



Fundamentals of Engineering
Mechanical Technology Workshop





Fundamentals of Engineering Mechanical Technology Workshop

Introduction:

Mechanical engineering technology is pivotal in the chemical, oil, gas, and petrochemical industries. This engineering discipline requires a deep understanding of mechanics and knowledge of other facets such as inspection, monitoring, and condition evaluation.

The engineering mechanical technology fundamentals workshop spans the spectrum from the theoretical principles of engineering to pragmatic aspects like the safe movement of substances and equipment sustainability. Mechanical technology engineering is further nuanced by material properties, static and rotating equipment design, assessment methods, and the integration of maintenance strategies and condition monitoring.

By exploring this extensive engineering mechanical technology fundamentals workshop, participants will gain a well-rounded understanding of mechanical technology and what mechanical engineering technology is in practice. They will also get hands-on experiences with mechanical technology tools and emerge as informed technicians equipped to handle challenges in mechanical technology workshops.

This mechanical technology course will emphasize mechanical technology tools, the mechanics behind a mechanical workshop, and mechanical technology engineering practices. Our workshop aims to present new mechanical technology developments and elucidate the definition of mechanical technology for professionals in the field.

Targeted Groups:

- Technical and non-technical personnel in mechanical technology sectors like chemical, petrochemical, oil, and mechanical industries seek to grasp mechanical engineering concepts.
- Maintenance and project engineers, production engineers, trainees in mechanical technician courses, and plant operators are seeking a foundational understanding of mechanical technology.
- Those with little experience in the field need a comprehensive introduction to what a mechanical technology course offers and its applications.

Conference Objectives:

By attending this engineering mechanical technology fundamentals workshop, participants will acquire the ability to:

- Employ Non-Destructive Examination NDE techniques for evaluating the integrity of static and rotating equipment.
- Choose the appropriate materials for various types of equipment, considering the definition and application of mechanical technology.
- Grasp the principle of operations and design elements in electrical and mechanical technology.
- Implement methods to protect equipment from corrosion.
- Recognize and diagnose different failure modes of static and rotating equipment used in electro-mechanical technology.

Targeted Competencies:

Attendees in this engineering mechanical technology fundamentals workshop will develop competencies in:

- Mechanical design complies with ASME, API, and other codes and standards.
- Select engineering materials based on their properties for specific tasks within mechanical technology engineering.
- Identify degradation mechanisms and prevent potential failures.
- Understand the utilization and maintenance of static and rotating equipment exclusive to the mechanical technology workshop.
- Apply and understand maintenance strategies and their fit within a new mechanical technology paradigm.
- Learn how to master condition monitoring, systematic inspections, and asset evaluation.

Conference Content:

Unit 1: Introduction and Fundamentals:

- Engineering material properties.
- Stress and strain.
- Learn analysis of fracture failure, stress concentration, and fracture toughness.
- Learn an Investigation of fatigue failure, including testing and mechanisms.
- Understand temperature considerations and creep failure.
- Identify damage mechanisms in mechanical technology tools.
- Fundamentals of mechanical design.
- Overview of ASME and API.
- Codes and standards.
- Design principles for static strength in mechanical technology applications.

Unit 2: Materials Selection and Inspection:

- Understand the criteria for materials selection in mechanical technology.
- Materials of construction.
- Carbon steels.
- Alloy steels.
- Stainless steels.
- Nickel-based and titanium alloys.
- Inspection techniques.
- Visual.
- Penetrant.
- Magnetic flux.
- Eddy's current inspections.
- X-ray and Gamma-ray.
- Ultrasonics - TOFD and Pulse-Echo.

Unit 3: Valves, Piping, and Fitness for Service:

- Valves.
- Valve types.
- Valve characteristics.
- Valve applications.
- Valve selection.
- Valve actuators.
- Piping and pipelines.
- ASME B31.
- Learn about pipe types, construction, and schedules.
- Steel pipes.
- Understand welded types and sections.
- Flanges and gaskets.
- Learn plastic pipes and composite pipes.
- Pipe coatings and linings.
- Pipe supports and insulation blocks.
- Stress relief in piping design.
- Pigging.
- Water hammer.
- Overview of API 570 - inspection and repair of pipelines and piping.
- API 579 overview.
- Fitness for service.

Unit 4: Corrosion:

- Fundamentals of corrosion.
- Learn about the types of corrosion encountered in mechanical technology engineering.
- Corrosion inspection and monitoring.
- Corrosion minimization.
- Coatings.
- Inhibitors.
- Cathodic protection.

Unit 5: Compressors:

- Classification of Compressors - Reciprocating, Centrifugal, and Screw.
- Understanding Blading and Staging.
- Study of the performance curves and their implications.
- Learn the usage of compressed air and related instruments.
- Understand the discussion on glands and mechanical seals in mechanical engineering technology.

Unit 6: Mechanical Maintenance:

- Strategies and Philosophies.
- Maintenance system optimization.
- Maintenance Management Systems.
- Condition Monitoring.
- Vibration Analysis.
- Shaft Alignment.