



## **ERCOT Certification**

### **Background**

The class will be delivered over a 5-day period. The class is intended to assist system personnel in preparing to take the ERCOT Certification Exam. Participants will be taken through 14 modules based on the ERCOT Fundamentals Manual. The course is culminated with students taking an examination reflective of the material covered.

### **Course Level**

Not Applicable

### **Target Audience**

The class is intended for System Operators and personnel who are preparing to obtain their ERCOT Certification Credential.

### **NERC Continuing Education Hours**

36.0 CEHs – Total  
0.0 CEHs – Standards  
36.0 CEHs – Ops Topics  
0.0 CEHs – Sim

### **NERC Emergency Training Requirement**

36.0 hours of Emergency Operations

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### **Class Content**

The class content includes 14 modules covering the following areas:

- Interconnected Operations – Benefits, Major Interconnections, ERCOT Interconnection, and Interconnections and Frequency
- Mathematics Review - Right Triangles, Sine Function, Cosine Function, Vectors, Phase Angle, Phasors, and Per-Unit
- DC Electricity – Current, Voltage, Electrical Circuits, Resistance, Ohm's Law, Kirchhoff's Laws, and Power and Energy
- AC Electricity - Alternating Current, Magnetism and Magnetic Fields, Capacitance and Inductance, Impedance, A.C. Power, and Three Phase Power
- Generating Units – Generators, Turbines, Generator Controls, Generator Capability, and Related Equipment
- Transmission Equipment - Power Transformers, Instrument Transformers, Transmission Lines, Circuit Breakers and Switches, and Meters and Data Communication
- Active and Reactive Power - Equations for Power Transfers and Power Transfer Limits
- Voltage Control - Active, Reactive and Complex Power, Low Voltage Causes, High Voltage Causes, Effects of Low Voltage, Effects of High Voltage, and Operation of Voltage Control Equipment
- Frequency Control – Fundamentals, Governor System Operation, Automatic Generation Control, Ancillary Services, Time Error, NERC Control Performance, Impact of Frequency Deviations, and Under-frequency Protection
- ERCOT Market – Concepts, Implementation, Market Mismatch, Scheduling, and Accounting
- System Protection – Fundamentals, Relay Operation, Types of Relays, and Synchronizing Equipment
- Transmission Operations - Security Criteria, Switching Process, and Response to Equipment Outages
- Emergency Operations - Generation Emergencies, Transmission Emergencies, and System Restoration
- Economic Operations - Power Production Costs, Unit Commitment, and Real-time Operation

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### **Classroom Schedule**

Day 1 - 8:00 AM to 5:00 PM (Lunch provided)

Day 2 - 8:00 AM to 5:00 PM (Lunch provided)

Day 3 - 8:00 AM to 5:00 PM (Lunch provided)

Day 4 - 8:00 AM to 5:00 PM (Lunch provided)

Day 5 - 8:00 AM to 5:00 PM (Lunch provided)

### **Attendee Requirements**

Attendees must sign-in for the training activity in accordance with the attendance verification process stated:

- Attendees are required to sign-in on the course sign-in sheet
- Attendees are required to provide their NERC SO Certification # on the sign-in sheet, if applicable
- Attendees are required to provide a photo ID as proof of identity
- Attendees must participate in all course activities
- Attendees must complete the activity assessment.
- Attendees must submit a course evaluation form

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