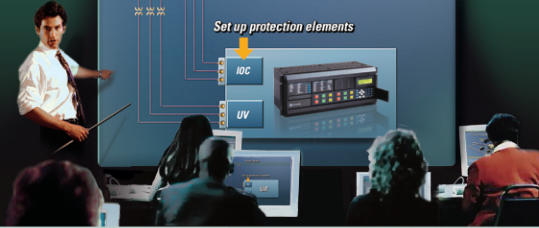




# UR



## TRNG-URAPPS

### ADVANCED APPLICATIONS

#### WHAT WILL I LEARN FROM THIS COURSE?

The protection engineer will gain an in-depth understanding of the major protective element algorithms for the B30, B90, C30, C60, D30, D60, F35, F60, G30, G60, L60, L90, M60, T35 and T60. The review of Oscillography and Event Logs for specific faults will aid the class in learning to evaluate the Universal Relay's performance.

#### WHO SHOULD ATTEND?

Application Engineers who are responsible for relay selection, relay programming and overall network design will benefit from this course.

#### PREREQUISITES

- A Degree in Electrical Engineering or equivalent
- UR Platform Course
- UR Data Communications course an asset
- The UR Applications I Interactive Learning CD would be an asset

#### TUITION

\$ 3,000 US\*

#### COURSE DURATION

5 Days

#### CEU CREDITS OFFERED

3.5 Credits

#### AGENDA

##### Day 1

###### F35 and F60 Feeder Protection

- F35 and F60 specifications
- Breaker Failure
- Autoreclose
- Synchrocheck
- Cold Load Pickup
- Downed Conductor detection (HI-Z)
- Multiple Feeder protection
- Automatic Bus Transfer Schemes
- Distributed Protection Schemes

###### Bus protection with the B30

- B30 specifications
- Busbar protection techniques
- Digital low-impedance Busbar Relays
- B30 theory of operation
- B30 Dynamic Bus Replica
- End Fault protection
- Setting rules for the 87B function
- B30 modeling and settings
- EnerVista UR Setup Software configuration for a typical application

##### Day 2

###### Bus protection with the B90

- B90 capacity
- B90 features and benefits
- B90 applications
- B90 architecture
- B90 wiring
- Breaker Failure
- Distance Recording
- B90 modeling and setting
- EnerVista UR Setup Software configuration for a typical application
- B90 application for ungrounded and lightly grounded systems

###### T35 and T60 Transformer Protection

- T35 and T60 specifications
- Phase and Magnitude Compensation
- Percent Differential characteristics and settings
- Instantaneous Differential protection
- Restricted Ground Fault protection
- Overexcitation protection
- Creating a protection and control settings file for a typical Transformer application

##### Day 3

###### M60 Motor Protection

- Motor Thermal Modeling
- Short Circuit protection
- Ground Fault detection
- Phase Differential
- Single Phase protection
- Mechanical Jam
- Loss of Load
- Acceleration Timer
- Starts per Hour / Time Between Starts

###### G60 and G30 Generator Protection

- G30 and G60 specifications
- Generator grounding
- Stator Differential
- 100% Stator Ground Fault protection (64G, 27TN)
- Current Unbalance
- Loss of Excitation
- Volts/Hz
- Reverse Power
- System Backup Distance
- Accidental Energization
- Overexcitation

##### Day 4

###### L90 Line Differential Protection

- L90 Communication interfaces
- L90 Self Synchronization and Channel Asymmetry
- Percent Current Differential
- 2 Terminal and 3 Terminal Line protection
- Dynamic Restraint Characteristic
- Disturbance Detector
- Charging Current Compensation
- Autoreclose
- Line Pickup
- Stub Bus protection
- Open Pole detection

###### L60 Line Phase Comparison

- L60 Pilot Communication interfaces
- Phase Comparison
- Backup Distance protection
- Breaker Failure

##### Day 5

###### D30 and D60 Line Distance Protection

- D30 and D60 specifications
- Phase / Ground Distance protection
- Distance Zones of Protection
- Load Encroachment
- Out of Step Tripping
- Power Swing Blocking
- Teleprotection Schemes
  - DUTT, PUTT, POTT, HYBRID POTT, Directional Blocking Scheme
  - Ground Directional elements
- Single Pole Tripping
- Autoreclose
- Series Compensated Lines

\* Tuition shown is for scheduled courses. Contact us for custom and on-site pricing.