



**PubH 7200, Section 115
Safety of Building Environments
Public Health Institute 2005**

SYLLABUS

Summary

Buildings can be constructed and maintained to help protect the health and safety of their occupants during emergency situations. Some of these same considerations improve conditions for occupants during normal building operations as well. Heating, ventilating, and air-conditioning (HVAC) systems are of particular concern for reducing occupant exposures to harmful agents. Security, fire protection, and life safety systems are also important. Students in this course will learn about HVAC systems and how to utilize them to reduce exposures to harmful agents. They will also tour a large public building, an office building, and a hospital to view their HVAC systems and to discuss measures taken to improve the security of the buildings and protection of their occupants.

Course Information

Tuesday, May 31, 9:00 AM – 12:00 Noon
Wednesday, June 1, 8:00 AM – 12:00 Noon
Thursday, June 2, 8:00 AM – 12:00 Noon
Friday, June 3, 8:00 AM – 12:00 Noon

Room 155 Blegen Hall
1 credit

Instructor Information

Lead Instructor:

Pete Raynor, Ph.D., Assistant Professor
Office: Mayo 1230
Office phone: (612) 625-7135
Email: praynor@umn.edu
Home phone: (952) 513-0729 (before 10:00 PM)

Additional Instruction:

Greg Hayes; Assistant Director, Department of Emergency Management, University of Minnesota

Mike Strommen, Ph.D.; Product Development Manager, 3M Filtration Products, 3M Company

Andy Streifel, M.P.H.; Health Care Environmentalist, Department of Environmental Health and Safety, University of Minnesota

Course Materials

Web-based reading assignments will be required for all four class sessions.

Learning Objectives

After completion of this course, participants will be able to:

- identify systems important to the health and safety protection of building occupants
- suggest improvements to building security
- suggest modifications to HVAC systems to protect building occupants
- select HVAC filters to improve collection of airborne particles
- discuss health and safety aspects of building systems with buildings managers and engineers

Course Grading

This course combines lectures with tours, calculations, and demonstrations. Students will be expected to spend about 3-6 hours reading materials and completing assignments before each class. Grades will also be assigned for class participation.

A brief quiz, lasting approximately 5-10 minutes, will begin each class. The quizzes will cover key points from the assigned readings.

Written observations will be required for each of the three tours taken during the course. These observations will be due during the class following the one during which the tour takes place. The goal of these assignments is to help students practice evaluating potential security and ventilation deficiencies in large buildings. The observations will each be graded on a 20-point scale for completeness and insight. Students are expected to work independently on the written observations although they may discuss their observations in general with classmates.

One problem set will be assigned during the course. This assignment will be due during the class following the one in which it is handed out. The goal of this assignment is to help students practice some of the computations associated with building ventilation. The assignment will be graded on a 20-point scale. Students may work together on the problem set. However, each student should submit her/his own assignment for grading.

Grades will be assigned for classroom participation. Students will be able to obtain full credit for classroom participation by asking questions, participating in discussions, and submitting one-minute "essays" requested periodically by the instructor.

For all work, partial credit will be awarded generously, so students should show all work. In addition, the neatness of the work is important because the instructor will be able to follow the students' reasoning more easily when trying to award partial credit.

The breakdown of grading for the course is:

Quizzes on readings	20 %
Classroom participation	20 %
Problem set	15 %
Written observations	45 %

Final grades will be assigned on either an A/F basis or an S/N basis. Students may change grading options during the initial registration period or during the first two days of the class. The grading option may not be changed after the second day of class. A/F letter grades will be determined by total effort as follows:

A (93-100 %)	Outstanding achievement relative to course expectations
A- (90-93 %)	
B+ (87-90 %)	
B (83-87 %)	Achievement above minimum course expectations
B- (80-83 %)	
C+ (77-80 %)	
C (73-77 %)	Achievement meeting the minimum course expectations
C- (70-73 %)	
D+ (67-70 %)	
D (60-67 %)	Achievement below minimum expectations, but sufficient for credit
F (< 60 %)	Represents failure (or no credit) and signifies that the work was either (i) completed but at a level of achievement that is not worthy of credit or (ii) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

S/N grades will be determined by total effort as follows:

S	Achievement that is satisfactory will be expected to complete all assignments and receive a minimum of 70% to receive a passing score (achievement required for an S is at the discretion of the instructor but may be no lower than a 70%).
N	Signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit (70% or higher) or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

What the Instructor Expects from Students

- Students are expected to attend all classes and to arrive on time.
- Students should look at assigned readings prior to class and bring the readings to class.
- Students should bring a calculator to all classes.
- Students are expected to answer questions posed by the instructors and participate in classroom discussions.

- Students are responsible for asking questions and/or letting instructors know when they do not understand lectures or course materials.
- Although students may work together on the problem set, each student should turn in a separate paper.
- Students must work independently on the quizzes given in class.
- Students are expected to work independently on their written observations, but they may discuss their observations in general with classmates.
- Students are encouraged to provide constructive feedback to the instructors when they are dissatisfied with the course content or teaching methods.

What Students Should Expect from the Instructor

- The instructor will be enthusiastic about the class and the subject matter.
- The instructor will begin and conclude classes on time.
- The instructor will state objectives for each class session.
- The instructor will provide for at least two breaks during each class.
- Respecting the students' styles of learning, the instructor will use a variety of instructional methods.
- The instructor will answer all questions posed during class by students. Whenever possible, questions will be answered immediately. As an alternative, the instructor may indicate that the question will be addressed later in the class or that he will answer the question at the beginning of the next lecture if he does not know the answer.
- The instructor will ensure that all discussions in class are conducted in a professional and collegial manner.
- The instructor will create assignments with clear expectations.
- The instructor will grade assignments objectively on criteria shared with the students in advance.
- The instructor will provide feedback on assignments that identifies both strengths and weaknesses in student work with constructive suggestions for improvement.
- The instructor will make himself available outside of class to discuss any aspect of the course with students.

Additional Information

Every class is influenced by the fact that participants bring diverse values, experiences, and abilities into the classroom. All participants will be expected to listen to those with differing views, disagreeing with the views while remaining respectful of the individuals who hold them. Students should feel free to question the instructors and each other collegially at any time.

School of Public Health students may withdraw from a course through the second day of the course without permission. No "W" will appear on the transcript. After the second day students are required to do the following:

- The student must contact and notify their advisor and course instructor informing them of the decision to withdraw from the course.

- The student must send an e-mail to the SPH Student Services Center (SSC). The email must provide the student name, ID#, course number, section number, semester and year with instructions to withdraw the student from the course, and acknowledgement that the instructor and advisor have been contacted.
- The advisor and instructor must email the SSC acknowledging the student is canceling the course. All parties must be notified of the student's intent.
- The SSC will complete the process by withdrawing the student from the course after receiving all emails (student, advisor, and instructor). A "W" will be placed and remain on the student transcript for the course.

After discussion with their advisor and notification to the instructor, students may withdraw until the end of the second day of class. There is no appeal process.

An incomplete grade is permitted only in cases of extraordinary circumstances and following consultation with the instructor. In such cases an "I" grade will require a specific written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements. Extension for completion of the work will not exceed one year.

This course follows the University of Minnesota Board of Regents' policy on student conduct and scholastic dishonesty which can be found at:

<http://www1.umn.edu/regents/policies/academic/StudentConductCode.pdf>. A grade of "F" or "N" for the entire course will be assigned for scholastic dishonesty as defined in the policy and will be reported to the Office of Student Judicial Affairs <http://www.sja.umn.edu/>. Plagiarism is an important element of this policy. It is defined as the presentation of another's writing or ideas as your own. Serious, intentional plagiarism will result in an "F" or "N" grade for this course. For more information on this policy and for a helpful discussion of preventing plagiarism, please consult University policies and procedures regarding academic integrity: <http://cisw.cla.umn.edu/plagiarism/uofmpolicies.html>. Students are urged to be careful that they properly attribute and cite others' work in their own writing. For guidelines for correctly citing sources, go to <http://tutorial.lib.umn.edu/>. In addition, original work is expected in this course. It is unacceptable to hand in assignments for this course for which you received credit in another course unless by prior agreement with the instructor. Building on a dissertation or final project is acceptable. If you have any questions, consult the instructor.

Any student with a documented disability (e.g., physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the instructor and Disability Services at the beginning of the semester. All discussions will remain confidential. For further information contact the University of Minnesota Disability Services website at <http://ds.umn.edu/> or call 612/626-1333 (V/TTY)



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COURSE SCHEDULE

5/31/05 Day 1

Course Introduction

Course syllabus and schedule; potential hazards for occupants of large buildings

Guest Instructor: *Greg Hayes, University of Minnesota*

Evaluating Preparedness of Public Buildings

Identifying risks for buildings; threat/hazard assessment tools for large buildings; prioritizing actions for improving building preparedness

Tour #1: Rarig Center

Use an assessment tool to evaluate preparedness of large public building

Required Reading:

●● Chapter 1, pp. 1-1 to 1-93 ●●

FEMA (2003): *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings*, Federal Emergency Management Agency Pub. No. 426, <http://www.fema.gov/pdf/fima/fema426.pdf>

Archibald RW, Medby JJ, Rosen B, Schachter J (2002): *Security and Safety in Los Angeles High-Rise Buildings After 9/11*, Santa Monica, CA: RAND, 73 pp.,
<http://www.rand.org/publications/DB/DB381/DB381.pdf>

U.S. Army Corps of Engineers (2001): *Protecting Buildings and Their Occupants from Airborne Hazards (Draft)*, U.S. Army Corps of Engineers, Pub. No. TI 853-01, 22 pp.,
http://buildingprotection.rdecom.army.mil/downloads/reports/airborne_hazards_report.pdf

6/1/05

Day 2

Guest Instructor: *Mike Strommen, 3M Company*

Pollutant Properties

Gases and vapors; aerosols; motion of particles;
chemical/biological/radiological/nuclear (CBRN) agents

Filtration

Filter theory; filter show-and-tell; filter performance

Heating, Ventilating, and Air-Conditioning (HVAC) Systems

Elements of HVAC systems; performance of HVAC systems; limiting
spread of harmful agents through buildings by HVAC systems

Required Reading:

NIOSH (2002): *Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks*, U.S.

Department of Health and Human Services, National Institute of Occupational Safety and Health, Pub. No. 2002-139, 28 pp.,

<http://www.cdc.gov/niosh/bldvent/pdfs/2002-139.pdf>

NIOSH (2003): *Guidance for Filtration and Air-Cleaning Systems to Protect Building Environments from Airborne Chemical, Biological, or Radiological Attacks*, U.S. Department of Health and Human Services, National Institute of Occupational Safety and Health, Pub. No. 2003-133, 62 pp., <http://www.cdc.gov/niosh/docs/2003-136/pdfs/2003-136.pdf>

TOUR #1 OBSERVATIONS DUE

6/2/05 Day 3

Guest Instructor: *Andy Streifel, University of Minnesota*

Ventilation in Health Care Facilities

HVAC systems in health care facilities; filtration in health care environments; pressure considerations in health care facilities; isolation rooms

Tour #2: Fairview University Hospital

Assess building preparedness; view operating HVAC systems; see isolation rooms

Tour #3: Academic Health Center Buildings

Assess building preparedness; view HVAC systems in large office, laboratory, and clinic buildings

Required Reading:

Streifel AJ (2000): Health-Care IAQ: Guidance for Infection Control, *Heating/Piping/Air Conditioning Engineering*, October 2000, pp. 28-36, http://www.hpac.com/microsites/pdf/streifel_0010.pdf

Streifel AJ (2003): Airborne Infectious Disease: Best Practices for Ventilation Management, *Heating/Piping/Air Conditioning Engineering*, September 2003, pp. 97-104, http://www.hpac.com/microsites/pdf/streifel_0309.pdf

PROBLEM SET DUE

6/3/05 Day 4

Safety Systems

Communication systems; fire protection systems; life safety systems

Preparedness Measures

Design measures to minimize threats to buildings; technology to increase building security; equipment for improving building security and preparedness; coordination with outside agencies

Required Reading:

●●● Chapters 2 & 3, pp. 2-1 to 3-52 ●●●

FEMA (2003): *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings*, Federal Emergency Management Agency Pub. No. 426, <http://www.fema.gov/pdf/fima/fema426.pdf>

TOURS #2 AND #3 OBSERVATIONS DUE