

Generators & Generator Voltage Regulation

This five-day course provides a thorough working knowledge of electrical power generators and their associated voltage regulation systems. This course concentrates on large utility equipment and backup emergency generator units, but also applies well to smaller (under 500kW) equipment. Emphasis is placed upon generator paralleling, generator/regulator response to changing loads, and VAR flows, maintenance, testing, and regulator settings and protection are covered in-depth. Generator theory is backed up by comprehensive lab demonstrations. Personnel who require an advanced knowledge of generator excitation systems will benefit highly from this course.

I. Fundamentals of AC Power

- AC Waveforms
- AC Phase Relationships
- Resistance in AC Circuits
- Inductance in AC Circuits
- Capacitance in AC Circuits
- Power in AC Circuits

II. Generator Excitation Theory

- AC Generators
- Generator Operating Characteristics

III. Semiconductor Fundamentals

- Atomic Review
- Semiconductor Conduction
- Extrinsic Semiconductors
- Diodes
- Transistors
- Silicon Controlled Rectifiers (SCRs)
- Thyrite
- Logic Review
- Operational Amplifiers (Op-Amps)

IV. AC Synchronous Generators

- AC Generators
- Generator Operating Characteristics

V. Alterrex Voltage Regulators

- System Overview
- Excitation System Components
- Alternator Field Control
- Additional Regulator Functions

VI. Westinghouse WTA Voltage Regulator and Excitation System

- System Overview
- Component Parts
- Excitation System
- Limiting Circuits
- Voltage Regulator
- Calibration, Maintenance, and
- Troubleshooting

VII. Generator Protection

- Short Circuit Protection
- Ground Fault Protection
- Overload Protection
- Thermal Protection
- Overspeed Protection
- Low Field Excitation or Loss of Field
- Excitation Protection
- Generator Monitoring Protection
- Protection Against Unbalanced Faults
- Overexcitation Protection