



Advanced Environmental Analysis (EPCT 2335)

Credit: 3 semester credit hours (2 hour lecture, 2 hour lab)

Prerequisite: Math 1332 or equivalent, and SCIT 1494 or SCIT 1418

Course Description

Regulations and standards in the analysis of samples using specific analytical instruments and their procedures. Emphasis on instrument calibrator sample preparation, evaluation, and reporting of analytical results.

Required Textbook and Materials

1. Fundamentals of Industrial Hygiene by Barbara A. Plog & Patricia J. Quinlan, 6th edition, NSC Press
 - a. ISBN number is 9780879123123

Course Objectives

Upon the completion of the course the student will be able to :

1. Demonstrate knowledge of the regulations and standards for the analysis of environmental samples.
2. Demonstrate competence in analytical procedures and instrument analysis.
3. Demonstrate submit evaluated sample results and recordkeeping.

Course Outline

- A. Welcome to LIT:
 1. Introduction of faculty and students
 2. Expectations
 3. Policies
- B. Air Sampling
 1. Types of air sampling
 2. Instruments
 3. Collection devices for gases and vapors
 4. Collection devices for particulates
 5. Suction pumps
 6. Flow- rate meters
 7. Sampling Methods
 8. Sampling and Analytical Methods
 9. Calibration
 10. Sampling and analytical error
 11. Recordkeeping
- C. NIOSH Methods for Sampling Airborne Contaminants
 1. Choosing measurement methods and sampling media
 2. Types and uses of solid sorbents
 3. Types and uses of aerosol samplers
 4. Factors affecting the collection of gases, vapors, and aerosols

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5. Sampling strategy
6. Sampling and calibration techniques
- D. Direct-Reading Instruments for Gases, Vapors, and Particulates
 1. Combustible gas monitors
 2. Oxygen monitors
 3. Carbon monoxide monitors
 4. Indoor air quality monitors
 5. Direct-reading colorimetric tubes and badges
 6. Other colorimetric direct-reading devices
- E. Monitors Intended for a Broad Range of Compounds
 1. Biosensors
 2. Spectrophotometers and spectrometers
 3. Gas chromatographs
 4. Portable gas chromatographs
 5. Mass spectrometers
 6. Particulate monitors
 7. Calibration
 8. Performance evaluations and instrument specifications
- F. Sampling and Analysis of Particulate Matter
 1. Sampling for particulate matter
 2. Microbiological sampling
 3. Size-selective particle sampling and analysis
 4. Surface sampling for particulate matter
 5. Analysis of air samples
 6. Metals, free crystalline silica, asbestos, radioactive particles, organic particles, direct-reading particle detectors
 7. Biological monitoring for individuals exposed to particulate matter
- G. Radiation (Ionizing and Non-ionizing)
 1. Measurement (film badges, pocket dosimeters, electronic alarm dosimeters, Geiger-Mueller counters)
 2. Calibration
 3. Basic safety factors (time, distance, and shielding)
- H. Noise
 1. Properties of sound
 2. Occupational damage-risk criteria (hearing ability, risk factors, analysis of noise exposure)
- I. Ergonomics
 1. Human capacity for work
 2. Heat Stress
 3. Workplace design (work space dimensions)

Grade Scale

- A = 90-100
- B = 80-89
- C = 70-79
- D = 60-69
- F = Less than 60

Course Evaluation

Final grades will be calculated according to the following criteria:

Test 1	20%
Test 2	20%
Test 3	20%
Final	30%
Participation	10%

Course Requirements

Homework is a course requirement and is expected to be complete by the next class meeting. Participation in classroom discussions/activities is also required.

Course Policies

1. It is the responsibility of students to obtain notes for any class periods missed. Class schedule may change, so it is imperative to attend class to keep abreast of changes in the order of topics and/or tests.
2. There will be no food, drinks or tobacco products consumed or used while in class.
3. Please do not bring children to class.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination status that provides comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator, at (409) 880-1737 or visit the office located in the Cecil Beeson Building.

Course Schedule

Week 1	IH Equipment – Pumps
Week 2	IH Calculations (TWA, converting mg/m ³ to ppm)
Week 3	IH Sampling Strategy
Week 4	IH Statistics (control limits, standard deviation, etc.)
Week 5	Test I
Week 6	Gases, Vapors, Solvents, (length of stain, charcoal active & passive pump calibrations, direct read, other types of active & passive monitoring)
Week 7	IH Equipment & Pumps

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Week 8	IH Equipment & Pumps
Week 9	Test II
Week 10	Particulates (metal fume, asbestos, respirable dust & total dust) Sample media
Week 11	Radiation (ionizing & non-ionizing)
Week 12	Test III
Week 13	Noise
Week 14	Ergonomics, Heat Stress – Report Writing
Week 15	Final

*The order in which topics are covered is subject to change. Tests dates are also subject to change.

Contact Information:

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