



AC/DC Fundamentals

This five-day course begins with a fundamental review of conductors and insulators, electric current, resistance, Ohm's and Kirchhoff's Laws, electrical power, and magnetism. AC circuit fundamentals are covered including inductive and capacitive circuits. Other topics include test equipment, semiconductors and diodes, transistors, and silicon controlled rectifiers.

I. Conductors and Insulators

- The Atom
- The Nucleus
- Electrical Charges
- Categories of Matter

II. EMF and Electric Current

- EMF
- Current Flow
- Voltage Potential

III. Resistance

- Characteristics of Resistance
- Ohm's Law

IV. Resistive Circuits

- Resistance in Series
- Resistance in Parallel
- Simplified Formulas
- Series-Parallel Circuits

V. Applying OHM's Law

- Current in Series Circuits
- Voltage & Current In Parallel Circuits
- Voltage & Current in Series-Parallel Circuits

VI. Kirchhoff's Laws

- Kirchhoff's Current Law
- Kirchhoff's Voltage Law
- Loop Equations

VII. Electrical Power

- The Unit of Power
- Power Equations
- Power Rating of Resistors

VIII. Magnetism

- Characteristics of Magnetism
- Magnetic Field Around a Current-Carrying Conductor
- Left-Hand Rule for a Conductor
- Magnetic Field of a Coil

IX. AC Power

- Sine Wave Generation
- Sine Wave Terminology

X. AC Phase Relationships

- Phase Concepts
- Phase Angle
- Phase Angle Diagrams

XI. Resistance in AC Circuits

XII. Inductance in AC Circuits

- Inductance
- Factors Affecting Inductance
- Voltage & Current in an Inductive AC Circuit
- Inductive Reactance

XIII. Capacitance in AC Circuits

- Capacitance
- Factors Affecting Capacitance
- Voltage & Current in a Capacitive AC Circuit
- Capacitive Reactance



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XIV. Power in AC Circuits

- True Power
- Apparent Power
- Reactive Power
- Power Factor
- Power Triangle

XV. Test Equipment

- Basic Meter Operation
- Voltmeter
- Ammeter
- Ohmmeter
- Multimeters
- Meggers
- Oscilloscopes

XVI. Semiconductor Theory and Diodes

- Characteristics of Matter
- Conductors, Semiconductors, and Insulators
- Basic PN Junctions
- Diode Ratings
- Diode Types
- Diode Waveshaping Circuits

XVII. Transistors

- Fundamentals
- Biasing
- Operation
- Circuit Configurations
- Biasing Techniques
- Operating Point
- Transistor Stability
- Load Lines
- Transistor-Transistor Logic (TTL)

XVIII. Silicon Controlled Rectifiers

XIX. Power Supplies

- DC Power Supply Characteristics
- Rectifier Circuits
- Power Supply Filters
- Power Supply Regulation
- Solid State Equipment Maintenance