



Civil Engineering

Structural Health Monitoring

Course Introduction

Structural Health Monitoring

Structural Health Monitoring is an advanced and interdisciplinary field that integrates sensing technology, data analysis, and engineering principles to assess the condition of structures in real-time. By continuously monitoring the integrity of structures, Structural Health Monitoring helps ensure safety, optimize maintenance, and extend the lifespan of critical infrastructure such as bridges, buildings, pipelines, and aircraft.

This course provides participants with a comprehensive understanding of Structural Health Monitoring principles, techniques, and applications, equipping them with the knowledge to design and implement Structural Health Monitoring systems effectively

Target Audience

- civil engineers.
- Experienced Civil Engineers Seeking Professional Development

Learning Objectives

- Understand the fundamental principles and importance of Structural Health Monitoring.
- Explore various sensing technologies and their applications in Structural Health Monitoring.
- Analyze and interpret data collected through Structural Health Monitoring systems.
- Design and implement Structural Health Monitoring strategies for real-world infrastructure.

- Evaluate case studies to learn best practices and innovative approaches in Structural Health Monitoring.

Course Outline

• DAY 01

Fundamentals of Structural Health Monitoring

- Overview of Structural Health Monitoring and its significance
- Key components of Structural Health Monitoring systems
- Introduction to sensing technologies
- Role of Structural Health Monitoring in infrastructure management
- **Case studies:** Success stories in Structural Health Monitoring

• Day 02

Sensing Technologies and Data Acquisition

- Types of sensors used in Structural Health Monitoring (e.g., strain gauges, accelerometers, fiber optic sensors)
- Wireless sensor networks and IoT in Structural Health Monitoring
- Data acquisition systems and their configurations
- Challenges in sensor deployment and data reliability
- **Hands-on activity:** Sensor selection and setup

• Day 03

Data Processing and Analysis

- Data preprocessing techniques
- Signal processing and feature extraction
- Machine learning applications in Structural Health Monitoring
- Real-time monitoring and anomaly detection
- **Practical session:** Analyzing Structural Health Monitoring data with software tools

• Day 04

Structural Health Monitoring System Design and Implementation

- Framework for designing Structural Health Monitoring systems

- Integration of hardware and software components
- Cost-benefit analysis of Structural Health Monitoring implementations
- Regulatory standards and compliance in Structural Health Monitoring
- **Group project:** Developing an Structural Health Monitoring plan for a selected structure

• **Day 05**

Advanced Topics and Case Studies

- Emerging trends in Structural Health Monitoring (e.g., AI, drones, digital twins)
- Structural Health Monitoring for extreme environments and disaster resilience
- Comprehensive case studies and lessons learned
- Future challenges and opportunities in Structural Health Monitoring
- Final assessment and feedback session

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 30, 2025	July 4, 2025	5 days	4250.00 \$	UAE - Dubai
July 28, 2025	None	None days	4950.00 \$	Turkey - Istanbul
Dec. 22, 2025	Dec. 26, 2025	5 days	4250.00 \$	UAE - Abu Dhabi