



## Course Outline

### Digital Multimeters in Practice

- I. Introduction. **Digital Multimeters in Practice** is an 8-hour (in-person) course focusing entirely on the use and functions of digital multimeters (DMMs), ammeters, and voltmeters. This course has been designed to be of value to anyone who uses such electrical test instruments—no matter their technical skill level. References shall include: The **National Electrical Code (NEC)**, the **Standard for Electrical Safety in the Workplace (NFPA 70E)**, a Solid State Educators Power Point Presentation, **Digital Multimeter Principles** (published by ATP with authorization from Fluke Corp.), supporting CD-ROM Power Point presentations, videos, **Fluke Corporation** handouts, a variety of DMMs, and assorted electrical components. This course is designed to instruct attendees in the proper (and safe) use of DMMs as well as explore the variety of functions, advantages, and disadvantages, of various meter types. Hands-on labs are a significant part of this training.
- II. Course Modules:
  - **MODULE 1** (2 hours):
    - Introduction: Basic DC theory and AC theory
    - **Fluke ABCs of Safety**
    - Introduction to **NFPA 70E—Standard for Electrical Safety in the Workplace**
    - **Solid State Power Point** and multimedia presentations
    - **NEC**: Definitions, General Requirements
    - **Digital Multimeter Principles**: Chapters 1—4 (Safety to Advanced Features)
    - Basic resistance measurement labs
  - **MODULE 2** (2 hours):
    - **NFPA 70E** Overview—**Standard for Electrical Safety in the Workplace**
    - **Solid State Power Point** and multimedia presentations
    - **Digital Multimeter Principles**: Chapters 5—9 (Measuring AC Voltage to Ohm's Law and Power Formula)
    - **NEC**: Overcurrent Protection, Grounding and Bonding, Wiring Methods
    - Power Factor Explained
    - Harmonic Distortion
  - **LAB MODULE 3** (2 hours):
    - **Fluke**: CAT Ratings
    - **Solid State Power Point** and multimedia presentations
    - **Digital Multimeter Principles**: Chapters 10—14 (Measuring Frequency and Duty Cycle to Ohm's Law and Power Formula)
    - GFCI and Ghost Voltage Labs
    - Capacitor Labs
    - LED labs
    - Min/Max Readings

- **LAB MODULE 4** (2 hours):
  - Analog versus Digital Meters
  - Autoranging meters
  - Voltage Tester Types (the good and the bad)
  - Basic Voltage, Amperage, and Resistance Measurement
  - Diode and Capacitor Testing
  - Proper PPE (Personal Protective Equipment)
  - Lab Review and Open Discussion

III. Summary. This course is intended to fully connect safety, proper use, and the various functions of DMMs, ammeters, and voltmeters.