

Power Theory & High Volt Apparatus

Focuses on Ohm's Law, measurements, fundamentals of AC and DC circuits, with an emphasis on transformers and transformer connections, identify key elements in high voltage electrical systems from the generation station to the end consumer.

Credit Hours: 3

STANDARD COMPETENCIES:

- I. Learn to:
 - A. Use Ohm's Law to calculate different electrical values.
 - B. Calculate series and parallel circuit values using Ohm's Law.
 - C. Describe the process by which alternating current is produced.
 - D. Explain the basic fundamentals of power factor and power factor correction.
 - E. Identify the key elements of the electrical system.
 - F. Explain the basic function of various distribution apparatus.
 - G. Explain the fundamentals of system protection.
 - H. Describe recent and future trends of electrical power systems.

TOPICAL OUTLINE:

- I. Use Ohm's Law to calculate different electrical values.
 - A. Calculate series and parallel circuit values using Ohm's Law.
 - B. Pertaining to the operation and maintenance of an electrical system.
- II. Describe the process by which alternating current is produced.
- III. Explain the basic fundamentals of power factor and power factor correction.
- IV. Identify the key elements of the electrical system.
 - A. Generation
 - B. Transmission
 - C. Substations
 - D. Distribution systems.
- V. Explain the basic function of various distribution apparatus.
 - A. Transformers
 - B. Capacitors
 - C. Regulators
 - D. Sectionalizers
 - E. Reclosures
 - F. Switches
- VI. Explain the fundamentals of system protection.
 - A. Fusing/Coordination
 - B. Importance of electrical apparatus coordination
 - C. Tagging/Clearances
- VII. Describe recent and future trends of electrical power systems.
 - A. Micro-turbines
 - B. Wind
 - C. Solar photovoltaic

- D. Hydro
- E. Fossil fuels
- VIII. Importance of Grounds, Neutrals, and Good Connections on Jumpers
 - A. Groundwire's role as a current carrying neutral conductor
 - B. Importance of a neutral and its application
 - C. Equipment grounding
 - D. Types of transformers
- IX. Balancing Distribution Power Circuits
 - A. Voltage drops using transformer ratio knowledge
 - B. Current levels using ammeters
 - C. Line switching for balance purposes
- X Introduction to Transformer Connections
 - A. Paralleling of transformers
 - B. Single phase transformer connection
 - C. Three phase transformer connections
 - D. Types of transformers