# Electrical Engineering Practices For Facilities Engineer Training

## Description

### Course Description

This course applies Electrical Engineering principles to oil and gas facilities design and operation and requires some prior experience. Electrical Engineering principles are reinforced through the use of individual and team problem solving exercises, one-line diagram coordination, interpretation, and class discussions of interfaces between facilities engineers, contractors and maintenance personnel.

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Participants gain additional understanding of electrical equipment requirements for facilities and what is important to the Electrical discipline.

### Course Objectives

- Key principles in project management for electrical projects including basics, front end loading, scope definition, brown-field vs. green-field, engineering deliverables, roles and responsibilities, project planning, risk analysis and management, cost estimating, and procurement, construction, contractor and supplier management
- Standards and recommended practices through an introduction to ANSI, API, CSA, CFR, IEC, IEEE, IES, ISA, NEMA, NFPA, AND UL
- Electrical distribution systems including background, planning, voltage selection, and system protection
- How to select, maintain and control DC and AC motors
- The characteristics, properties, insulation, shielding, jacketing, short circuit capabilities, and references of wires and cables
- Transformers which include operation, models, types, components, turns and voltage ratios, connections, losses, efficiency, ratings, application, selection, and safety
- Medium and low voltage switchgear and motor control centers including specifications, maintenance, and distribution
- Topics in faults and circuit protection including sensing devices, fuses, direct tripping devices, protective relaying, relaying schemes, major equipment protection, and system relay coordination
- Distribution, construction, fuses, circuit breakers, disconnects, grounding, types, and ratings of

switchboards and panels
- The systems and requirements of uninterruptible power supply (UPS) and emergency power in addition to an overview of generator set, ATSs, and batteries
- Fault protection, system grounding philosophy, ungrounded systems, grounded systems, bonding, ignition sources, bonding techniques, separately derived systems, performance, and substation grounding
- About North American and International classifications of hazardous areas in addition to NEC and IEC comparisons, extension of zones, equipment certification, and equipment protection methods

**Course Outlines**

- Electrical project management
- Standards and recommended practices
- Distribution systems
- Motors
- Wire and cable
- Transformers
- Switchgear
- Motor control centers
- Switchboards and panels
- Electrical faults (short circuits) and circuit protection
- UPS and emergency power
- Electrical system ground and bonding
- Hazardous area classification

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