lab Exercise 1 (https://canvas.uw.edu/courses/1099266/assignments/3524134)	due by 5pm
	 Problem Set 1 (https://canvas.uw.edu/courses/1099266/assignments/3524137)	due by 5pm
Mon Feb 13, 2017	 HVAC, Thermal Comfort, IAQ & Plenum Systems - (CLASS HELD AT ROOSEVELT BLDG) (https://canvas.uw.edu/calendar?event_id=966452&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Lab Exercise 2 (https://canvas.uw.edu/courses/1099266/assignments/3524135)	due by 5pm
Wed Feb 15, 2017	 Respirator Selection (https://canvas.uw.edu/calendar?event_id=966463&include_contexts=course_1099266)	1:30pm to 3:20pm
	 LEV Design: Single Branch System Homework (https://canvas.uw.edu/courses/1099266/assignments/3524136)	due by 5pm
Mon Feb 20, 2017	 UW HOLIDAY - President's Day (https://canvas.uw.edu/calendar?event_id=966464&include_contexts=course_1099266)	12am
Wed Feb 22, 2017	 Vent: Fan Selection (https://canvas.uw.edu/calendar?event_id=966446&include_contexts=course_1099266)	1:30pm to 2:20pm
	 System Design & Air Cleaning Systems (https://canvas.uw.edu/calendar?event_id=966445&include_contexts=course_1099266)	2:30pm to 3:20pm
Mon Feb 27, 2017	 Exposure Controls for Physical Agents (https://canvas.uw.edu/calendar?event_id=966444&include_contexts=course_1099266)	1:30pm to 3:20pm
	 Case Study Assignment Guidelines (https://canvas.uw.edu/courses/1099266/assignments/3524130)	due by 11:59pm
Wed Mar 1, 2017	 Case Study 3: Respirator Fit Testing (Roosevelt Bldg) (https://canvas.uw.edu/calendar?event_id=966441&include_contexts=course_1099266)	1:30pm to 3:20pm

Mon Mar 6, 2017

 [Student case study group work time \(https://canvas.uw.edu/calendar?event_id=966442&include_contexts=course_1099266\)](https://canvas.uw.edu/calendar?event_id=966442&include_contexts=course_1099266)


1:30pm to 3:20pm

Wed Mar 8, 2017

 [Student Case Study Presentations 1 & 2 \(https://canvas.uw.edu/calendar?event_id=966443&include_contexts=course_1099266\)](https://canvas.uw.edu/calendar?event_id=966443&include_contexts=course_1099266)

1:30pm to 3:20pm

Sat Mar 18, 2017


 [FINAL EXAM - ENVH557A - take home March 9: due March 19 \(https://canvas.uw.edu/courses/1099266/assignments/3524133\)](https://canvas.uw.edu/courses/1099266/assignments/3524133)

due by 5pm

 [Reference Document for Final \(https://canvas.uw.edu/courses/1099266/assignments/3524138\)](https://canvas.uw.edu/courses/1099266/assignments/3524138)

due by 5pm

 [ENVH 557 Case Study Example \(https://canvas.uw.edu/courses/1099266/assignments/3524131\)](https://canvas.uw.edu/courses/1099266/assignments/3524131)

 [ENVH 557 Case Study Example V2 \(https://canvas.uw.edu/courses/1099266/assignments/3524132\)](https://canvas.uw.edu/courses/1099266/assignments/3524132)

Front Page

Course Description:

This course presents the engineering principles of selecting and designing exposure controls to protect people from chemical physical and biological agents. The course is intended for graduate students in exposure assessment, occupational health, engineering, and environmental health. The class is broadly organized around modules on the concepts of source controls, pathway controls and receptor controls. A series of case study exercises by members of the class is designed to illustrate the application of exposure control techniques in real situations, and integrate the various approaches from the lecture material.

An extended content session (1hr/week, 1 credit) provides in-depth material related to the use of local exhaust ventilation (LEV) for source control in occupational settings. This session expands content on hood selection, and includes new material on duct system design, air cleaners and fan selection necessary for workplace ventilation. Extensive use of computer design methods and a final design project are required for the extended content section. 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.

Class Books

Class Books

"Woodside"

Environmental, Safety, and Health Engineering by Gayle Woodside, Dianna Kocurek,
Contains principles of environmental engineering, safety engineering and industrial hygiene/occupational health engineering.
ISBN: 0471109320, New York, John Wiley 1997 (print on demand book)

"McD"

McDermott, H Ventilation for Contamination Control ACGIH Publications 2001

"IV"

Industrial Ventilation, A Manual of Recommended Practice, ACGIH Pub. 25th Ed.

"PPE/RP guide"

Personal Protective Equipment Pocket Guide,
Genium Publishing Corporation

ISBN: 0-931690-73-0 Copyright © 1995 64 pages

This employee guidebook explains OSHA's personal protective equipment standard and how to comply.
It also includes forms employees can use to document their comprehension of their PPE responsibilities.

Respirator Pocket Guide

Genium Publishing Corporation,

ISBN: 0-931690-81-1 Copyright © 1995 64 pages

This guide explains and helps workers understand the importance of regulatory issues,
how respirators are designed to handle differing airborne hazards, and details basic equipment use and maintenance.

OSHA Publication 3151, Personal Protective Equipment, , 46 pp, (Revised 2004).

OSHA publication #3079, Respiratory Protection, 44pp, (Revised 2002) OSHA Small Entity Compliance Guide for Respiratory Protection Standard (CFR 1910.134), 149pp

Selected textbooks and study resources

"Woodside" Environmental, Safety, and Health Engineering by Gayle Woodside, Dianna Kocurek, Contains principles of environmental engineering, safety engineering and industrial hygiene/occupational health engineering. ISBN: 0471109320, New York, John Wiley 1997 (print on demand book)

"McD" McDermott, H Ventilation for Contamination Control ACGIH Publications 2001

Industrial Ventilation, A Manual of Recommended Practice, ACGIH Pub. 25th Ed.

Personal Protective Equipment Pocket Guide, Genium Publishing Corporation

ISBN: 0-931690-73-0 Copyright © 1995 64 pages

This employee guidebook explains OSHA's personal protective equipment standard and how to comply. It also includes forms employees can use to document their comprehension of their PPE responsibilities.

Respirator Pocket Guide Genium Publishing Corporation, ISBN: 0-931690-81-1 Copyright © 1995 64 pages This guide explains and helps workers understand the importance of regulatory issues, how respirators are designed to handle differing airborne hazards, and details basic equipment use and maintenance.

OSHA Publication 3151, Personal Protective Equipment, , 46 pp, (Revised 2004).

OSHA publication #3079, Respiratory Protection, 44pp, (Revised 2002) OSHA Small Entity Compliance Guide for Respiratory Protection Standard (CFR 1910.134), 149pp

Info & Class Details

Contact Information

Professor Michael Yost

Department of Environmental & Occupational Health Sciences, Box 357234

Office Hours: by appointment only

Email: airion@uw.edu (<mailto:airion@uw.edu>)

Phone 206-685-7243

For questions on course content and website:

Jacob Delbridge, Exposure Sciences Program Coordinator

Email: exposci@uw.edu (<mailto:exposci@uw.edu>)

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](tel: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.

Learning Objectives

Main Course: 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. Describe atmospheric dispersion processes and compute dispersion parameters from sampling data.
4. Apply elementary dispersion modeling concepts to estimate community impacts.
5. Compute exposure estimates for well-mixed rooms involving dilution ventilation and constant inputs.
6. Describe the function of HVAC components used for building ventilation.
7. Describe the role of HVAC in indoor air quality and infection control for health care settings.
8. Measure the flow characteristics of a ventilation system and apply this data for system diagnostics.
9. Select the appropriate type of local exhaust hood for controlling workplace exposures.
10. Describe criteria for selecting chemical or biological protective clothing.
11. Describe criteria for selecting protective equipment for physical agents such as noise or laser light.
12. Describe the criteria for specifying respiratory protection based on appropriate protection factors.
13. List the elements and evaluation of a comprehensive respiratory protection program.
14. Describe the inventory control and chemical hygiene requirements for hazardous materials.
15. List the key elements of a hazardous material management plan.

Additional Ventilation Section -- 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 or pipes using standard tables.
4. Design and specify the components of a single-branch local exhaust ventilation system.
5. Design and specify the components of a multiple branch local exhaust ventilation system.

Grading Policy

Assignments and grading

Weekly reading assignments will be posted on the website and announced in class.

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

Assigned discussion will be graded for content and participation.

Problem sets & discussion count for ~30% of the grade.

The midterm will count for ~30% of the grade.

The final exam / class project 30%.

Class participation and peer Evaluation ~10%.

