

## INDUSTRIAL HYGIENE LABORATORY

EH 527

FALL 2006

**Course Director:** William J. Brazile

**Course Director Contact Information:** (970) 491-4272; brazile@colostate.edu

**Office Hours:** By appointment or drop by.

**Location:** Room 19 Physiology or as arranged

**Times:** Wednesdays, 8:00 to 10:50

**Prerequisite:** EH 526 or concurrent enrollment in EH 526

**Textbook(s):** *The Occupational Environment - Its Evaluation and Control*. Salvatore DiNardi, editor. AIHA, Fairfax, VA. 1998. **Or** *Fundamentals of Industrial Hygiene, Fourth Edition*. Barbara Plog, editor. National Safety Council, Chicago.

### Course Objectives

Upon successful completion of this course, the student will be able to:

- Identify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes (EO 6.2.1);
- Recommend and evaluate engineering, administrative, and personal protective equipment controls and/or other interventions to reduce or eliminate hazards (EO 6.2.4);
- Solve complex problems through a combination of observation, literature review, measurement, and data analysis within a variety of environments using the basic scientific method (EO 6.2.5);
- Assess quantitative aspects of exposure assessment (EO 6.2.3);
- Communicate laboratory results effectively in writing (EO 6.2.10);
- Describe quantitative aspects of generation of agents, factors, and stressors (EO 6.2.2);
- Demonstrate proficiency in computations used in industrial hygiene.

*Note: EO refers to the Occupational and Environmental Health Section Educational Objectives.*

**Class Schedule**

<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Instructor</b>
Aug 23	Laboratory Methods Lecture and Class Orientation	Readings are Specified in Laboratory Exercises	Brazile
Aug 30	Calibration		Brazile
Sept 6	Asbestos Counting		Rice
Sept 13	Sampling Strategy Design		Todd
Sept 20	Particulate Sampling		Schledewitz
Sept 27	Gas & Vapor Sampling*		Brazile
Oct 4	Real Time Monitoring		Brazile
Oct 11	Personal Protective Equipment		Brazile
Oct 18	Ventilation		Brazile
Oct 25	Noise*		Fehringer
Nov 1	Heat Stress		Brazile
Nov 8	Health Physics		Johnson
Nov 15	Radiofrequency & Microwaves		Sandfort
Nov 22	Fall Recess—No Class		N/A
Nov 29	Bioaerosol Sampling		Reynolds
Dec 6	Industrial Hygiene Walk Through		Brazile
Dec 13	Presentation of IH Walkthrough Reports (coordinate with EH 526)		

**Grading**

- A = 90-100%
- B = 80-89%
- C = 70-79%
- D = 60-69%
- F = 50-59%

**Grade Distribution**

Formal Laboratory Reports	
Gas & Vapor Sampling	10%
Noise	10%
Weekly Laboratory Exercises	45%
Laboratory Notebook	5%
Walk-Through Report	<u>30%</u>
	100%

## Formal Laboratory Reports

Formal laboratory reports will be submitted by students for the two laboratory exercises starred (\*) in the class schedule. The laboratory report will clearly and concisely convey the work that was conducted in the laboratory. Your laboratory report should contain enough information so that another investigator can repeat the work with no other sources of information.

The following format for the two formal reports will be followed.

1. **Title** - The title should clearly indicate the nature of the work conducted.
2. **Introduction** - Introduce the reader to the purpose and significance of the laboratory work. It should provide the theoretical background on the topic and explain the principle(s) of the analytical technique(s).
3. **Objectives** - The objectives of the laboratory should be summarized in a few sentences.
4. **Materials and Methods** - The methods described in the laboratory exercises should be incorporated by reference--do not copy the methods over. You should indicate any deviations from the referenced methods that occur in your specific laboratory exercise (e.g., if a different flow rate was used). A list of materials and equipment (including lot number or serial number) should be included in this section.
5. **Results** - The results should be presented clearly, preferably in a tabular form. Both raw (actual parameters measured) and calculated data should be included. For example, in flow calibration of a pump, include the times measured by the stopwatch, the volume measured, and the calculated flow rates. When multiple values are obtained, calculate the mean and standard deviation.
6. **Discussion** - Discuss the significance of the results and comment on the problems you encountered during the exercise and how these affected the interpretation of your results.
7. **Answers to Questions** - Include the answers to the laboratory thought questions in the report. Be concise.
8. **Conclusions** - Attempt to draw some general conclusions from your interpretations of the data or the procedures employed.

## Formal Laboratory Report Evaluation:

There are a total of 10 points available for each laboratory report. They will be allocated according to the following format:

- Format, neatness, general presentation 2 points
- Introduction, objectives, materials and methods 2 points
- Results and Discussion 3 points

- Answers to thought questions 2 points
- Conclusions 1 point

### **Laboratory Exercises**

Students will provide the following for laboratory exercises (those not starred above) in a typed-written format to the course director:

- Data,
- Calculations, and
- Answers to thought questions.

Formal laboratory reports and thought questions will be e-mailed to Dr. Brazile the Wednesday following the laboratory exercise before the laboratory class begins. Laboratory reports and laboratory exercises that are received late will be penalized 10% per day unless arrangements are made with Dr. Brazile.

### **Laboratory Notebooks**

Students will keep a laboratory notebook for all laboratory exercises that will be turned in by the students at the final examination for review by Dr. Brazile.

The laboratory notebook reflects what you did in the laboratory and should explain exactly what you did so that your results are reproducible. The notebook will list every step taken in the laboratory, all equipment used (including serial number or lot number), and all results and calculations on those results. Each page will be sequentially numbered and dated. Your laboratory partner(s) will be referenced. Relevant comments will be included: for example, your impressions of whether the equipment was working properly, problems you had with the equipment, etc. Data will be presented in tabular form. All entries will be in ink. Errors will be crossed out with a single line (i.e., "White-Out" will not be used).

Each new laboratory exercise will begin on a new page. A table of contents will be provided in the first few pages, so skip a few pages before the first laboratory exercise.

Only pre-bound notebooks may be used.

### **Student Responsibilities**

1. Students are expected to take EH 526 concurrently with or prior to this laboratory course.
2. Students are expected to read (1) the assigned text material and (2) the entire laboratory before each laboratory period. The laboratory lecture will primarily be a review of important concepts and to answer specific questions the students may have before beginning the laboratory.
3. Students should look at laboratory equipment manuals before asking the instructor a question.
4. Each student will spend as much time with each piece of equipment as necessary to become completely familiar with it. Laboratory partners will take turns with equipment so that everyone gets enough "hands-on" time.