Syllabus

Principles of Industrial Hygiene 11:375:434

Instructor

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Course Description

Principles of Industrial Hygiene provides an introduction to the field of industrial hygiene and to occupational health in general. The instructor focuses on introducing concepts, terminology, and methodology in the practice of industrial hygiene and identifies resource materials. The class would benefit those wishing to pursue a Master's degree in industrial hygiene; those interested in the industrial hygiene, environmental health or safety professional careers, or for students in allied health fields needing a basic understanding of industrial hygiene.

Text

Latest edition of TLVs and BEIs, American Conference of Industrial Hygienists, Signature Publications. Tel. # 513-742-2020 or www.acgih.org. Recommended but not required resource: Fundamentals of Industrial Hygiene, National Safety Council Chicago, IL, 5th edition or later edition.

Grading system

Quiz, mid-term exam, final exam, case study essay and class participation in various homework assignments, hands-on exercises and drills.

Course Objectives

Upon completion of this course, you should be able to:

- Describe the legal, professional, and ethical framework for the practice of industrial hygiene.
- Define basic terms and technical concepts integral to the practice of industrial hygiene.
- Explain the differences between chemical (gases/vapors, dusts/mists/fumes), physical, biomechanical and biological agents in the workplace.
- Calculate time-weighted averages and capture velocity and flowrates.
- Convert between various units of exposure (for example, mg/m^3 to ppm).
- Calculate and interpret noise exposures and doses.
- Identify the basic concepts of workplace exposure assessment.
- Describe the hierarchy of controls and how it applies to hazard control.

- Integrate various concepts into a broader occupational/ environmental health practice.
- Provide a basis for advanced course work in occupational safety and health.
- Develop a skill to safely respond, contain and dispose of a chemical or biological spill or release into an indoor or outdoor environment.

Typical course agenda

Topic
Overview of Course, Introduction & Overview of Industrial Hygiene/Safety, HAZWOPER and Industrial Processes, Anatomy, Physiology and Toxicology (Lung-Inhalation route of exposure)
Toxicology (continue with inhalation, skin, eye hazards and associated health Hazards)
Chemical Hazards-Recognition of hazards for gases, vapors, solvents & Particulate, Gas and Vapor Monitoring (hands-on workshop)
Particulate, Gas and Vapor Monitoring (hands-on workshop)
ERG, SDS, NIOSH, TLV-Book (all TLVs, TWA, STELs, C,) Ergonomics, Non ionizing and radiation hazards and controls
OSHA Government Regulations (including 1910.120) TLV-Documentation continued and OSHA PEL's, STEL, Ceiling limits and special chemical hazard regulations (ie. Asbestos, methylene chloride, Hexavalent Chromium)
Temperature Extremes, Noise, Fall Protection, Fire Protection, Confined space, Biosafety/Indoor Air Quality & Mold Assessment
Personal Protective Equipment Controls (Respirators, Safety Glasses, Protective suits, etc.) hands-on exercise and demonstrations
Ventilation/engineering controls
Medical Surveillance and TLVs- BEIs, spill containment systems, absorption and disposal methods, Container drum handling & decontamination hands- on practice & technique drills
Health & Safety Plan review & exercise
HAZMAT zones, role assignments, incident command and pre- emergency response drill hands-on activities
HAZWOPER emergency response hands-on incident drill

Learning Goals

Knowledge:

Understanding the fundamentals of industrial hygiene and apply to biological, physical and chemical hazard release safe mitigation methods. Proposed instructional and assessment activities include one quiz, one midterm and final to ascertain the knowledge retained in the class. (17% of quiz, 37% of midterm, 37% of final exam assessment, 2% on homework and case study completion and 7% participation in hands on exercises and field drills)

Analysis:

How to evaluate the chemical, biological or physical human sensory detection or through current, accredited and acceptable industrial hygiene collection or measurement results in comparison to various Federal, State or Municipal codes, regulations and standards. Proposed instructional and assessment activities will include hands-on or simulated drills on using industrial hygiene instrumentation, analyzing and interpreting data.

Communication:

How to effectively convey the evaluation, recognition and control of hazards to personnel of interest. This would involve verbal discussions, meetings and formal presentations. Proposed instructional and assessment activities include the desktop and spill drill where students will role-play and engage in an incident command scenario.

Teams:

How to recognize, evaluate and control biological, physical and chemical agents through utilizing small group projects and drills. Proposed instructional and assessment activities designed to help the student function on an emergency response team or environmental, health and safety department multifunction department. Such activities will include a hands-on or simulated spill drill incident.

Ethics:

Ensure students understand professional industrial hygiene ethics and possible real life issues of concern. Proposed instructional and assessment activities include a review of the American Board of Industrial Hygiene Code of Ethics and OSHA regulatory standards of compliance. A few questions will be presented on this topic in the quiz and midterm. (100% of assessment)

Performance Target Criteria

Learning Goals	Unsatisfactory (D or F)	Satisfactory (C)	Good (B)	Outstanding (A)
1. **Knowledge.** Ability to understand the fundamentals of industrial hygiene and apply to biological, physical and chemical hazard release safe mitigation control methods.	Does not attempt to understand the usage of industrial hygiene fundamentals and its application to various hazards and controls. This is based on answering less than 70% or less questions correctly on the quiz, midterm and final exam.	Attempts to understand the usage of industrial hygiene fundamentals and its application to various hazards and controls. This is based on answering 70% or more questions correctly on the quiz, midterm and final exam.	Successfully to understand the usage of industrial hygiene fundamentals and its application to various hazards and controls. This is based on answering 80% or more questions correctly on the quiz, midterm and final exam.	Masters the usage of industrial hygiene fundamentals and its application to various hazards and controls. This is based on answering 90% or more questions correctly on the quiz, midterm and final exam.
2. **Analysis.** Ability to evaluate the chemical, biological or physical human sensory detection or through current, accredited and acceptable industrial hygiene collection or measurement results in comparison to various Federal, State or Municipal codes, regulations and standards.	Cannot evaluate the chemical, biological, or physical human bio-mechanics stressors through current, accredited and acceptable industrial hygiene collection or measurement and evaluation method results in comparison to Various Federal and State regulations. This is based on answering 60% to 69% questions correctly on a quiz, midterm and final exam.	Ability to evaluate the chemical, biological or physical human sensory detection or through current, accredited and acceptable industrial hygiene collection or measurement results but shows difficulty in comparison to various Federal, State or Municipal codes, regulations and standards. This is based on answering 70% to 79% questions correctly on the quiz, midterm and final exam.	Ability to evaluate the chemical, biological, bio-mechanics or physical human stressors or through current, accredited and acceptable industrial hygiene collection or measurement results shows good comparison to various Federal, State or Municipal codes, regulations and standards. This is based on answering 80% to 89% questions correctly on the quiz, midterm and final exam.	Fully effective in the ability to evaluate the chemical, biological, bio-mechanics, physical human stressors through current, accredited an acceptable industrial hygiene collection or measurement results comparison to various Federal, State or Municipal codes, regulations and standards. This is based on answering 90% or more questions correctly on the quiz, midterm and final exam.

3. **Communication.** How to effectively convey the evaluation, recognition and control of hazards to personnel of interest. This would involve verbal discussions, meetings and formal presentations.	Does not complete nor participate in discussion regarding the HASP, homework assignment, case study or spill drill assignment.	Completes the HASP, case study, homework assignment and spill drill but does not participate in regards to the formal presentations in front of classmates.	Completes the HASP, homework assignment and spill drill with few errors found. Participates in formal presentations in front of classmates.	Completes the HASP, homework assignment and spill drill with no errors. Participates in formal presentations in front of classmates.
4. **Teamwork.** How to recognize, evaluate and control biological, physical and chemical agents through utilizing small group projects and drills participation.	Does not show up for class, does not participate in group desktop, case study and spill drill exercise.	Shows up for class, contributes to the exercises, but does not participate with other classmates in group discussion or drills.	Shows leadership in conducting desktop and spill drill exercises, participates in class, and volunteers as Deputy Incident Commander, Safety Officer or other Leadership roles in the drill.	Shows leadership in all desktop exercises and voluntarily serves as Incident Commander i the spill drill exercise. Active participation in class for various group discussions.
5. **Ethics.** Ensure students understand professional industrial hygiene ethics and possible real life issues regarding the topic	Does not comprehend the ethics portion of the class topic and does not answer any correct answers regarding ethics. This is based on answering 50% questions correctly on a quiz, midterm and final exam.	Comprehends the ethics portion of the class topic and answers correctly regarding ethics on 50% of the questions.	Comprehends the ethics portion of the class topic and answers correctly regarding ethics on 75% of the questions.	Comprehends the ethic portion of the class top and answers correctly regarding ethics on 100% of the questions.