

**TUCSON ELECTRICAL JATC**  
**ON-LINE COURSES OFFERED**

***Some classes require a textbook, there will be an additional charge, please call the Tucson Electrical JATC for the cost of the book. 790-4690.***

**AC Systems, Level I– 3rd Ed.**

*Student: \$25.22*

Item Code: J103LM.K1

Course Credits: 2

Course Level:1

Prerequisite Courses:

- DC Theory, Level IV – 2<sup>nd</sup>. Ed

Required Materials:

- AC Theory Textbook
- National Electrical Code - 2017
- Building a Foundation in Mathematics

Other Prerequisites:

None

Course Lessons:

1. Reviewing the Applications of DC Theory
2. Understanding Vectors and How to Use Them Effectively
3. Comparing Direct Current To Alternating Current
4. Making Circuit Calculations for Basic Systems
5. Becoming Familiar with AC Resistive Circuits
6. Understanding the Basic Characteristics of AC Circuits

**AC Theory, Level I– 3<sup>rd</sup>. Ed**

*Student: \$37.73*

Item Code: J203LM.K1

Course Credits: 3

Course Level:1

Prerequisite Courses:

- DC Theory, Level IV - 2nd Ed.
- AC Systems, Level I – 3<sup>rd</sup>. Ed.

Required Materials:

- AC Theory Textbook

Other Prerequisites:

None

Course Lessons:

1. Understanding Inductance and How It Affects a Circuit
2. Working with Inductors that are in Series and/or Parallel
3. Becoming Familiar with Inductive Reactance
4. Understanding Capacitance and How it Affects a Circuit
5. Understanding and Working Safely With Capacitors
6. Working with Capacitors that are in Series and/or Parallel
7. Becoming Familiar with Capacitive Reactance

**AC Theory, Level II – 3<sup>rd</sup>. Ed.**

*Student: \$37.73*

Item Code: J203LM.K2

Course Credits:3

Course Level:2

Prerequisite Courses:

- AC Theory, Level I – 3<sup>rd</sup>. Ed.

Required Materials:

- AC Theory Textbook
- Building a Foundation in Mathematics (S665)

Other Prerequisites:

None

Course Lessons:

1. Comprehending the Parameters of Series RC Circuits
2. Comprehending and Analyzing Series RLC Circuits
3. Understanding and Working with Parallel RL Circuits
4. Understanding and Working with Parallel RC Circuits
5. Comprehending and Analyzing Parallel RLC Circuits
6. Identifying and Working with LC Circuits
7. Comparing Series and Parallel RLC Circuits
8. Analyzing and Working with Combination RLC Circuits

**AC Theory, Level III - 3<sup>rd</sup> Ed.**

*Student: \$65.46*

Item Code: J203LM.K3

Course Credits:1

Course Level:3

Prerequisite Courses:

- AC Theory, Level II – 3<sup>rd</sup>. Ed.

Required Materials:

- AC Theory Textbook
- Test Instruments and Applications Textbook (S571)

Other Prerequisites:

None

**Course Lessons:**

1. Power Factor
2. Power Factor Correction
3. General Use Test Instruments
4. Electronic Circuit Test Instruments
5. Introduction to Generators
6. Understanding How the DC Generator Works
7. Understanding the Design and Function of AC Generators
8. An Introduction to 3-Phase Systems

**Blueprints, Level I**

*Student: \$33.46*

Item Code: J244LM.I1

Course Credits:2.5

Course Level:1

**Prerequisite Courses:**

- Code, Standards, and Practices 1, Level I, Based on the 2017 NEC

**Required Materials:**

- Blueprint Reading for Electricians Textbook
- Residential Blueprints

**Other Prerequisites:**

None

**Course Lessons:**

1. The Fundamentals of Blueprint Drawing and How to Make Proper Sketches
2. Understanding Architectural Views and How to Draw Them
3. Recognizing and Understanding Common Scales Used on Blueprints
4. ICP 1: Math for Blueprint Reading
5. Using Blueprints Specifications, Elevations and Schedules Properly
6. Understanding and Drawing Electrical Symbols Used on Blueprints
7. Understanding and Drawing Mechanical Symbols Used on Blueprints
8. Understanding How to Properly Use a Residential Blueprint
9. Reading and Analyzing a Residential Blueprint

**Blueprints, Level II**

*Student: \$43.06*

Item Code: J244LM.I2

Course Credits:2

Course Level:2

**Prerequisite Courses:**

- Blueprints, Level I

**Required Materials:**

- Blueprint Reading for Electricians Textbook
- Commercial Blueprints

Other Prerequisites:

None

Course Lessons:

1. Reviewing the Basic Fundamentals of Blueprints and How They are Drawn
2. Analyzing and Laying-Out Residential Circuits
3. Understanding Job Costs and How to Do an Actual Takeoff
4. Understanding, Interpreting, and Evaluating Blueprint Specifications
5. Interpreting Blueprint Schedules and Locating Components on the Print
6. Becoming Familiar with Blueprint Systems Integration
7. Learning How to Effectively Use Blueprints

### **Blueprints, Level III**

*Student: \$43.06*

Item Code: J244LM.I3

Course Credits:1

Course Level:3

Prerequisite Courses:

- Blueprints, Level II

Required Materials:

- Blueprint Reading for Electricians Textbook
- Industrial Blueprints

Other Prerequisites:

None

Course Lessons:

1. Review and Introduction
2. Industrial Specifications
3. Industrial Prints I
4. Industrial Prints II
5. Industrial Prints III

### **Building a Foundation in Mathematics, Level I**

*Student: \$46.77*

Item Code: J201LM.I1

Course Credits:0

Course Level:0

Prerequisite Courses:

None

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Whole Numbers
2. Fractions
3. Decimals
4. Integers
5. Rational Numbers
6. Exponents
7. Units and Measurements
8. Algebra Essentials
9. Equations, Formulas, and Inequalities
10. Ratios, Rates, and Proportions
11. Percents

**Building a Foundation in Mathematics, Level II w/ SW (w/o IG)**

*Student: \$56.23*

Item Code: J201LM.I2

Course Credits:0

Course Level:0

Prerequisite Courses:

- Building a Foundation in Mathematics, Level I

Required Materials:

- Building a Foundation in Mathematics (S665)

Other Prerequisites:

None

Course Lessons:

1. Logarithms
2. The Cartesian Plane
3. Systems of Equations
4. Plane Geometry
5. Solid Geometry
6. Trigonometry
7. Vectors
8. Binary, Octal, and Hexadecimal Numbers
9. Boolean Algebra Fundamentals

**Building Automation 1: Control Devices and Applications, Level I**

*Student: \$22.54*

Item Code: J238LM.H1

Course Credits:1.5

Course Level:1

Prerequisite Courses:

None

Required Materials:

- Building Automation: Control Devices

Other Prerequisites:

- 4000 Hours of OJT

Course Lessons:

1. Introduction to Building Automation
2. Electrical Systems
3. Lighting Sources and Controls
4. Lighting System Control Devices
5. HVAC Systems
6. HVAC System Applications
7. Automated Building Operation and Applications

**Code and Practices 1, Level I, Based on the 2017 NEC**

*Student: \$37.19*

Item Code: J231LM.K1

Course Credits:4

Course Level:1

Prerequisite Courses:

None

Required Materials:

- National Electrical Code - 2017 (S950)
- Electrical Systems Textbook (S970)
- Ugly's Electrical References (S954)

Other Prerequisites:

None

Course Lessons:

1. An Introduction to the *National Electrical Code*
2. Interpreting the Language of the *NEC*—Article 100
3. Understanding and Applying Article 110 of the *NEC*
4. Understanding and Applying Article 110 of the *NEC* II
5. General Building Wire Properties and the *NEC*
6. Understanding Conductor Insulation and *NEC* Specifications
7. Introduction to Wiring Devices
8. General Requirements Related to Installing Wiring Devices
9. General Requirements Related to Installing Industrial Wiring Devices
10. Specific Receptacle Installation Requirements
11. Specific Switch Installation Requirements

**Code and Practices 2, Level I, Based on the 2017 NEC**

*Student: \$21.97*

Item Code: J232LM.K1

Course Credits:2

Course Level:1

Prerequisite Courses:

- Code, Standards, and Practices 1, Level I, Based on the 2017 NEC

Required Materials:

- National Electrical Code - 2017 (S950)
- Electrical Systems Textbook (S970)

Other Prerequisites:

None

Course Lessons:

1. Understanding the Principles Involved in the Sizing of Building Wire
2. Beginning to Calculate Conductor Ampacity
3. Branch Circuits I
4. Branch Circuits II
5. Feeders and Outside Branch Circuits and Feeders
6. Services
7. Switches, Receptacles, and Luminaires

**Code and Practices 3, Level 1, Based on the 2017 NEC**

*Student: \$37.19*

Item Code: J233LM.K1

Course Credits:2

Course Level:1

Prerequisite Courses:

- Code, Standards, and Practices 2, Level II, Based on the 2017 NEC

Required Materials:

- National Electrical Code – 2017

Other Prerequisites:

None

Course Lessons:

1. Purpose of Overcurrent Protection and Types of Overcurrents
2. Overcurrent Protective Device Categories
3. Overcurrent Protective Device Ratings
4. Types of OCPDs—Circuit Breakers
5. Types of OCPDs—Fuses
6. Practical Guidelines for OCPD Ampacity Sizing
7. Conductor Tap Rules
8. Calculation of Fault Currents
9. Ground-Fault Protection of Equipment

**Code and Practices 4, Level I, Based on the 2017 NEC**

*Student: \$24.64*

Item Code: J234LM.K1\_CP

Course Credits:2

Course Level:1

**Prerequisite Courses:**

- Code and Practices 3, Level I, Based on the 2017 NEC

**Required Materials:**

- National Electrical Code - 2017
- Significant Changes to the NEC

**Other Prerequisites:**

None

**Course Lessons:**

1. Installing Electrical Services
2. Swimming Pools, Fountains, and Similar Installations
3. Understanding Emergency and Standby Systems Installation Requirements
4. Over 1,000-Volt Installations
5. Remote-Control, Signaling, and Power-Limited Circuits
6. 2017 NEC Changes – Part I
7. 2017 NEC Changes – Part II

**Code Calculations, Level I, Based on the 2017 NEC**

*Student: \$21.51*

Item Code: J227LM.K1\_CC

Course Credits:1

Course Level:1

**Prerequisite Courses:**

- Code and Practices 3, Level I, Based on the 2017 NEC

**Required Materials:**

- Code Calculations Textbook - 2017
- Electrical Systems Textbook
- National Electrical Code - 2017

**Other Prerequisites:**

None

**Course Lessons:**

1. Special Occupancies
2. Electrical Equipment
3. Special Equipment
4. Introduction to Cable Tray Systems
5. Installing Surface Metallic Raceways
6. Cable Tray Fills
7. Ampacity of Conductors in Cable Trays
8. Electric Welders

**Code Calculations, Level II, Based on the 2017 NEC**

*Student: \$21.51*

Item Code: J227LM.K2\_CC

Course Credits:1.5

Course Level:2



**Prerequisite Courses:**

- Code and Practices 3, Level I, Based on the 2017 NEC
- Code Calculations, Level I, Based on the 2017 NEC

**Required Materials:**

- Code Calculations Textbook - 2017
- National Electrical Code - 2017

**Other Prerequisites:**

None

**Course Lessons:**

1. Determining Conductor Ampacity
2. Finalizing Ampacity Calculations
3. Performing Box Size and Fill Calculations
4. Calculating Raceway Fill
5. Introduction to Electrical Load Calculations
6. Range and Appliance Calculations
7. Calculating the Parameters of Multifamily Dwelling Loads in Accordance with the *NEC*
8. Calculating the Parameters of Commercial Loads in Accordance with the *NEC*

**Codeology, Level I, Based on the 2017 NEC**

*Student: \$40.46*

Item Code: J207LM.K1

Course Credits:3

Course Level:1

**Prerequisite Courses:**

- Code, Standards, and Practices 1, Level I, Based on the 2017 NEC

**Required Materials:**

- Codeology Textbook
- National Electrical Code - 2017

**Other Prerequisites:**

None

**Course Lessons:**

1. Developing *NEC* Skills
2. The *National Electrical Code* Process
3. The Arrangement of the *NEC*
4. The Structure of the *NEC*
5. The Language of the *NEC*
6. *Codeology* Fundamentals
7. Article 90 Introduction
8. Applying the *NEC*'s "GENERAL" Chapter
9. Applying the *NEC*'s "PLAN" Chapter
10. Applying the *NEC*'s "BUILD" Chapter
11. Applying the *NEC*'s "USE" Chapter
12. Applying the *NEC*'s "SPECIAL" Chapters
13. Applying Chapter 8, Chapter 9 Tables, and *NEC* Exam Preparation Skills

**Conduit Fabrication, Level I – 2<sup>nd</sup>. Ed**

*Student: \$29.26*

Item Code: J204LM.H1

Course Credits:3

Course Level:1

Prerequisite Courses:

None

Required Materials:

- Building a Foundation in Mathematics (S665)
- Conduit Bending and Fabrication Textbook (S495)
- National Electrical Code - 2017 (S950)
- Conduit Lab Manual (J204L)
- TI-30X IIS Solar Calculator (S159)

Other Prerequisites:

None

Course Lessons:

1. How to Work with Fractions
2. Using Basic Trigonometric Functions
3. Introduction to Conduit Bending
4. Conduit Types
5. Conduit Threading Techniques
6. Hand Fabrication of 90° Stubs
7. Hand Fabrication of Back-to-Back Bends
8. Hand Bending Offsets and Kicks

**Conduit Fabrication, Level II – 2<sup>nd</sup>. Ed**

*Student: \$29.26*

Item Code: J204LM.H2

Course Credits:4

Course Level:2

Prerequisite Courses:

- Conduit Fabrication, Level I - 2<sup>nd</sup>. Ed

Required Materials:

- Conduit Bending and Fabrication Textbook

Other Prerequisites:

None

Course Lessons:

1. Conduit Threading Techniques
2. Push-Through Bending: 90° Bends
3. Bending Kicks, Offsets and Saddles Using the Push-Through Method
4. Segmented Bends

**DC Theory, Level I – 2<sup>nd</sup>. Ed**

*Student: \$23.86*

Item Code: J202LM.K1

Course Credits:3

Course Level:1

Prerequisite Courses:

None

Required Materials:

- DC Theory Textbook

Other Prerequisites:

None

Course Lessons:

1. What is Electricity?
2. Electrical Energy Sources
3. Electrical Switches
4. Conductors, Conductor Resistance, and Wattage Loss
5. Introduction to Electrical Devices
6. Current, Voltage, and Resistance in a Circuit
7. The Electrical Circuit and Ohm's Law
8. Power in a Circuit

**DC Theory, Level II – 2<sup>nd</sup>. Ed**

*Student: \$23.86*

Item Code: J202LM.K2

Course Credits:3

Course Level:2

Prerequisite Courses:

- DC Theory, Level I - 2nd Ed.

Required Materials:

- DC Theory Textbook (S640)
- Test Instruments and Applications Textbook (S571)

Other Prerequisites:

None

Course Lessons:

1. The Series Circuit
2. Understanding and Calculating Resistance in DC Series Circuits
3. How Current Reacts in DC Series Circuits
4. How Voltage Functions in DC Series Circuits
5. How to Calculate Power in DC Series Circuits
6. Energized Circuits and the Potential Hazards They Possess
7. How to Draw Basic Electrical Circuits Correctly
8. Introduction to Test Instruments

**DC Theory, level III – 2<sup>nd</sup>. ED**

*Student: \$23.86*

Item Code: J202LM.K3

Course Credits:2

Prerequisite Courses:

- DC Theory, Level II

Required Materials:

- DC Theory Textbook (S640)
- Test Instruments and Applications Textbook

Other Prerequisites:

None

Course Lessons:

1. How Current Reacts in DC Parallel Circuits
2. Understanding Resistance in DC Parallel Circuits
3. Working with Ratios and Proportion
4. How Voltage Functions in DC Parallel Circuits
5. How to Calculate Power in DC Parallel Circuits

**DC Theory, Level IV - 2<sup>nd</sup>. Ed.**

*Student: \$23.86*

Item Code: J202LM.K4

Course Credits: 2

Prerequisite Courses:

- DC Theory, Level III - 2nd Ed.

Required Materials:

- DC Theory Textbook (S640)
- National Electrical Code - 2017

Other Prerequisites:

None

Course Lessons:

1. Applying the Principle of Superposition to Circuit Calculations
2. Kirchhoff's Laws
3. Thevenin's and Norton's Theorems
4. Understanding the Principles of Magnetism
5. Understanding the Principles of Electromagnetism
6. DC Generators and Motors
7. Using DC Theory to Solve Real World Problems

**Digital Electronics, Level I**

*Student: \$53.72*

Item Code: J240LM.L1

Course Credits:5

Course Level:1

Prerequisite Courses:

- DC Theory, Level IV - 2nd Ed.

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Introduction to Digital Electronics
2. Introduction to Boolean Algebra
3. AND Logic
4. OR Logic
5. BUFFER and INVERTER Amplifiers
6. NAND and NOR Logic
7. XOR and XNOR Logic
8. Debouncing Circuits

**Electrical Safety-Related Work Practices, Level I, Based on the 2018 70E**

*Student: \$63.29*

Item Code: J444LM.L1

Course Credits:2

Course Level:1

Prerequisite Courses:

None

Required Materials:

- Electrical Safety-Related Work Practices Textbook
- National Electrical Code - 2017
- NFPA 70E Textbook

Other Prerequisites:

None

Course Lessons:

1. Electrical Hazard Awareness
2. OSHA Considerations
3. Introduction to Lockout, Tagging, and the Control of Hazardous Energy
4. Fundamentals of 3-Phase Bolted Fault Currents
5. Fault Current Fundamentals

**Electrical Safety-Related Work Practices, Level II, Based on the 2018 70E**

*Student: \$63.29*

Item Code: J444LM.L2

Course Credits:2

Course Level:2

Prerequisite Courses:

- Electrical Safety-Related Work Practices, Level I, Based on the 2018 70E

Required Materials:

- Electrical Safety-Related Work Practices Textbook
- NFPA 70E Textbook

Other Prerequisites:

None

Course Lessons:

1. Introduction to NFPA 70E®
2. Justification, Assessment, and Implementation of Energized Work
3. Identifying OCPD Types
4. Methods to Select Arc Flash PPE
5. Maintenance Considerations
6. Eliminating or Reducing Hazards by Design and Upgrades

**Fire Alarm Systems, Level I, Based on the 2017 NEC**

*Student: \$35.52*

Item Code: J211LM.K1

Course Credits: 2

Prerequisite Courses:

- DC Theory, Level IV - 2nd Ed.
- Job Information 1, Level II, Based on the 2017 NEC

Required Materials:

- Fire Alarm Textbook (S846)
- National Electrical Code – 2017

Other Prerequisites:

None

Course Lessons:

1. Introduction to Fire Alarm Systems
2. Fundamentals and System Requirements
3. Initiating Devices
4. Notification Appliances
5. Wiring and Wiring Methods
6. System Interfaces and Safety Control Functions
7. Emergency Communications Systems and Emergency Voice/Alarm Communications Systems
8. Plans and Specifications

**Fire Alarm Systems, Level II, Based on the 2017 NEC**

*Student: \$35.52*

Item Code: J211LM.K2

Course Credits:2

Course Level:2

Prerequisite Courses:

- Fire Alarm Systems, Level I, Based on the 2017 NEC

Required Materials:

- Fire Alarm Textbook

Other Prerequisites:

None

Course Lessons:

1. Advanced Detection Topics
2. Public Emergency Alarm Reporting Systems and Supervising Stations
3. Single- and Multiple-Station Alarms and Household Fire Alarm Systems
4. Inspection, Testing, and Maintenance

**Grounding and Bonding, Level I, Based on the 2017 NEC**

*Student: \$36.67*

Item Code: J210LM.K1

Course Credits:2

Course Level:1

Prerequisite Courses:

- AC Theory, Level III - 3rd Ed.

Required Materials:

- Grounding and Bonding Textbook
- National Electrical Code – 2017

Other Prerequisites:

None

Course Lessons:

1. Introduction
2. Circuit Basics and Overcurrent Protection
3. *Code* Arrangement and Application
4. Grounding Electrodes and the Grounding Electrode System
5. Requirements for Services and Grounded Conductors
6. Grounding Electrode Conductors
7. Bonding Requirements
8. Equipment Grounding Conductors (EGCs)
9. Grounding Electrical Equipment
10. Isolated (Insulated) Grounding Circuits and Receptacles

**Grounding and Bonding, Level II, Based on the 2017 NEC**

*Student: \$36.67*

Item Code: J210LM.K2

Course Credits:2.5

Course Level:2

Prerequisite Courses:

- Grounding and Bonding, Level I, Based on the 2017 NEC

Required Materials:

- Grounding and Bonding Textbook
- National Electrical Code - 2017
- Test Instruments Textbook
- Test Instruments Applications Manual

Other Prerequisites:

None

Course Lessons:

1. Grounding at Separate Buildings or Structures
2. Grounding Electrical Systems
3. Grounding Requirements for Separately Derived Systems
4. Special Occupancies and Conditions
5. Grounding Special Equipment
6. Grounding and Bonding for Communications Systems and Equipment
7. Ground-Fault Circuit Interrupters (GFCI) and Ground-Fault Protection of Equipment (GFPE)
8. Grounding Rules for Medium-and High-Voltage Systems
9. Grounding Systems and Earth Ground Test Instruments

**Hazardous Locations, Level I, Based on the 2017 NEC**

*Student: \$38.28*

Item Code: J257LM.J1

Course Credits:2

Course Level:1

Prerequisite Courses:

- Code, Standards, and Practices 3, Level I, Based on the 2017 NEC

Required Materials:

- National Electrical Code - 2017

Other Prerequisites:

None



Course Lessons:

1. Hazardous (Classified) Location Concepts
2. Article 500—Understanding Class I, II, and III Locations
3. The Requirements for Electrical Installations in Class I Hazardous (Classified) Locations
4. The Requirements for Electrical Installations in Class II Hazardous (Classified) Locations
5. Requirements for Wiring in Class III Hazardous (Classified) Locations and Intrinsically Safe Systems
6. Article 505—Zone 0, 1, and 2 Locations
7. Article 506—Zones 20, 21, and 22 Locations for Combustible Dusts or Ignitable Fibers/Flyings
8. Specific Locations—Article 511 through Article 516
9. Hazardous Location Applications

**Health Care Facility Systems, Level I, Based on the NFPA 99 and 2017 NEC**

*Student: \$22.61*

Item Code: J260LM.K1

Course Credits:1

Course Level:1

Prerequisite Courses:

- Code, Standards, and Practices 3, Level I, Based on the 2017 NEC

Required Materials:

- Health Care Systems Textbook

Other Prerequisites:

None

Course Lessons:

1. Introduction
2. Utility Power
3. Distribution
4. Patient Care Spaces

**Instrumentation Introduction - Module 1**

*Student: \$61.48*

Item Code: J126LM

Course Credits:2

Course Level:0

Prerequisite Courses:

- Blueprints, Level I
- Electrical Safety-Related Work Practices, Level I, Based on the 2018 70E
- AC Theory, Level I - 3rd Ed.

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Math Pre-Test Assessment
2. Math
3. Science Pre-Test Assessment
4. Science
5. Electrical Theory Pre-Test Assessment
6. Electrical Theory
7. Meters and Measurements Pre-Test Assessment
8. Meters and Measurements
9. Instrumentation Vocabulary Pre-Test Assessment
10. Instrumentation Vocabulary
11. Process and Instrumentation Diagram Interpretation Pre-Test Assessment
12. Process and Instrumentation Diagram Interpretation
13. Final Exam

**Instrumentation Introduction – Module 2: Basics**

*Student: 61.48*

Item Code: J134LM

Course Credits: 5

Prerequisite Courses:

- Instrumentation Introduction – Module 1

Required Materials:

- Applied Science of Instrumentation Textbook

Other Prerequisites:

None

Course Lessons:

1. Review
2. Introduction to Instrumentation
3. Fundamentals of Process and Control Systems
4. Instrumentation Symbols and Diagrams
5. Calibration Procedure and Documentation
6. Principles of Pressure
7. Principles of Level
8. Principles of Flow
9. Principles of Temperature
10. Principles of Smart Instrumentation and Communication
11. Control Valves, Actuators, and Accessories
12. Final Exam

**Instrumentation Introduction – Module 3: Advanced**

*Student: \$69.95*

Item Code: J135LM

Course Credits: 2

Prerequisite Courses:

- Instrumentation Introduction - Module 2: Basics

Required Materials:

- Applied Science of Instrumentation Textbook

Other Prerequisites:

None

Course Lessons:

1. Review
2. Analytical Measurement
3. Process Controllers
4. Fundamentals of Control
5. Installation of Control Systems
6. Final Exam

**Introduction to Programmable Logic Controllers**

*Student: \$35.00*

Item Code: J162LM

Course Credits: 4.5

Prerequisite Courses:

- Motor Control, Level I

Required Materials:

None

Course Lessons:

1. PLC and Electrical Safety
2. Electrical Principles and PLCs
3. Electrical Circuits and PLCs
4. PLC Hardware
5. PLC Programming Instructions
6. Programming PLC Timers and Counters
7. PLC and System Interfacing
8. PLC Installations and Startup
9. PLC and System Maintenance
10. Troubleshooting Principles and Test Instruments
11. Troubleshooting PLC Hardware
12. Troubleshooting with PLC Software
13. Analog Principles
14. Analog Device Installation and PLC Programming

**Job Information 1, Level I, Based on the 2017 NEC**

*Student: \$27.19*

Item Code: J221LM.M1

Course Credits:3

Course Level:1

Prerequisite Courses:

None

Required Materials:

- DC Theory Textbook
- Electrical Systems Textbook
- National Electrical Code – 2014

Other Prerequisites:

None

Course Lessons:

1. Identifying Some Basic Tools of the Trade
2. The Workplace of an Electrical Worker
3. The Proper Care and Use of Ladders
4. Choosing and Installing the Correct Masonry Fastener
5. Alignment and Measurement
6. The Reality of Electrical Shock
7. Electrical Safety
8. Understanding The Function and Design of Ground-Fault Interrupters
9. CAUTION: Overhead Work in Progress
10. Using and Installing Twist-On Wire Connectors

**Job Information 1, Level II, Based on the 2017 NEC**

*Student: \$27.19*

Item Code: J221LM.M2

Course Credits: 3

Prerequisite Courses:

- Job Information 1, Level I, Based on the 2017 NEC

Required Materials:

- DC Theory Textbook
- National Electrical Code - 2017
- Building a Foundation in Mathematics
- Electrical Systems Textbook

Other Prerequisites:

None

Course Lessons:

1. Building Wire Construction and Insulation Properties
2. How Building Wire is Sized
3. Working Properly With Aluminum Conductors
4. Identifying Commonly Used Electrical Materials
5. Working with Prefixes and Powers of 10
6. Using the Metric System and Metrication Changes
7. How to Solve Basic Algebraic Equations
8. Introduction to Firestopping
9. Fire-Resistant Wall and Floor Assembly Penetrations
10. Firestop Applications
11. Wire-Pulling Techniques

**Klein Virtual Boot Camp**

*Student: \$52.43*

Item Code: J398LM

Course Credits:0

Course Level:0

Prerequisite Courses:

None

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Basic Hand Tool Identification and Use
2. Power Tool Identification and Use
3. Basic Material Identification and Selection
4. Installing a Receptacle
5. Installing a Switch
6. Reading a Folding Ruler and Tape Measure
7. Basic Use of a Hacksaw

**Lighting Essentials, Level I – 2<sup>nd</sup>. Ed**

*Student: \$19.60*

Item Code: J259LM.K1

Course Credits:1.5

Course Level:1

Prerequisite Courses:

None

Required Materials:

- Lighting Design Basics Textbook

Other Prerequisites:

- 4000 Hours of OJT

Course Lessons:

1. Basic Concepts in Lighting
2. The Science of Light
3. Qualities of Light Sources
4. Daylighting
5. Lamps
6. Luminaires
7. Lighting Controls
8. Quantity and Quality of Light

## **Lighting Essentials, Level II – 2<sup>nd</sup>. Ed**

*Student: \$19.60*

Item Code: J259LM.K2

Course Credits:1.5

Course Level:2

Prerequisite Courses:

- Lighting Essentials, Level I – 2<sup>nd</sup>. Ed

Required Materials:

- Lighting Design Basics Textbook

Other Prerequisites:

None

Course Lessons:

1. Basic Lighting Retrofit and Energy Codes
2. Understanding Fluorescent and HID Lighting Terminology
3. The ABCs of Electronic Fluorescent Ballasts
4. The ABCs of High Intensity Discharge (HID) Ballasts I
5. The ABCs of High Intensity Discharge (HID) Ballasts II
6. Introduction to LED Lighting and Technology
7. LED Lighting in Detail
8. LED Lighting Applications

## **Lightning Protection, Level I**

*Student: \$34.16*

Item Code: J276LM.J1

Course Credits:1

Course Level:1

Prerequisite Courses:

- Grounding and Bonding, Level I, Based on the 2017 NEC

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Lightning Protection Systems Introduction
2. Lightning Protection Systems - Ground Work
3. Down Conductors and Bonding
4. Rooftops
5. Concealed and Structural Steel Systems
6. Bonding Requirements and Potential Equalization
7. Surge Protection Devices

## **Milwaukee Test & Measurement Academy**

*Student: \$66.00*

Item Code: CET501

Course Credits:0

Course Level:0

Prerequisite Courses:

None

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Introduction to Training — How to use this Academy
2. Introduction to Meters
3. Work Order 1—Water Heater Element Testing
4. Work Order 2—Lighting Troubleshooting, Voltage Testing
5. Work Order 3—Server Room Temperature, Blown Fuse, 3-phase Power
6. Work Order 4—Circuit Breaker Trip, Overcurrent on AC Circuit
7. Work Order 5—Floor Buffer, Circuit Troubleshooting, Grounding
8. Work Order 6—PV Array Troubleshooting
9. Work Order 7—Motor Starter, Contacts, Capacitor Troubleshooting

## **Motor Control, Level I**

*Student: \$21.56*

Item Code: J209LM.H1

Course Credits:3.5

Course Level:1

Prerequisite Courses:

- Motors, Level II, Based on the 2017 NEC - 2nd Ed.

Required Materials:

- Fundamentals of Motor Control

Other Prerequisites:

None

Course Lessons:

1. Introduction to Magnetic Motor Control
2. Manual Pilot Devices
3. Automatic Pilot Devices
4. Magnetic Control Relays
5. Control Transformers
6. Magnetic Contactors
7. Basic Motor Starters
8. Basic Timers
9. Control Diagrams and Drawings

## **Motor Control, Level II**

*Student: \$21.56*

Item Code: J209LM.H2

Course Credits:4

Course Level:2

Prerequisite Courses:

- Motor Control, Level I

Required Materials:

- Fundamentals of Motor Control

Other Prerequisites:

None

Course Lessons:

1. Basic Electronics for Motor Control Devices
2. More Electronics for Motor Control Devices
3. Solid-State Motor Control Pilot Devices
4. Solid-State Relays
5. Motor Control Centers
6. Special Purpose Starters
7. Electronic Programmable Timers
8. Special Control Components
9. AC Motor Speed Control

## **Motor Control, Level III**

*Student: \$21.56*

Item Code: J209LM.H3

Course Credits:1.5

Course Level:3

Prerequisite Courses:

- Motor Control, Level II

Required Materials:

- Fundamentals of Motor Control

Other Prerequisites:

None

Course Lessons:

1. DC Motor Control
2. Understanding Analog Signals
3. Analog Pilot Devices
4. Working With Solid-State Devices in Motor Control
5. Variable Frequency Drives
6. Programmable Logic Controllers
7. Controlling Synchronous, Stepper, and Servo Motors
8. Networked Motor Control
9. Troubleshooting Electrical Systems



**Motors, Level I – 2<sup>nd</sup>. Ed**

*Student: \$16.14*

Item Code: J206LM.J1

Course Credits:2

Course Level:1

Prerequisite Courses:

- AC Theory, Level II - 3rd Ed.
- Code, Standards, and Practices 3, Level I, Based on the 2017 NEC

Required Materials:

- Code Calculations Textbook - 2011
- Motors Textbook

Other Prerequisites:

None

Course Lessons:

1. Magnetism and Induction
2. Motor Nameplates
3. AC Alternators
4. Three-Phase Motors
5. Squirrel-Cage Motors
6. Wound-Rotor Motors
7. Single-Phase Motors
8. Motor Protection
9. DC Motors and Generators
10. Starting
11. Motor Branch Circuits
12. Motor Branch-Circuit Protection
13. Motor Overload Protection
14. Sizing Motor Disconnect

**Motors, Level II Based on the 2017 NEC – 2<sup>nd</sup>. Ed**

*Student: \$16.14*

Item Code: J206LM.J2\_17

Course Credits:1.5

Course Level:2

Prerequisite Courses:

- Motors, Level I – 2<sup>nd</sup>. Ed

Required Materials:

- Motors Textbook
- National Electrical Code - 2017 (S950)
- Code Calculations Textbook - 2017 (S00817)

Other Prerequisites:

None

**Course Lessons:**

1. Wound-Rotor Motors
2. Single-Phase Motors
3. Motor Protection
4. DC Motors and Generators
5. Starting
6. Motor Branch Circuits
7. Motor Branch-Circuit Protection
8. Motor Overload Protection
9. Sizing Motor Disconnect

**NECA Basic Foremanship**

*Student: \$105.98*

Item Code: NECA104LM

Course Credits:0

Course Level:0

Prerequisite Courses:

None

Required Materials:

None

Other Prerequisites:

None

Course Lessons:

1. Overview Basic Foremanship
2. Mobilizing the Job for Success
3. Maintaining a Safe Job Site
4. Documentation
5. Job Closeout
6. Managing Tools and Materials
7. Managing Cost, Time, and Quality
8. Managing Change
9. Work Planning and Scheduling
10. Managing the Human Resource
11. Communication and Team Building
12. Managing the Crew and Leadership Motivation
13. Production in Construction
14. Supervising in a CW/CE Environment
15. Organizing for Success

**Power Quality, Level I**

*Student: \$35.21*

Item Code: J228LM.11

Course Credits:2

Course Level:1

Prerequisite Courses:

- AC Theory, Level III - 3rd Ed.
- DC Theory, Level V - 2nd Ed.

Required Materials:

- Power Quality Textbook

Other Prerequisites:

None

Course Lessons:

1. Why Care About Power Quality?
2. The Basics of Power Quality
3. Safety
4. Using the Right Tool
5. Monitor Setup
6. Data Collection and Analysis
7. Practical Examples
8. "Rules of Thumb"
9. Mitigation Equipment

**Rigging, Hoisting, and Signaling, Level I**

*Student: \$36.27*

Item Code: J241LM.J1

Course Credits:2

Course Level:1

Prerequisite Courses:

None

Required Materials:

- Rigging, Hoisting, Signaling Practices Textbook

Other Prerequisites:

- 4000 Hours of OJT

Course Lessons:

1. Hoisting Safety
2. Cranes
3. Lift Planning
4. Signaling
5. Load Weight and Balance
6. Slings and Sling Hitches
7. Rigging Equipment Maintenance
8. Rigging Hardware
9. Chains and Chain Slings
10. Synthetic Slings
11. Wire Rope and Wire Rope Slings
12. Fiber Rope and Knots
13. Block and Tackle
14. Hoists

**Test Instruments, Level I**

*Student: \$35.60*

Item Code: J285LM.H1

Course Credits:2

Course Level:1

Prerequisite Courses:

- AC Systems, Level I - 3rd Ed.

Required Materials:

- Test Instruments Textbook

Other Prerequisites:

None

Course Lessons:

1. Voice-Data-Video (VDV) Test Instruments
2. Power Quality Test Instruments
3. High Voltage and Insulation Test Instruments
4. Instrumentation and Process Control Test Instruments
5. Special Maintenance Test Instruments
6. Troubleshooting

**Torque, Level I**

*Student: \$35.21*

Item Code: J242LM.1

Course Credits:0.5

Course Level:1

Prerequisite Courses:

None

Required Materials:

None

Other Prerequisites:

- 4000 Hours of OJT

Course Lessons:

1. Torque Theory
2. Threaded Fasteners Basics
3. Introduction to Torque Applications
4. Torque Products
5. Real World Electrical Torque Applications

**Transformers, Level I - 2nd Ed.**

*Student: \$79.32*

Item Code: J205LM.11

Course Credits:2

Course Level:1

**Prerequisite Courses:**

- AC Theory, Level II - 3rd Ed.
- Code, Standards, and Practices 2, Level II, Based on the 2017 NEC

**Required Materials:**

- Transformers Principles and Applications Textbook

**Other Prerequisites:**

None

**Course Lessons:**

1. Magnetism and Electromagnetism
2. Transformers Operation Principles
3. Transformer Connections
4. Real World Transformer Connections
5. Harmonics
6. Power Generation and Distribution

**Transformers, Level II, Based on the 2017 NEC - 2nd Ed.**

*Student: \$47.33*

Item Code: J205LM.I2\_17

Course Credits:2

Course Level:2

**Prerequisite Courses:**

- Code Calculations, Level II, Based on the 2017 NEC
- Transformers, Level I - 2nd Ed.

**Required Materials:**

- Transformers Principles and Applications Textbook
- Code Calculations Textbook - 2017
- National Electrical Code - 2017

**Other Prerequisites:**

None

**Course Lessons:**

1. Reactors and Isolation Transformers
2. Autotransformers
3. Buck-Boost Transformers
4. Understanding Transformer Overcurrent Protection
5. Transformer Overcurrent Protection with Associated Tap Rules

**Transformers, Level III 2<sup>nd</sup>. Ed.**

*Student: \$22.79*

Item Code: J205LM.I3

Course Credits:1

Course Level:3

**Prerequisite Courses:**

- Transformers, Level I - 2nd Ed.

Required Materials:

- Transformers Principles and Applications Textbook

Other Prerequisites:

None

Course Lessons:

1. Electrical Safety
2. Special Transformers
3. Special Connections
4. Selection and Installation
5. Maintenance and Troubleshooting



