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
   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
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)
EPCT 2335
Course Syllabus

**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 statues 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/m3 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
EPCT 2335  
Course Syllabus

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:**

**Instructor:** Joe Duplechin  
**Office:** MPC 240  
**Telephone:** (409)880-8850  
**Office Hours:** Tuesday 4:00 pm. to 5:00 pm.