Corrosion Engineering and Prevention 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

Corrosion Engineering and Prevention is a critical discipline focused on protecting industrial assets, infrastructure, and mechanical systems from degradation caused by electrochemical reactions, environmental exposure, and material failure. Corrosion Engineering and Prevention Training Course equips learners with practical and theoretical knowledge in asset integrity management, corrosion mechanisms, failure analysis, and mitigation strategies used across oil & gas, marine, construction, manufacturing, and power industries.

With increasing global demand for sustainable infrastructure, reliability engineering, and lifecycle asset optimization, corrosion prevention has become a core competency for engineers and technicians. This course integrates modern techniques such as cathodic protection systems, protective coatings technology, corrosion monitoring, and predictive maintenance strategies to enhance operational efficiency, reduce downtime, and extend asset lifespan in harsh industrial environments.

Programme Curriculum

Corrosion Engineering and Prevention Training Course

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Course Duration

5 days

Course Objectives

1. Understand fundamental principles of corrosion science and electrochemistry
2. Identify types of corrosion including galvanic, pitting, crevice, and uniform corrosion
3. Apply corrosion prevention strategies in industrial environments
4. Design and evaluate cathodic protection systems
5. Implement advanced protective coatings and surface treatment technologies
6. Conduct corrosion failure analysis and root cause investigation (RCFA)
7. Develop asset integrity management (AIM) programs
8. Use corrosion monitoring and inspection techniques (NDT methods)
9. Apply materials selection criteria for corrosion resistance
10. Interpret corrosion data for predictive maintenance planning
11. Ensure compliance with ISO standards and industrial corrosion codes
12. Mitigate corrosion risks in oil & gas, marine, and chemical plants
13. Integrate digital corrosion monitoring and smart inspection technologies

Target Audience

- Corrosion engineers and materials engineers
- Mechanical and chemical engineers
- Maintenance and reliability engineers
- Oil & gas professionals
- Marine and offshore engineering personnel
- Construction and infrastructure engineers
- Quality assurance and inspection specialists
- Technical managers and asset integrity supervisors

Course Modules

Module 1: Fundamentals of Corrosion Science

- Electrochemical principles of corrosion
- Thermodynamics and corrosion reactions
- Environmental factors affecting corrosion
- Corrosion rate measurement techniques
- Introduction to corrosion classification
- **Case Study:** Failure analysis of steel pipelines due to uniform corrosion in coastal environments.

Module 2: Types and Mechanisms of Corrosion

- Galvanic corrosion mechanisms
- Pitting and crevice corrosion behavior

- Stress corrosion cracking (SCC)
- Erosion-corrosion in pipelines
- Microbiologically influenced corrosion (MIC)
- **Case Study:** Offshore platform degradation due to MIC and chloride-induced pitting.

Module 3: Corrosion Control and Prevention Techniques

- Environmental modification methods
- Inhibitors and chemical treatment systems
- Protective coatings selection and application
- Material upgrades and alloy selection
- Design considerations for corrosion prevention
- **Case Study:** Chemical plant equipment protected using epoxy and polyurethane coating systems.

Module 4: Cathodic Protection Systems

- Sacrificial anode systems design
- Impressed current cathodic protection (ICCP)
- System monitoring and troubleshooting
- Soil and seawater resistivity effects
- CP system installation standards
- **Case Study:** Pipeline corrosion prevention using ICCP in a high-salinity desert region.

Module 5: Corrosion Monitoring and Inspection Techniques

- Non-destructive testing (NDT) methods
- Ultrasonic thickness measurement
- Corrosion coupons and probes
- Inline inspection (ILI) tools
- Digital monitoring systems and IoT sensors
- **Case Study:** Smart sensor-based corrosion monitoring in refinery storage tanks.

Module 6: Materials Selection and Failure Analysis

- Corrosion-resistant alloys (CRA) selection
- Metallurgy for corrosion resistance
- Fractography and failure investigation
- Root cause analysis (RCA) techniques
- Lifecycle assessment of materials
- **Case Study:** Heat exchanger failure due to improper stainless steel grade selection.

Module 7: Asset Integrity and Risk-Based Inspection (RBI)

- Asset integrity management systems
- Risk-based inspection planning
- Integrity operating windows (IOWs)
- Probability of failure analysis
- Maintenance optimization strategies
- **Case Study:** RBI implementation reducing shutdown costs in an oil refinery.

Module 8: Advanced Corrosion Management & Digital Solutions

- Predictive corrosion analytics
- AI and machine learning in corrosion prediction
- Digital twins for asset monitoring
- Smart inspection technologies
- Industry 4.0 integration in corrosion control
- **Case Study:** AI-driven corrosion prediction system in offshore wind turbines.

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
28 Sep 2026	02 Oct 2026	Online	$1,000
28 Sep 2026	02 Oct 2026	Physical	$1,500
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0

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

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