Industrial Hygiene & Occupational Health

Course general description:

This advanced **Industrial Hygiene & Occupational Health** course provides a **comprehensive understanding of workplace health hazards, exposure assessments, and control measures** based on international standards (OSHA, ACGIH, NIOSH, and ISO 45001).

The course includes **hands-on training in industrial hygiene monitoring, exposure calculations, and risk assessment techniques**. Key focus areas include:

- ✔ **Airborne Contaminant & Exposure Limit Calculations (TWA, STEL, PELs, RELs, TLVs)**
- ✔ **Ventilation System Design & Performance Calculations (Dilution & Local Exhaust Ventilation - LEV)**
- ✔ **Noise Exposure & Hearing Conservation (Decibel Adjustments, Noise Dose Calculations)**
- ✔ **Heat Stress Indices & Metabolic Workload Calculations**
- ✔ **Toxicological Risk Assessments & Dose-Response Modeling**
- ✔ **Biological Exposure Indices (BEIs) & Chemical Exposure Limits**

Practical workshops, real-world case studies, and exposure assessment exercises will enhance participants' ability to **apply industrial hygiene principles effectively** in various industries, including **oil & gas, chemical processing, manufacturing, and construction**.

This course also serves as a valuable preparation resource for professionals pursuing BCSP certifications (CSP, ASP) by covering essential Industrial Hygiene topics included in the exam syllabus. Participants will develop a strong foundation in exposure assessment, workplace health risk evaluations, and control strategies, which are critical for success in the BCSP examinations.

Audience:

This course is intended for:

- Process Safety & HSE Professionals
- Industrial Hygienists & Occupational Health Practitioners
- HSE Professionals & Safety Engineers
- Process & Operations Managers
- Risk & Compliance Officers
- Regulatory Inspectors & Auditors
- Occupational Physicians & Nurses

Course objectives:

By the end of this course, participants will be able to:

- **Conduct industrial hygiene risk assessments** and apply exposure monitoring techniques.
- **Calculate airborne exposure limits** (TWA, STEL, Ceiling Limits) and compare them with regulatory limits (OSHA, ACGIH, NIOSH).
- **Apply ventilation design calculations** (dilution, LEV, face velocity, hood efficiency).
- **Perform noise exposure dose calculations** and develop hearing conservation programs.
- **Analyze heat stress using WBGT (Wet Bulb Globe Temperature) and metabolic workload formulas**.
- **Interpret toxicological data and apply dose-response relationships** to occupational exposure assessments.
- **Develop industrial hygiene programs** based on exposure control strategies and best practices.

Course duration:
5 days
Course location:
Dubai
Course contents:
Day 1: Introduction to Industrial Hygiene & Exposure Assessment

- Pretest
- **Fundamentals of Industrial Hygiene & Occupational Health**
  - Definitions, scope, and key principles
  - Regulatory standards (OSHA, ACGIH, NIOSH, ISO 45001, ANSI)
  - Role of industrial hygiene in workplace safety
- **Airborne Contaminants & Exposure Assessment**
  - Types of airborne hazards (dust, fumes, gases, vapors, mists)
  - Exposure pathways and biological effects
  - Methods of air sampling and real-time monitoring
- **Industrial Hygiene Exposure Calculations (Hands-on Training)**
  - **Time-Weighted Average (TWA) Calculation**
  - **Short-Term Exposure Limit (STEL) Calculation**
  - **Permissible Exposure Limit (PEL) & Threshold Limit Value (TLV) Assessments**
- **Workshop:** TWA, STEL, and PEL calculations for real case studies

Day 2: Ventilation & Respiratory Protection in Industrial Hygiene

- **Ventilation Systems for Contaminant Control**
  - General ventilation vs. Local Exhaust Ventilation (LEV)
  - Hood design, face velocity, and capture efficiency
  - Airflow measurement and performance testing
- **Industrial Ventilation System Calculations**
  - **Dilution Ventilation Equation & Air Changes per Hour (ACH) Calculation**
  - **Local Exhaust Ventilation (LEV) Design – Duct Velocity & Hood Efficiency Calculations**
- **Respiratory Protection Programs**
  - Types of respirators (APRs, PAPRs, SCBA)
  - Fit testing (qualitative & quantitative)
  - Assigned Protection Factors (APFs) and selection criteria
- **Workshop:** Calculating ventilation flow rates for specific workplace scenarios

Day 3: Noise & Heat Stress Exposure Assessments

- **Occupational Noise Exposure & Hearing Conservation**
  - Noise sources and exposure limits (OSHA, ACGIH)
  - Engineering and administrative noise controls
  - Hearing conservation program requirements
- **Noise Exposure Calculations (Hands-on Training)**
  - **Noise Dose Calculation (% Dose and TWA Adjustment Formula)**
  - **Combining Multiple Noise Sources (Decibel Addition Formula)**
- **Heat Stress & Thermal Hazards in Workplaces**
  - Heat stress risks and heat-related illnesses
  - Heat stress control strategies (engineering, administrative, PPE)

- **Heat Stress Index Calculations**
  - **Wet Bulb Globe Temperature (WBGT) Calculation**
  - **Metabolic Heat Workload Calculation**
- **Workshop:** Noise & WBGT calculations with real case scenarios

Day 4: Toxicology, Biological Hazards & Chemical Risk Assessment

- **Principles of Occupational Toxicology & Dose-Response Relationships**
  - Acute vs. chronic toxicity
  - Toxicokinetics & toxicodynamics (absorption, distribution, metabolism, excretion)
  - LD50, NOAEL, LOAEL, and risk assessment methodologies
- **Chemical Exposure & Risk Management**
  - Chemical safety data sheet (SDS) interpretation
  - Chemical hazard control strategies (hierarchy of controls)
  - Exposure route analysis (inhalation, dermal, ingestion)
- **Biological Hazards in the Workplace**
  - Infectious disease risks (COVID-19, TB, Legionella)
  - Biohazard risk assessment & prevention strategies
  - PPE selection for biological exposure control
- **Workshop:** Dose-response analysis and biological exposure risk evaluation

Day 5: Compliance, Program Development & Final Case Study

- **Developing an Industrial Hygiene Program**
  - Key elements of an industrial hygiene program
  - Occupational health surveillance & medical monitoring
  - Industrial hygiene audits and compliance requirements
- **Regulatory Compliance & Legal Aspects**
  - OSHA compliance audits and penalties
  - Documentation and record-keeping requirements
  - Best practices for regulatory inspections
- **Emergency Response & Industrial Hygiene Incident Management**
  - Chemical spills, confined space incidents, biohazard exposures
  - PPE selection for emergency response situations
  - Workplace decontamination strategies
- **Final Case Study:**
  - **Participants will analyze real-world industrial hygiene data, perform exposure calculations, and develop a risk control strategy.**

Methodology:

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions

Assessment and Certification:

Upon completion, participants receive a **Certificate in Advanced Industrial Hygiene & Occupational Health**, validating their skills in exposure assessment, risk analysis, and workplace health protection.

Course code: (THSE011)