

Course: IH&S 725- Industrial Hygiene Sampling/Analysis

Semester: Spring 2005

900 – 1150, Monday, MRB 109

1700 – 1815, Tuesday & Thursday MRB 107 [omit most weeks]

Number of credit hours: 4

Description: Calibration and use of sampling and analytical equipment used by industrial hygienists to evaluate the work environment. Advantages and disadvantages of different equipment under various conditions. Biological monitoring as an evaluation tool.

Prerequisite: IMSE 561 and Consent of the instructor

Instructor	Professor	Steven E. Guffey, PhD, CIH Associate Professor and IH Program Coordinator Dept. of IMSE
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	Office	MRB 353C
	Hours	Tuesday and Thursday 2-4 PM Other times by appointment (please email)

Reference Materials

- 1) The Occupational Environment – Its Evaluation and Control, Edited by Salvatore DiNardi, Published by the Am. Ind. Hyg. Association
- 2) Air Sampling Instruments for Evaluation of Atmospheric Contaminants, 8th edition. Edited by the Air Sampling Instruments Committee of the Am. Conf. of Governmental Ind. Hyg.
- 3) A Strategy for Assessing and Managing Occupational Exposures, 2nd Edition Edited by John R. Mulhausen and Joseph Damiano

Some of these references (and others) are kept on a shelf in MRB 340. Please use them there and do not remove them.

Note on sampling project

The field sampling project makes up nearly all of the “lab” portion of the course. You will work with a mentor who is a safety and health professional at a local company or organization to develop and execute your project. The lab report you submit to the mentor belongs to the mentor and to the instructor of this class. The best reports will be shown to students in succeeding classes to demonstrate how to do a project. If you wish, your name can be blanked off of the report.

Philosophy of the Course:

The philosophy of the course is to teach and expose students to the basic aspects of developing and conducting exposure assessments and to impress upon them their responsibility as health and safety professionals to be able to assemble information and data from the scientific literature and to evaluate that information and data to make professionally and scientifically sound decisions about the potential of or actual exposure to a worker or group of workers.

Objectives of the Course:

1. Introduce students to the elements of developing, planning and conducting an exposure assessment and developing a sound, reasoned sampling strategy.
2. Introduce students to the basic techniques they need to professionally and scientifically evaluate and analyze exposure information and data, including statistically based decision making.
3. Provide students a real-world experience of working with labor, management, and analytical laboratories to conduct an exposure assessment.
4. Give students the opportunity to setup and use spreadsheet capabilities to manage, sort, and evaluate large volumes of exposure data.
5. Guide students through the process of critically evaluating exposure assessment related material published in the professional and scientific literature.
6. Give students the opportunity to prepare and present technical materials for peer audiences

Student Learning Outcomes for the Course:

Students completing IH&S 725 will have acquired ability to:

1. Develop and implement an exposure assessment strategy, in a real-world exposure situation, suitable to make a sound, reasoned decision about the exposure that was assessed (Program Outcome 1, 5, 6 & 8);
2. Identify and evaluate variables that effect the selection of appropriate sampling instrumentation and analytical methodology to assess exposure (Program Outcome 1);
3. Determine minimum sampling volumes, reduce impactor data and do lognormal probability calculations and plots (Program Outcome 1 & 2);
4. Use spreadsheets to store, evaluate and analyze exposure data (Program Outcome 1 & 4);
5. Calculate statistical parameters of an exposure estimate to make statistically based decisions (Program Outcome 1 & 2);
6. Critically review the scientific and professional literature on exposure assessment and present review (Program Outcome 1 & 3);
7. Prepare and give a technical peer training seminar (Program outcome 1 & 8); and
8. Prepare and present results of airborne contaminate exposure assessment (Program outcome 1 & 8).

Method of Instruction:

IH&S 725 includes both a lecture and laboratory experience. The laboratory incorporates a field experience conducted under the mentorship of the plant occupational safety and health professional and the course coordinator, both of which will generally hold the C.I.H., C.S.P, or other professional certification. The lecture experience incorporate three hours of lecture each week of the semester. The laboratory experience incorporates three hours of laboratory each week of the semester which is used for several laboratory demonstration/activities and the field experience.

NOTE:

1. Depending on guest lecturers, lecture schedules may need to be revised.
2. You are expected to have access to a computer with spreadsheet software and will need a basic knowledge of spreadsheets and formula writing in a spreadsheet.
3. You are expected to have access to a computer with presentation software and be able to prepare a presentation using such software.
4. If you do not have spreadsheet or presentation software skills you will be expected to acquire them to a level sufficient to complete the class assignments.

TENTATIVE AGENDA

- 1/09 Introduction
Air sampling project discussion
Introduction of the sampling database project
Review of IH calculations and Gas Laws
- 1/10 Introduction to project mentors (1.5 hrs)
- 1/19 Exposure Assessment Process (3 hours)
- 1/23 Aerosol Sampling – 3 hr lecture - guest lecturer Dr. Martin Harper
- 1/30 Gas and Vapor Sampling – 3 hr lecture - guest lecturer Dr. Martin Harper
- 2/6 Developing the Assessment Strategy
1. Selection of instrumentation and analytical method;
 2. Accuracy and precision and sources of sampling errors
 3. Minimum sample volumes
 4. Introduction of a sampling database and the spreadsheet project
 5. Sample representativeness and quality
 6. Preparation of known concentrations
- 2/13 Exam 1
- 2/20,2/27,3/6 Developing the Assessment Strategy: Sample data reduction and interpretation
1. lognormal distributions, standard normal distributions
 2. geometric means and geometric standard deviations
 - a. determined by calculation
 - b. determined by plotting
 3. confidence limits, one-sided and two-sided tolerance limits, exposure fractions, etc
 4. compliance decisions
- 3/11 – 3/19 Spring Break
- 3/20 Exposure sampling article review
Review for exam
- 3/24 Exam 2
- 3/27 Particle size sampling
Impactor data analysis
- 4/3 Specialty sampling – guest lecturer Dr. Martin Harper
- 4/10 Selection of the IH laboratory
- 4/17 Sampling Project Reviews
- 4/24 Sampling Project Presentations

GRADING

Exams and Final	35%
Data Analysis Report	15%
Article Review	10%
Training Presentation	10%
Sampling Project	
Final Report	15%
Presentation	5%

Policy on Academic Dishonesty

Anyone found cheating on an exam, assignment, labs or copying electronic data or programs etc. will be given a 0 on that activity and a formal report will be made to the department Chairperson. Working together on assignments is encouraged. However, each student must turn in their own work.

Social Justice Statement

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (293-6700).