



London TDM

# Mechanical and Electrical Engineering Training Courses

**Course Venue:** United Arab Emirates - Dubai

**Course Date:** From 19 October 2025 To 23 October 2025

**Course Place:** Downtown Dubai

**Course Fees:** 5,000 USD

## Introduction

Welcome to "Advanced Thermodynamics for Engineers," a comprehensive 5-day course designed to deepen your understanding of thermodynamic principles and their applications in various engineering fields. This course builds on fundamental concepts and explores advanced topics that are crucial for solving complex engineering problems related to energy, heat transfer, and fluid systems. Our goal is to equip you with the knowledge and skills needed to tackle real-world challenges effectively.

## Objectives

- Enhance understanding of advanced thermodynamic concepts and theories.
- Apply thermodynamic principles to solve complex engineering problems.
- Develop skills in modeling and analyzing energy systems.
- Explore the latest advancements and technologies in thermodynamics.
- Facilitate critical thinking and innovative solutions in thermal engineering.

## Course Outlines

### Day 1: Fundamentals Review and Advanced Laws

- Revisiting basic thermodynamical properties and processes.
- Detailed analysis of the First and Second Laws of Thermodynamics.
- Concepts of entropy and exergy in practical applications.
- Advanced energy analysis of closed and open systems.
- Case studies on energy conversion and efficiency improvements.

### Day 2: Thermodynamic Cycles and Applications

- Advanced study of Carnot, Rankine, and Brayton cycles.
- Introduction to refrigeration and heat pump cycles.
- Analysis of combined and cogeneration cycles.
- Real-world applications in power generation and HVAC systems.
- Optimizing cycle efficiency and performance in engineering design.

### Day 3: Phase Equilibrium and Non-Ideal Systems

- Understanding phase diagrams and phase equilibria.
- Advanced concepts in multi-component systems.
- Introduction to activity and fugacity in non-ideal mixtures.
- Thermodynamic models for real gases and liquids.
- Applications in chemical engineering and materials science.

### Day 4: Irreversibility and Availability Analysis

- Exploring irreversibility in thermodynamic processes.
- Quantifying energy losses and areas for improvement.
- Availability and exergy analysis of thermal systems.
- Applications in engineering optimization and sustainable design.
- Problem-solving sessions using software tools for analysis.

## **Day 5: Advances in Thermodynamics and Emerging Technologies**

- Exploring the role of thermodynamics in renewable energy technologies.
- Innovations in heat transfer and energy storage systems.
- Thermodynamics in fuel cells and bioenergy applications.
- Future trends in thermodynamics research and industry applications.
- Course evaluation and final project presentations.