

## Low and Medium Voltage Power Systems

This three-day course reviews the 1999 NEC and an overview of the significant changes from earlier editions. Topics relating to industrial applications including grounding, overcurrent protection, wiring methods, and working clearances are given. This course includes class exercises working through typical calculations and determinations that require participants to search and find information in the Code.

### I. Introduction

- Course Overview
- NEC & Local Electrical Code
- Compliance

### II. Electrical Power Systems

- Fundamentals and Theory
- One Line Diagrams
- Drawing Standards and Symbolology
- Sound Engineering Practices

### III. Power System Calculations

- Limitations
- Bus Sizing and Ratings
- Feeder, Neutral and Ground
- Conductor Sizing
- Metering and Protective Relay Trip Calculations
- Relay Settings
- Time-Current Curve Plotting
- KW and KVAR Meter Instrument
- Transformer Calculations

### IV. Metering

- Three-Line Diagram Review (Using Client Diagrams)
- Potential Transformers, Voltage Switches, Voltmeters
- Current Transformers, CT Shorting Switches, Ammeters
- KW, KVAR and PF Meter Connections

### V. Protective Relaying

- OC (50/51), Rev Pwr (32), Diff OC (87), and Grd Fault (51G)
- Resistance Grounding Systems

### VI. Breaker Control

- Low and Medium Voltage Switchgear
- Low and Medium Voltage Circuit Breakers
- Trip and Lockout Circuits
- Local and Relay Tripping
- Remote/Automatic Tripping

### VII. 480V and 4160V Procedures

- Lockout/Tagout Procedures for Low and Medium Voltage Circuit Breakers (OSHA Requirements)
- Rackout Procedures for Stored Energy Breakers
- Medium Voltage Cable Terminations Principles and Practices

### VIII. Maintenance and Troubleshooting

- If/Then Matrix (Electrical & Mechanical)
- Typical Problems and Solutions
- Preventive Maintenance