From Wheels to Watts: Mechanical to Electrical Conversion

2027 □□□□□ 30 – 26
Amsterdam (Netherlands)



From Wheels to Watts: Mechanical to Electrical Conversion

Ref: 20222876_230126 Location: Amsterdam (Netherlands) Fees: 5900 GBP

Course Description

This intensive 1-week course explores the fundamental principles and practical applications of mechanical to electrical power conversion. Participants will gain a comprehensive understanding of electromechanical energy conversion, electric machinery, and power electronic systems. The course combines theoretical knowledge with hands-on exercises to provide a well-rounded learning experience for engineers and technicians in the energy sector.

Learning Objectives

- Understand the basic principles of electromechanical energy conversion
- Analyze and model various types of electric machines and their characteristics
- Apply reference frame theory to manipulate dynamic equations of electric machinery
- Design and implement power electronic circuits for controlling electric machines
- Evaluate energy conversion processes in modern applications such as renewable energy systems and electric vehicles

Course Modules

Day 1: Fundamentals of Energy Conversion

- Introduction to electromechanical energy conversion
- Magnetic circuits and materials
- Energy and co-energy concepts
- Electromechanical coupling

Day 2: Electric Machinery Analysis

- DC machines: generators and motors
- Synchronous machines
- Induction machines
- Permanent magnet machines



Day 3: Advanced Machine Modeling

- Reference frame theory
- Dynamic modeling of electric machines
- Numerical simulation techniques
- Machine parameter estimation

Day 4: Power Electronics for Machine Control

- Power semiconductor devices
- DC-DC converters
- Inverters and motor drives
- Pulse width modulation techniques

Day 5: Applications and Emerging Technologies

- Renewable energy systems: wind and solar
- Electric and hybrid vehicle powertrains
- Grid integration of distributed generation
- Energy storage systems

Practical Wins for Participants

- Ability to analyze and optimize electromechanical systems for improved efficiency
- Skills to design and implement advanced motor control strategies
- Capability to integrate power electronic converters with electric machines
- Knowledge to contribute to cutting-edge energy conversion projects in various industries

