

Industrial Hygiene Applications (EPCT 2331)



Credit: 3 semester credit hours (3:3:0)

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

Course Description

A study of the industrial environment and its relation to worker's health. This course provides training in anticipation, recognition, evaluation, and controlling health hazards—particularly chemical, physical, biological, and ergonomic factors existing in the workplace and having injurious effects on workers. The course also introduces training in instrumentation used in monitoring and measuring health hazards in the workplace and covers current issues in industrial hygiene.

Required Textbook and Materials

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

Course Objectives

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

1. Analyze samples of air, water, and soil in reference to OSHA standards. (SCANS: C1.5, C3, C5.5, C7.5, C9.4, C12.4, C14.4, C15.5, C18.5, F1.5, F3.5, F4.5, F6.4, F9.5, F11.4, F13.5, F16.4, F17.5)
2. Identify the impact of hazards on workers; interpret and apply regulations in a business environment; gather, manage, and analyze data; apply professional standards; prepare a report on various areas of industrial hygiene based on student investigations.

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

Course Outline

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| A. Welcome to LIT: | 2. Expectations |
| 1. Introduction of faculty and students | 3. Policies |
| | B. Respiratory Protective Programs |

Approved 8/2012

EPCT 2331

Course Syllabus

1. Exposure assessment of respirator wearers
 2. Medical evaluations of respirator wearers
 3. Respirator fit, training, and maintenance
- C. Classes of Respirators
1. Air-purifying devices
 2. Atmosphere-supplying respirators
 3. Combination air-purifying and atmosphere-supplying devices
- D. Respirator selection
1. Selection requirements
 2. Hazard determination
 3. Selection steps
 4. Effective protection factor
- E. Respirator Fit Testing
1. Qualitative fit testing
 2. Qualitative fit
 3. Test protocols
 4. Quantitative fit testing
 5. Quantitative fit test protocol
 6. Positive pressure respirators
- F. General Industry Standard for Respirators
1. 1910.134 Specific guidelines
 2. Training
- G. Ventilation
1. Local exhaust ventilation
 2. System components
 3. Airflow and pressure principles
 4. LEV performance evaluation and improvement
 5. Velocity measurements
 6. Static pressure measurements
- H. Dilution Ventilation Systems
1. Natural ventilation
 2. Mechanical ventilation
- I. System Design Considerations
1. Safety factors
 2. Dilution ventilation system layout
- J. Calculating Dilution Airflow for Health Protection
1. For health
 2. Steady-state
 3. Purging
 4. Dilution airflow design date
- K. Measuring Dilution Performance
1. Smoke tubes
 2. Volumetric airflow
 3. Velometers
- L. General Ventilation of Nonindustrial Occupancies
1. Energy conservation versus indoor air quality
 2. HVAC systems-zones
 3. Testing, troubleshooting, and maintaining HVAC systems
- M. Evaluation of Hazards
1. Evaluation
 2. Air sampling
 3. Direct-reading instruments for Gases, Vapors, and Particulates
- N. Noise
1. Sound measuring instruments
 2. Sound surveys
 3. Noise control programs
- O. Degrees of Thermal Stress
1. Recognition, evaluation and control of heat stress
 2. Recognition, measurement, evaluation and control of cold stress
- P. Radiation
1. Control programs
 2. Sources of radiation
 3. Operational factors
 4. Employee exposure potential
 5. Records
- Q. Ergonomics
1. Engineering anthropometry
 2. Measuring techniques-Biomechanic

EPCT 2331
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:

- 1. Test 1 20%
- 2. Test 2 20%
- 3. Test 3 20%
- 4. Final 30%
- 5. Participation 10%

Course Requirements

- 1. Homework is a course requirement and is expected to be complete by the next class meeting.
- 2. Student will demonstrate competency in performing I.H. skills such as using monitoring equipment, the care, selection, and use of respirators, and calculations required for ventilation.

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. No food, drinks or tobacco products consumed or used while in class.
- 3. 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 statutes 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 her office located in the Cecil Beeson Building, room 116.

Course Schedule

Week of	Topic	Reference
Week 1	Respiratory Protection	pp. 195-244

EPCT 2331
Course Syllabus

Week of	Topic	Reference
Week 2	Respiratory Protection	
Week 3	NIOSH Decision Tree for Selection of a Respirator	pg. 198
Week 4	1910.134 Respiratory Standard	OSHA.gov
Week 5	Test I	
Week 6	Ventilation (ACGIH Ventilation Manual)	Instructor
Week 7	Ventilation (ACGIH Ventilation Manual)	Instructor
Week 8	Test II	Instructor
Week 9	Ventilation (ACGIH Ventilation Manual)	Instructor
Week 10	Test III	
Week 11	Control of Noise	Instructor
Week 12	Control of Heat & Radiation	pp. 216-217, 781
Week 13	Ergonomics-Controls	Instructor
Week 14	Other Control methods (Substitution, Administrative, Engineering)	
Week 15	Review	
Week 16	Final Exam	

Contact Information

Instructor: Joe Duplechin
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Office Hours: Tuesday 4:00 pm. to 5:00 pm