Industrial Toxicology for Chemical Engineers Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Industrial Toxicology has become a critical discipline in modern chemical engineering due to increasing regulatory requirements, sustainability commitments, occupational health concerns, and the growing complexity of industrial chemical processes. Chemical engineers are responsible for designing, operating, and optimizing systems that involve hazardous substances, making it essential to understand toxicological principles, exposure pathways, risk assessment methodologies, and control strategies. Industrial Toxicology for Chemical Engineers Training Course provides comprehensive knowledge on chemical hazard identification, toxic substance behavior, exposure assessment, dose-response relationships, toxicokinetics, toxicodynamics, and industrial health protection measures. Participants will gain practical insights into managing toxic risks across manufacturing plants, refineries, petrochemical facilities, pharmaceutical industries, mining operations, and environmental protection programs.

The course integrates emerging trends such as Process Safety Management (PSM), ESG compliance, Industrial Hygiene Monitoring, REACH regulations, Globally Harmonized System (GHS), Chemical Risk Assessment, Exposure Modeling, AI-driven Safety Analytics, Sustainable Chemical Manufacturing, and Environmental Health & Safety (EHS) Excellence. Through practical case studies, real-world incidents, quantitative risk assessment techniques, and regulatory compliance frameworks, participants will develop competencies to minimize occupational exposure, improve workplace safety performance, strengthen regulatory compliance, and support sustainable industrial operations in highly regulated environments.

Programme Curriculum

Industrial Toxicology for Chemical Engineers Training Course

Introduction

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Course Duration

5 days

Course Objectives

Upon completion of this training, participants will be able to:

1. Understand advanced principles of Industrial Toxicology and Occupational Health.
2. Identify toxic chemical hazards using modern Chemical Risk Assessment methodologies.
3. Evaluate exposure pathways using Exposure Modeling and Industrial Hygiene techniques.
4. Apply Toxicokinetics and Toxicodynamics in industrial process environments.
5. Conduct quantitative Health Risk Assessment (HRA) for industrial operations.
6. Implement Process Safety Management (PSM) strategies for toxic substances.
7. Utilize GHS Classification and Safety Data Sheets (SDS) effectively.
8. Develop Exposure Monitoring and Biological Monitoring programs.
9. Integrate ESG, Sustainability, and Responsible Care principles into toxicological management.
10. Assess carcinogenic, mutagenic, reproductive, and endocrine-disrupting chemicals.
11. Apply AI-powered Safety Analytics and Predictive Risk Management approaches.
12. Design engineering controls to reduce occupational exposure risks.
13. Ensure compliance with international EHS, REACH, OSHA, and ISO standards.

Target Audience

1. Chemical Engineers
2. Process Engineers
3. Plant Managers
4. Production Supervisors
5. EHS Professionals
6. Industrial Hygienists
7. HSE Managers and Officers
8. Regulatory Compliance and Sustainability Professionals

Course Modules

Module 1: Fundamentals of Industrial Toxicology

- Principles of toxicology and occupational health
- Dose-response relationships
- Toxicokinetics and toxicodynamics
- Routes of exposure and absorption mechanisms
- Classification of toxic agents
- **Case Study:** Bhopal Gas Tragedy – Toxicological impact assessment and lessons learned.

Module 2: Chemical Hazard Identification and Classification

- Hazard identification methodologies
- GHS classification systems
- Safety Data Sheet interpretation
- Chemical inventory management
- Hazard communication programs
- **Case Study:** Hazard classification failures in chemical storage facilities.

Module 3: Occupational Exposure Assessment

- Workplace exposure monitoring
- Airborne contaminant assessment
- Biological monitoring techniques
- Exposure modeling tools
- Occupational exposure limits (OELs)
- **Case Study:** Benzene exposure management in petrochemical plants.

Module 4: Toxic Industrial Chemicals and Health Effects

- Acute and chronic toxicity
- Carcinogens and mutagens
- Neurotoxic chemicals
- Respiratory toxicants
- Endocrine-disrupting substances
- **Case Study:** Asbestos exposure and long-term occupational disease management.

Module 5: Industrial Hygiene and Exposure Control

- Engineering controls
- Administrative controls
- Personal protective equipment (PPE)
- Ventilation system design
- Exposure reduction strategies
- **Case Study:** Silica dust control program in manufacturing operations.

Module 6: Health Risk Assessment and Regulatory Compliance

- Health Risk Assessment methodologies
- REACH compliance requirements
- OSHA toxic substance standards

- ISO 45001 integration
- Regulatory reporting and documentation
- **Case Study:** Chemical risk assessment for a specialty chemicals facility.

Module 7: Toxic Release Management and Emergency Response

- Toxic release scenarios
- Emergency preparedness planning
- Incident investigation techniques
- Toxic spill containment strategies
- Crisis communication management
- **Case Study:** Chlorine gas release emergency response in industrial facilities.

Module 8: Emerging Trends in Industrial Toxicology

- AI-driven safety analytics
- Predictive toxicology
- ESG and sustainability reporting
- Green chemistry initiatives
- Digital EHS transformation
- **Case Study:** Application of predictive toxicology and machine learning in chemical risk management.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com