

# IEC's Electrical Apprenticeship Program 2nd Year Course Outline



## First Semester

NEC® Scope, Definitions, Working Spaces, and Branch Circuits; Hazardous Locations; Common Voltage Systems  
Service Calculations, and Class 1 Installations  
Services, and Class 2 Installations  
Conductor and Overcurrent Protection; Class 3 Installations  
Grounding Terminology, Equipment Grounding Conductors and Commercial Garage Installations  
Grounding Electrode System, Main Bonding Jumper and Motor Fuel Dispensing Facilities  
Ohm's Law Review, Article 300, Aircraft Hangar, and Bulk Storage Facilities  
Conduit Fill, Box Fill, Pull Box Sizing, Raceway and Cable Support; Spray Applications  
First Semester Mid-Term Review and Exam  
Switches, Switchboards, and Panelboards and Health Care Facilities  
Flexible Cords, Luminaires, Appliances and Health Care Facilities  
Introduction to AC Theory and Places of Assembly  
AC Theory – Inductive and Capacitive Reactance: Miscellaneous Buildings  
AC Theory – Impedance and Power Factor: Temporary Installation  
Single-Phase Transformers: Introduction, Types and Applications, Single-Voltage Calculations and Connections  
Single-Phase Transformers: Dual-Voltage Calculation and Connections, and Fault-Current and Code Calculations  
First Semester Exam

## Second Semester

Three-Phase Power Generation, Transmission and Distribution; Introduction to Three-Phase Ohm's Law  
3Ø Transformers: Delta-Delta  
3Ø Transformers: Delta-Wye  
Non-Linear Loads: 3Ø Fault Currents and Voltage Drop  
Transformers: NEC® Requirements  
Buck-Boost Transformers: Single- and Three-Phase, Connections and Applications  
Buck-Boost Transformers: Calculations and Selection  
Generators, Transfer Switches, and Emergency Systems  
Second Semester Mid-Term Review and Exam  
Electric Motors: DC and AC Single-Phase  
Electric Motors: Polyphase  
Motors: General Knowledge and Sizing Branch Circuit Conductors  
Motor Branch Circuit Overcurrent Protective Devices: Short Circuit and Grounding Fault Protection  
Motor: Overload Protection, Disconnects, Starters and EGC  
Locked Rotor Current and Phase Loss for Motors; A/C and Refrigeration Equipment; Fire Pumps  
Motor Feeder Conductors, OCPDs, and Tap Conductors  
Final Exam



Mid-South IEC

2814 Stage Center Drive, Bartlett TN, 38134

Phone: (901) 682-3546 [www.midsouthiec.org](http://www.midsouthiec.org) [www.facebook.com/msiec](https://www.facebook.com/msiec)