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Course Name

Electrical Motors and Drives: Protection, Maintenance & Troubleshooting

Sector Name

Electrical Engineering

Document Type

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Electrical Motors and Drives: Protection, Maintenance & Troubleshooting

Course Introduction

The course covers all topics relating to both AC motors and their drives. AC motors represent the industry's workhorse in all applications. It is no exaggeration to suggest that more than half of the energy consumed worldwide is converted by AC motors into work, and these are controlled by drives.

Understanding maintenance and troubleshooting procedures of such vital industrial equipment means that reduced downtime and increased productivity for the company. The protection is a requirement along with their function and integration with the overall system, ensuring that such expensive apparatus is well guarded against failures, which further offers safety for operations personnel as well.

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Electrical Motors and Drives: Protection, Maintenance & Troubleshooting

Target Audience

- ✓ Technician, semiconductor development
- ✓ Power-distribution engineer
- ✓ Controls design engineer

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Electrical Motors and Drives: Protection, Maintenance & Troubleshooting

Learning Objectives

- ✓ Understand the various types of AC motors and starters
- ✓ Determine the components and operations of variable speed drives
- ✓ Explain the different types of variable speed drives
- ✓ Analyze the common faults in a variable-speed drive
- ✓ Design the protection requirements for motors and drives

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Electrical Motors and Drives: Protection, Maintenance & Troubleshooting

Course Outline

✓ DAY 01

Module (01) Introduction to AC Motors

- ✓ Fundamentals of Rotating Machines Theory
- ✓ Principles of Operation of AC Motors
- ✓ Construction, Rotor Slip, and Torque-Speed Characteristic
- ✓ Single-phase and three-phase AC motors
- ✓ Types, Construction, Characteristics, and Applications
- ✓ Starting of induction motors and associated techniques and acceleration
- ✓ Speed control requirements of AC motors and load matching
- ✓ Selection of AC motors for industrial applications and service factor
- ✓ Medium voltage motors and applications

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Course Outline

✓ Day 02

Module (02) Troubleshooting and Maintenance of Motors

- ✓ Characteristics of motors, enclosures, and cooling methods
- ✓ Predictive maintenance, motor troubleshooting, and diagnostic testing
- ✓ Failures in three-phase stator windings and rewind scenarios when a motor fails
- ✓ Troubleshooting and maintenance of AC motors, routine care
- ✓ Slow acceleration or refusal to start an AC motor, overheating, and noise
- ✓ Standards and testing instruments

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Course Outline

✓ Day 03

Module (03) Drives

- ✓ Fundamental principles and understanding of AC Variable Speed Drives
- ✓ Power semiconductors, diode, thyristor (SCR), IGBT, MOSFET, GTO, and others.
- ✓ Voltage-source, current-source, and pulse-width-modulated (PWM) inverters
- ✓ Benefits and applications of VSD
- ✓ Two-level PWM, regeneration, and dynamic braking, volts per hertz control
- ✓ Medium voltage VSDs, switching transients, harmonics, and power factor

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Course Outline

✓ Day 04

Module (04) Troubleshooting and Maintenance of Drives

- ✓ Soft starters and selecting the correct VSD
- ✓ VSD analyzers for converter failures, inverters, and rectifiers
- ✓ Troubleshooting techniques and maintenance for VSD
- ✓ VSD parameter guidelines and settings
- ✓ VSD bearing failures and remedies
- ✓ Testing instruments and scope meters for VSD

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Course Outline

✓ Day 05

Module (05) Protection of Motors and Drives

- ✓ Protection of AC motors, requirements, and overload protection
- ✓ Fuses, circuit breakers, magnetic and thermal overload, and solid-state
- ✓ Motor protection curves, back-up protection
- ✓ Protection of inverters and electronic converters driving motors
- ✓ Case studies, selection and design of systems, and their protection
- ✓ Q&A and wrap-up session

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 24, 2027	May 28, 2027	5 days	4950.00 \$	Spain , Barcelona
Sept. 7, 2026	Sept. 11, 2026	5 days	4250.00 \$	UAE , Abu Dhabi
Dec. 28, 2026	Jan. 1, 2027	5 days	4250.00 \$	UAE , Abu Dhabi
March 14, 2027	March 18, 2027	5 days	4250.00 \$	KSA , Riyadh

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