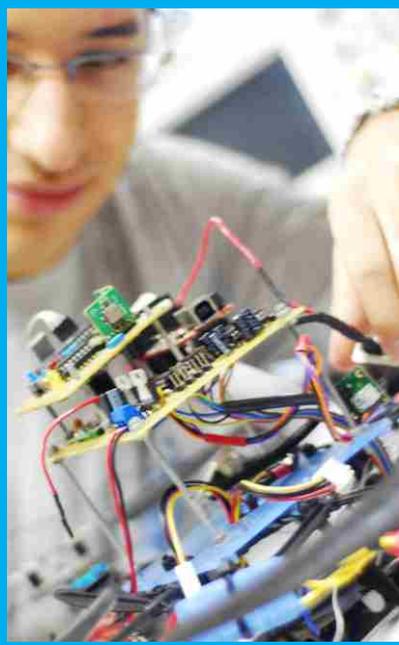
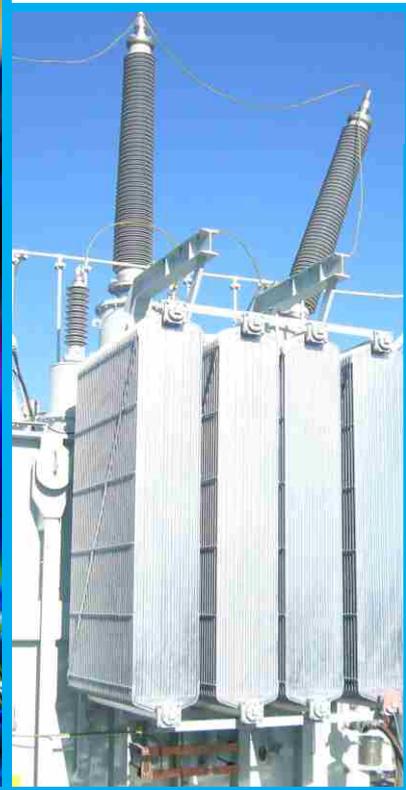


MOTOR PROTECTION, CONTROL & MAINTENANCE TECHNOLOGIES



What You Will Learn...

- Specify protection requirements for motors
- Maintain electrical motors
- Specify speed control requirements for motors
- Understand essentials of motors and drives
- Detail the main issues with testing of motors
- Prevent or at least minimise motor bearing failure
- Troubleshoot and fix faults on motors and drives
- Interface control circuits of motors with PLCs/DCSs
- Reduce downtime on electrical motors
- Improve plant safety
- Improve plant throughput
- Reduce your spares usage and requirements

SmartBrains Oil and Energy Institute provides premium training courses for energy industry executives and fresh engineering graduates. Our success and distinguished reputation is thanks to our commitment to provide first-class programmes to our clients. Combining leading professionals from across the industry as lecturers and an interactive, practical format, the lessons learnt in a SmartBrains for Energy course are directly transferable back to the work place.

Our Strategic Objectives

To be recognized by industry and employers as a highly reputable training organization. Provide dynamic leadership, sound management and excellence in training. Continue to improve our services through quality management processes. Invest in and value our people through professional development activities. Grow our business through innovation and to continue to be financially secure. Be influential in the economic development of the industries we serve nation wise

Our Mission

“To provide quality training and assessment services and to prepare our students for a fulfilling professional career in their chosen industry. We are committed to upholding our values of providing excellence in training”

Course STRUCTURE



“I would like to thanks T&P Team of Smartbrains who helped me to get skill set on Electrical System Design. The learning experience was good and placement is excellent”

Zeeshan Ahmad

Ankit Electrotech Engineers Pvt Ltd, Noida

DAY ONE

INTRODUCTION AND OUTLINE OF WORKSHOP OBJECTIVES

FUNDAMENTALS OF MOTOR TECHNOLOGY AND CONSTRUCTION

- Basic principles of rotating electric machines
- Fundamental principles of speed control
- Efficiency, torque, inertia, horsepower/power factor
- Torque-speed curves
- Induction/synchronous/wound rotor types
- Basic construction and physical configuration, windings
- Principles of operation and performance

DAY TWO

MOTOR CONTROL

- Power Circuit
- Control Circuit
- Full Online voltage starting
- Reduced voltage starting
 - Delta-star
 - Resistance
 - Reactor
 - Autotransformer
 - Soft start
- Braking
- Speed Control
- Reversing

THREE PHASE AC INDUCTION MOTORS

- Components
- Theory of operation
- Induction motor design
- Duty cycles
- Insulation and Cooling requirements
- Starting methods
- Selecting motors
- Types of faults, fault finding and testing of AC machines
- Testing instrumentation

ENERGY LOSSES AND EFFICIENCY OF THREE PHASE AC INDUCTION MOTORS

- Standards
- Types of Losses
- Tests for measurement and computation of losses and efficiency
- Dynamometers
- Principles of load application by braking
- Torque measurement basics
- Types of practical dynamometers

MOTOR FAILURE ANALYSIS

- Frequent starts
- High inertia
- Inadequate cooling
- Congestion on fan cover
- Improper spacing at end of motor
- Incorrect belt alignment
- Solid belt guards
- Excessive loading causing bearing clearance problems
- Insulation failures
- Bearing current problems

TESTING

- Insulation life and resistance
- Polarization index
- Hipot
- DC ramp test
- Ac hipot
- Capacitance test
- Dissipation factor
- Partial Discharge
- Surge test
- Mechanical testing
- Online testing

BEARING FAILURE ANALYSIS

- Bearing failures
- Grease and greasing
- Belt Drive aspects
- Balance
- Storage issues
- Service factor loading

PROTECTION OF MOTORS

- Thermal overload
- Time constraints
- Early relays and new digital relays
- Starting and stalling conditions
- Over Current / Overload
- Under-voltage / Over-voltage
- Under frequency
- Pole slip / Out of step
- Loss of excitation
- Inadvertent energization
- Over fluxing
- Stall protection / acceleration time / Start up supervision / Time between starts
- Unbalanced supply voltages
- Negative sequence currents
- De-rating factors
- Earth faults - core balance, residual stabilising resistors
- Calculation of protective relay settings

CONTROL SYSTEM FOR AC VARIABLE SPEED DRIVES

- Overall control system
- Power supply for the control system
- Dc Bus charging system
- VSD control loops (Open Loop/Closed loop)
- Vector control
- Current feedback in ac variable speed drives
- Speed feedback from motor

INSTALLATION AND FAULT FINDING

- General installation and environmental requirements
- Power supply connections and earthing
- Where to install contactors in power circuit
- Installation of ac converters into metal enclosures

Why

SmartBrains?

SmartBrains is the ultimate choice for all the working & non working engineer's in energy Sector training requirements. Our extensive portfolio of energy training courses are:

- ▶ 100% focused on the Oil and energy industry.
- ▶ Guided by the industry's renowned professionals with unprecedented knowledge of the Oil and energy industry.
- ▶ Highly interactive program with practical and relevant case studies.
- ▶ Training by extensively researched self developed cutting edge techniques.
- ▶ Skill development techniques with comprehensive set of documentation, practical skills and tools used in the Industry.

Admission

Requirements

- ▶ Duly Filled Application Form
- ▶ 2 Photographs
- ▶ Photo State of Qualifying Examination
- ▶ Address Proof
- ▶ I.D. Proof
- ▶ Latest Resume



- ▶ The perfect opportunity to develop network and experiences with knowledge sharing.
- ▶ Internationally acclaimed engineering qualification.
- ▶ Designed for both Fresh engineers and working professionals to attain growth in oil and energy industry.
- ▶ One of the finest international faculty.
- ▶ Interactive, interesting and motivational training sessions.
- ▶ Access to enormous reference books and research materials.

Declaration

- ▶ This training program is on AUTONOMOUS basis conducted by SmartBrains.
- ▶ SmartBrains has right to expel any student at any time for misbehavior, poor attendance without refunding the fees.
- ▶ Certification will be issued only after completion of course, submission of all assignments and passing all the examinations.
- ▶ SmartBrains has its own rules and regulations about conducting examinations and assessment of examinations

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