

Core Curriculum

Course Level and Credit Summary

Fall 2023 - Final



Core Curriculum: Credit Summary Per Year

1st Year	
Core	29
Advanced	4
Local Advanced	2
Application	2.25
Total	37.25

2nd Year	
Core	25
Advanced	1
Local Advanced	0
Application	0
Total	26

3rd Year	
Core	19.5
Advanced	10
Local Advanced	0
Application	0
Total	29.5

4th Year	
Core	13.5
Advanced	12
Local Advanced	0
Application	0
Total	25.5

5th Year	
Core	2.5
Advanced	15.5
Local Advanced	0
Application	0
Total	18

Grand Totals	
Total Core Credits	89.5
Total Advanced Credits	42.5
Total Local Advanced Credits	2
Total Application Credits	2.25
Total Credits	136.25

Core Curriculum: Course Selection Per Year

1st Year Core	
DC Theory, Level I - 2nd Ed.	3
DC Theory, Level II - 2nd Ed.	3
DC Theory, Level III - 2nd Ed.	2
DC Theory, Level IV - 2nd Ed.	2
DC Theory, Level V - 2nd Ed.	2
Job Information 1, Level I, Based on the 2020 NEC	3
Job Information 1, Level II, Based on the 2020 NEC	3
Orientation, Level I	2
Conduit Fabrication, Level I - 2nd Ed.	3
Conduit Fabrication, Level II - 2nd Ed.	4
Code, Standards, and Practices 1, Based on the 2020 NEC	4
Test Instruments, Level I	2
Electrical Industry Applications Manual, Lesson 1-Splicing Conductors	0.25
Electrical Industry Applications Manual, Lesson 2-Installing a Duplex Receptacle	0.25
Electrical Industry Applications Manual, Lesson 3-Installing a Single Pole Switch	0.25
Electrical Industry Applications Manual, Lesson 4-Installing a Switched Duplex Receptacle	0.25
Electrical Industry Applications Manual, Lesson 5-Proper Device Installation Techniques, GFCI Rough-In	0.25
Electrical Industry Applications Manual, Lesson 7-Installing a Retrofit "Old Work" Electrical Box	0.25
Electrical Industry Applications Manual, Lesson 13-Cutting a Hole in a Metal Enclosure for an EMT Connector	0.25
Electrical Industry Applications Manual, Lesson 16-Installing Flexible Metallic Conduit	0.25
First Aid/CPR	1
OSHA 10	1
Electrical Industry Applications Manual, Lesson 17-Installing Armor Clad and Metal Clad Cables	0.25
Harassment Prevention: Awareness and Responsibilities - 2023 - CML	0

2nd Year Core	
Transformers, Level I - 2nd Ed.	2
AC Systems, Level I - 3rd Ed.	2
AC Theory, Level I - 3rd Ed.	3
AC Theory, Level II - 3rd Ed.	4
Codeology, Based on the 2020 NEC	3
Blueprints, Level I	2.5
Code, Standards, and Practices 2, Level I, Based on the 2020 NEC	2
Code, Standards, and Practices 2, Level II, Based on the 2020 NEC	2
Electrical Code Calculations, Level I, Based on the 2020 NEC	1
Electrical Safety-Related Work Practices, Level I, Based on the 2021 70E	2
Orientation, Level II	1.5
Emotional Intelligence	1

3rd Year Core	
AC Theory, Level III - 3rd Ed.	3
Fire Alarm Systems, Level I, Based on the 2020 NEC	2
Grounding and Bonding, Level I, Based on the 2020 NEC	2
Rigging, Hoisting, and Signaling, Level I	2
Blueprints, Level II	2
Code, Standards, and Practices 3, Based on the 2020 NEC	2
Electrical Safety-Related Work Practices, Level II, Based on the 2021 70E	2
Grounding and Bonding, Level II, Based on the 2020 NEC	2.5
Lightning Protection, Level I	1
Transformers, Level II, Based on the 2020 NEC - 2nd Ed.	2
Health Care Facility Electrical Systems, Level I, Based on the 2021 NFPA 99 and 2020 NEC	1
Preparing for Leadership: Personal Qualities - 2nd Ed.	2
Digital Electronics, Level I	5
AC Theory, Level IV - 3rd Ed.	1

Core Curriculum: Course Selection Per Year

4th Year Core	
Blueprints, Level III	1
Building Automation 1: Control Devices and Applications, Level I	1.5
Code, Standards, and Practices 4, Based on the 2020 NEC	1
Code, Standards, and Practices 5, Based on the 2020 NEC	2
Introduction to Programmable Logic Controllers - 2nd Ed.	4.5
Lighting Essentials, Level I - 2nd Ed.	1.5
Lighting Essentials, Level II - 2nd Ed.	1.5
Motor Control, Level I	3.5
Motor Control, Level II	4
Motor Control, Level III	1.5
Motors, Level I - 2nd Ed.	0.5
Motors, Level II, Based on the 2020 NEC - 2nd Ed.	1.5
Code, Standards, and Practices 6, Based on the 2020 NEC	1.5

5th Year Core	
Electric Vehicle Charging Systems (EVCS-17) - 2nd Ed. w/ 2020 NEC Supplement (Approved for EVTP)	0.5
Building Automation 2: System Integration with Open Protocols, Level I L	2
Distributed Generation, Level I	0.5
Intrusion Detection, Level I - 2nd Ed.	1.5
Orientation, Level III	1
Power Quality, Level I	2
Structured Cabling - 2nd Ed.	3
Torque, Level I	0.5
Photovoltaic Systems Workbook SW	3
Electrical Code Calculations, Level II, Based on the 2020 NEC	1
Electrical Code Calculations, Level III, Based on the 2020 NEC	0.5
OSHA 30 Hour	2.5

Core Curriculum: 1st Year Core Courses

	Credits	Page
DC Theory, Level I - 2nd Ed.		
J202LM.K1	3	2
DC Theory, Level II - 2nd Ed.		
J202LM.K2	3	3
DC Theory, Level III - 2nd Ed.		
J202LM.K3	2	3
DC Theory, Level IV - 2nd Ed.		
J202LM.K4	2	4
DC Theory, Level V - 2nd Ed.		
J202LM.K5	2	4
Job Information 1, Level I, Based on the 2020 NEC		
J221LM.N1	3	5
Job Information 1, Level II, Based on the 2020 NEC		
J221LM.N2	3	6
Orientation, Level I		
J200LM.I1	2	7
Conduit Fabrication, Level I - 2nd Ed.		
J204LM.H1	3	8
Conduit Fabrication, Level II - 2nd Ed.		
J204LM.H2	4	9
Code, Standards, and Practices 1, Based on the 2020 NEC		
J231LM.L	4	10
Test Instruments, Level I		
J285LM.H1	2	11
Electrical Industry Applications Manual, Lesson 1-Splicing Conductors		
≡ J300.K	0.25	1
Electrical Industry Applications Manual, Lesson 2-Installing a Duplex Receptacle		
≡ J300.K	0.25	1
Electrical Industry Applications Manual, Lesson 3-Installing a Single Pole Switch		
≡ J300.K	0.25	1
Electrical Industry Applications Manual, Lesson 4-Installing a Switched Duplex Receptacle		
≡ J300.K	0.25	1

Core Curriculum: 1st Year Core Courses cont.

Electrical Industry Applications Manual, Lesson 5-Proper Device Installation Techniques, GFCI Rough-In

≡ J300.K	0.25	1
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Electrical Industry Applications Manual, Lesson 7-Installing a Retrofit "Old Work" Electrical Box

≡ J300.K	0.25	1
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Electrical Industry Applications Manual, Lesson 13-Cutting a Hole in a Metal Enclosure for an EMT Connector

≡ J300.K	0.25	1
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Electrical Industry Applications Manual, Lesson 16-Installing Flexible Metallic Conduit

≡ J300.K	0.25	1
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First Aid/CPR

TX2720.LC2	1	11
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OSHA 10

TX2720.LC1	1	12
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Electrical Industry Applications Manual, Lesson 17-Installing Armor Clad and Metal Clad Cables

≡ J300.K	0.25	1
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Harassment Prevention: Awareness and Responsibilities - 2023 - CML

J158LM.D	0	12
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Core Curriculum: 1st Year Required Materials

Required Materials:

- *Building a Foundation in Mathematics (S665)*
- *Conduit Lab Manual (J204L)*
- *Electrical Systems Textbook (S1070)*
- *National Electrical Code - 2017 (S950)*
- *Test Instruments and Applications Textbook (S571)*
- *Ugly's Electrical References (S1054)*
- *Conduit Bending and Fabrication Textbook (S495)*
- *DC Theory Textbook (S640)*
- *National Electrical Code - 2014 (S750)*
- *National Electrical Code - 2020 (S1050)*
- *TI-30X IIS Solar Calculator (S159)*

Core Curriculum: 2nd Year Core Courses

	Credits	Page
Transformers, Level I - 2nd Ed.		
J205LM.I1	2	13
AC Systems, Level I - 3rd Ed.		
J103LM.K1	2	13
AC Theory, Level I - 3rd Ed.		
J203LM.K1	3	14
AC Theory, Level II - 3rd Ed.		
J203LM.K2	4	15
Codeology, Based on the 2020 NEC		
J207LM.L	3	16
Blueprints, Level I		
J244LM.I1	2.5	17
Code, Standards, and Practices 2, Level I, Based on the 2020 NEC		
J232LM.L1	2	17
Code, Standards, and Practices 2, Level II, Based on the 2020 NEC		
J232LM.L2	2	18
Electrical Code Calculations, Level I, Based on the 2020 NEC		
J227LM.L1	1	18
Electrical Safety-Related Work Practices, Level I, Based on the 2021 70E		
J444LM.M1	2	19
Orientation, Level II		
J200LM.I2	1.5	19
Emotional Intelligence		
J161LM	1	20

Core Curriculum: 2nd Year Required Materials

Required Materials:

- *AC Theory Textbook (S641)*
- *Blueprint Reading for Electricians Textbook (S648)*
- *Code Calculations Textbook - 2020 (S00820)*
- *Electrical Systems Textbook (S1070)*
- *National Electrical Code - 2020 (S1050)*
- *Transformers Principles and Applications Textbook (S476)*
- *Applied Codeology Textbook (S01720)*
- *Building a Foundation in Mathematics (S665)*
- *Electrical Safety-Related Work Practices Textbook (S944)*
- *National Electrical Code - 2017 (S950)*
- *Residential Blueprints (S135.H)*

These are materials that would have been bought previously based on this worksheet:

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|--|--------------------------|
| • <i>Building a Foundation in Mathematics (S665)</i> | <i>Purchased, Year 1</i> |
| • <i>Electrical Systems Textbook (S1070)</i> | <i>Purchased, Year 1</i> |
| • <i>National Electrical Code - 2017 (S950)</i> | <i>Purchased, Year 1</i> |
| • <i>National Electrical Code - 2020 (S1050)</i> | <i>Purchased, Year 1</i> |

Core Curriculum: 3rd Year Core Courses

	Credits	Page
AC Theory, Level III - 3rd Ed.		
J203LM.K3	3	20
Fire Alarm Systems, Level I, Based on the 2020 NEC		
J211LM.L1	2	21
Grounding and Bonding, Level I, Based on the 2020 NEC		
J210LM.L1	2	22
Rigging, Hoisting, and Signaling, Level I		
J241LM.J1	2	23
Blueprints, Level II		
J244LM.I2	2	24
Code, Standards, and Practices 3, Based on the 2020 NEC		
J233LM.L	2	25
Electrical Safety-Related Work Practices, Level II, Based on the 2021 70E		
J444LM.M2	2	26
Grounding and Bonding, Level II, Based on the 2020 NEC		
J210LM.L2	2.5	27
Lightning Protection, Level I		
J276LM.J1	1	28
Transformers, Level II, Based on the 2020 NEC - 2nd Ed.		
J205LM.I2_20	2	28
Health Care Facility Electrical Systems, Level I, Based on the 2021 NFPA 99 and 2020 NEC		
J260LM.L1	1	29
Preparing for Leadership: Personal Qualities - 2nd Ed.		
J900LM.A	2	30
Digital Electronics, Level I		
J240LM.I1	5	31
AC Theory, Level IV - 3rd Ed.		
J203LM.K4	1	31

Core Curriculum: 3rd Year Required Materials

Required Materials:

- *AC Theory Textbook (S641)*
- *Code Calculations Textbook - 2020 (S00820)*
- *Effective Leadership Skills Textbook (S197)*
- *Fire Alarm Systems Textbook (S946)*
- *Health Care Systems Textbook (S898)*
- *Rigging, Hoisting, Signaling Practices Textbook (S661)*
- *Transformers Principles and Applications Textbook (S476)*
- *Blueprint Reading for Electricians Textbook (S648)*
- *Commercial Blueprints (S136.H)*
- *Electrical Safety-Related Work Practices Textbook (S944)*
- *Grounding and Bonding Textbook (S36820)*
- *National Electrical Code - 2020 (S1050)*
- *Test Instruments and Applications Textbook (S571)*

These are materials that would have been bought previously based on this worksheet:

- | | |
|---|--------------------------|
| • <i>AC Theory Textbook (S641)</i> | <i>Purchased, Year 2</i> |
| • <i>Blueprint Reading for Electricians Textbook (S648)</i> | <i>Purchased, Year 2</i> |
| • <i>Code Calculations Textbook - 2020 (S00820)</i> | <i>Purchased, Year 2</i> |
| • <i>Electrical Safety-Related Work Practices Textbook (S944)</i> | <i>Purchased, Year 2</i> |
| • <i>National Electrical Code - 2020 (S1050)</i> | <i>Purchased, Year 1</i> |
| • <i>Test Instruments and Applications Textbook (S571)</i> | <i>Purchased, Year 1</i> |
| • <i>Transformers Principles and Applications Textbook (S476)</i> | <i>Purchased, Year 2</i> |

Core Curriculum: 4th Year Core Courses

	Credits	Page
Blueprints, Level III		
J244LM.I3	1	32
Building Automation 1: Control Devices and Applications, Level I		
J238LM.H1	1.5	32
Code, Standards, and Practices 4, Based on the 2020 NEC		
J234LM.L	1	33
Code, Standards, and Practices 5, Based on the 2020 NEC		
J235LM.L	2	33
Introduction to Programmable Logic Controllers - 2nd Ed.		
J162LM.A	4.5	34
Lighting Essentials, Level I - 2nd Ed.		
J259LM.K1	1.5	35
Lighting Essentials, Level II - 2nd Ed.		
J259LM.K2	1.5	36
Motor Control, Level I		
J209LM.H1	3.5	37
Motor Control, Level II		
J209LM.H2	4	38
Motor Control, Level III		
J209LM.H3	1.5	39
Motors, Level I - 2nd Ed.		
J206LM.J1	0.5	39
Motors, Level II, Based on the 2020 NEC - 2nd Ed.		
J206LM.J2_20	1.5	40
Code, Standards, and Practices 6, Based on the 2020 NEC		
J236LM.L	1.5	41

Core Curriculum: 4th Year Required Materials

Required Materials:

- *Blueprint Reading for Electricians Textbook (S648)*
- *Code Calculations Textbook - 2020 (S00820)*
- *Fundamentals of Motor Control (S547)*
- *Lighting Design Basics Textbook (S699)*
- *National Electrical Code - 2020 (S1050)*
- *Significant Changes to the NEC (S1053)*
- *Building Automation: Control Devices (S518)*
- *Electrical Systems Textbook (S1070)*
- *Industrial Blueprints (S137)*
- *Motors Textbook (S649)*
- *Programmable Logic Controllers Textbook (S631)*

These are materials that would have been bought previously based on this worksheet:

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|---|--------------------------|
| • <i>Blueprint Reading for Electricians Textbook (S648)</i> | <i>Purchased, Year 2</i> |
| • <i>Code Calculations Textbook - 2020 (S00820)</i> | <i>Purchased, Year 2</i> |
| • <i>Electrical Systems Textbook (S1070)</i> | <i>Purchased, Year 1</i> |
| • <i>National Electrical Code - 2020 (S1050)</i> | <i>Purchased, Year 1</i> |

Core Curriculum: 5th Year Core Courses

	Credits	Page
Electric Vehicle Charging Systems (EVCS-17) - 2nd Ed. w/ 2020 NEC Supplement (Approved for EVITP)		
J138LM.B	0.5	42
Building Automation 2: System Integration with Open Protocols, Level I L		
J239LM.I1L	2	43
Distributed Generation, Level I		
J229LM.I1	0.5	44
Intrusion Detection, Level I - 2nd Ed.		
J146LM.A1	1.5	44
Orientation, Level III		
J200LM.I3	1	45
Power Quality, Level I		
J228LM.I1	2	46
Structured Cabling - 2nd Ed.		
J271LM.J1	3	47
Torque, Level I		
J242LM.1	0.5	48
Photovoltaic Systems Workbook SW		
≡ J230SW.J	3	49
Electrical Code Calculations, Level II, Based on the 2020 NEC		
J227LM.L2	1	50
Electrical Code Calculations, Level III, Based on the 2020 NEC		
J227LM.L3	0.5	50
OSHA 30 Hour		
≡ J050/J051	2.5	51

Core Curriculum: 5th Year Required Materials

Required Materials:

- *Building Automation: System Integration (S519)*
- *National Electrical Code - 2020 (S1050)*
- *Power Quality Textbook (S569)*
- *Code Calculations Textbook - 2020 (S00820)*
- *Photovoltaic Systems Textbook, 3rd Ed. (S674)*
- *Structured Cabling Textbook (S681)*

These are materials that would have been bought previously based on this worksheet:

- *Code Calculations Textbook - 2020 (S00820)* *Purchased, Year 2*
- *National Electrical Code - 2020 (S1050)* *Purchased, Year 1*

Core Curriculum: Course Level and Credit Summary

Applications Manual

Item Code: **J300.K**

Core Curriculum Year: 1 and 2

Core Credits

Advanced Credits

Level I/II

Course Prerequisite(s): None

Required Material(s): None

Lesson 1	Splicing Conductors	0.25
Lesson 2	Installing a Duplex Receptacle	0.25
Lesson 3	Installing a Single Pole Switch	0.25
Lesson 4	Installing a Switched Duplex Receptacle	0.25
Lesson 5	Proper Device Installation Techniques, GFCI Rough-In	0.25
Lesson 6	Using Anchors to Install a Metal Enclosure	0.25
Lesson 7	Installing a Retrofit "Old Work" Electrical Box	0.25
Lesson 8	Using a Hacksaw	0.25
Lesson 9	Lifting and Carrying Conduit	0.25
Lesson 10	Erecting an Extension Ladder	0.25
Lesson 11	Hand Bending a 90° Stub-up	0.25
Lesson 12	Hand Bending a Box Offset	0.25
Lesson 13	Cutting a Hole in a Metal Enclosure for an EMT Connector	0.25
Lesson 14	Installing a Raceway Support System (Trapeze)	0.25
Lesson 15	Threading Conduit (Tapered Thread)	0.25
Lesson 16	Installing Flexible Metallic Conduit	0.25
Lesson 17	Installing Armor Clad and Metal Clad Cables	0.25
Lesson 18	Installing a Luminaire (Recessed "Can" Fixture)	0.25
Lesson 19	Installing a Luminaire (2' x 4' Fluorescent)	0.25
Lesson 20	Wire Pulling Techniques	0.25
Lesson 21	Terminating a Category 5e or 6/6A Work Area Outlet	0.25
Lesson 22	Labeling and Marking	0.25
Lesson 23	"Trimming Out" an Electrical Panel	0.25
Lesson 24	Exothermic Welding of Copper Conductors	0.25
Lesson 25	Connecting a Dual-Voltage, Wye-Wound Motor	0.25

ATTENTION: Your JATC will choose four out of the 25 Applications Manual lessons to be presented to students during the first year, and four out of the remaining Applications to be presented to students during the second year. Any Applications presented above the four per year must be matched with additional classroom time beyond 180 hours.

Core Curriculum: Course Level and Credit Summary

DC Theory, Level I - 2nd Ed.

Item Code: J202LM.K1

Core Curriculum Year: 1

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- *DC Theory Textbook (S640)*

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

Core Curriculum: Course Level and Credit Summary

DC Theory, Level II - 2nd Ed.

Item Code: J202LM.K2

Core Curriculum Year: 1

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): DC Theory, Level I - 2nd Ed.

Other Prerequisites: None

Required Material(s):

• *DC Theory Textbook (S640)*

• *Test Instruments and Applications Textbook (S571)*

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

DC Theory, Level III - 2nd Ed.

Item Code: J202LM.K3

Core Curriculum Year: 1

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): DC Theory, Level II - 2nd Ed.

Other Prerequisites: None

Required Material(s):

• *DC Theory Textbook (S640)*

• *Building a Foundation in Mathematics (S665)*

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

Core Curriculum: Course Level and Credit Summary

DC Theory, Level IV - 2nd Ed.

Item Code: J202LM.K4

Core Curriculum Year: 1

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): DC Theory, Level III - 2nd Ed.

Other Prerequisites: None

Required Material(s):

• *DC Theory Textbook (S640)*

• *National Electrical Code - 2017 (S950)*

- Lesson 1 Understanding Resistance in DC Combination Circuits
- Lesson 2 How Current Reacts in DC Combination Circuits
- Lesson 3 How Voltage Functions in DC Combination Circuits
- Lesson 4 How to Calculate Power in DC Combination Circuits
- Lesson 5 How Voltage and Current Dividers Work
- Lesson 6 The Design and Operation of the 3-Wire, Single-Phase System

DC Theory, Level V - 2nd Ed.

Item Code: J202LM.K5

Core Curriculum Year: Advanced

Advanced Credits

2.0

Course Prerequisite(s): DC Theory, Level I/IV

Other Prerequisites: None

Required Material(s):

• *DC Theory Textbook (S640)*

• *National Electrical Code - 2014 (S750)*

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

Core Curriculum: Course Level and Credit Summary

Job Information 1, Level I, Based on the 2020 NEC

Item Code: J221LM.N1

Core Curriculum Year: 1

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *DC Theory Textbook (S640)*
- *Electrical Systems Textbook (S1070)*

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

Core Curriculum: Course Level and Credit Summary

Job Information 1, Level II, Based on the 2020 NEC

Item Code: J221LM.N2

Core Curriculum Year: 1

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): Job Information 1, Level I

Other Prerequisites: None

Required Material(s):

- *Electrical Systems Textbook (S1070)*
- *DC Theory Textbook (S640)*
- *National Electrical Code - 2020 (S1050)*
- *Building a Foundation in Mathematics (S665)*
- *TI-30X IIS Solar Calculator (S159)*

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

Core Curriculum: Course Level and Credit Summary

Orientation, Level I

Item Code: **J200LM.I1**

Core Curriculum Year: 1

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- Lesson 1 How to Study This Course and Achieve Your Personal Goals
- Lesson 2 The Attributes of an IBEW/NECA Apprenticeship
- Lesson 3 Knowing Your Apprenticeship and Your Responsibilities
- Lesson 4 The IBEW and Its History
- Lesson 5 NECA's Structure and Heritage
- Lesson 6 Your Job and the Future It Holds for You
- Lesson 7 Sexual Harassment
- Lesson 8 The Economics of Employment
- Lesson 9 Safety Never Takes a Break

Core Curriculum: Course Level and Credit Summary

Conduit Fabrication, Level I - 2nd Ed.

Item Code: J204LM.H1

Core Curriculum Year: 1

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): None

Other Prerequisites: None

Notifications:

This course replaces Conduit Fabrication, Level I - 1st Ed.

Required Material(s):

- *Building a Foundation in Mathematics (S665)*
- *Conduit Bending and Fabrication Textbook (S495)*
- *National Electrical Code - 2017 (S950)*
- *Conduit Lab Manual (J204L)*

- Lesson 1 How to Work with Fractions
- Lesson 2 Using Basic Trigonometric Functions
- Lesson 3 Introduction to Conduit Bending
- Lesson 4 Conduit Types
- Lesson 5 Hand Fabrication of 90° Stubs
- Lesson 6 Hand Fabrication of Back-to-Back Bends
- Lesson 7 Hand Bending Offsets and Kicks
- Lesson 8 Hand Bending—Three- & Four-Bend Saddles

Core Curriculum: Course Level and Credit Summary

Conduit Fabrication, Level II - 2nd Ed.

Item Code: J204LM.H2

Core Curriculum Year: 1

Core Credits

Advanced Credits

4.0

Course Prerequisite(s): Conduit Fabrication, Level I

Other Prerequisites: None

Notifications:

This course replaces Conduit Fabrication, Level II - 1st Ed.

Required Material(s):

- *Conduit Bending and Fabrication Textbook (S495)*
- *Conduit Lab Manual (J204L)*

Lesson 1 Conduit Threading Techniques

Lesson 2 Push-Through Bending: 90° Bends

Lesson 3 Bending Kicks, Offsets and Saddles Using the Push-Through Method

Lesson 4 Segmented Bends

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 1, Based on the 2020 NEC

Item Code: J231LM.L

Core Curriculum Year: 1

Core Credits

Advanced Credits

4.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *Electrical Systems Textbook (S1070)*
- *Ugly's Electrical References (S1054)*

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

Core Curriculum: Course Level and Credit Summary

Test Instruments, Level I

Item Code: J285LM.H1

Core Curriculum Year: Advanced

Advanced Credits

2.0

Course Prerequisite(s): AC Systems, Level I

Other Prerequisites: None

Required Material(s):

- *Test Instruments and Applications Textbook (S571)*

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

First Aid/CPR

Item Code: TX2720.LC2

Core Curriculum Year: Advanced

Local Advanced Credits

1.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

Core Curriculum: Course Level and Credit Summary

OSHA 10

Item Code: TX2720.LC1

Core Curriculum Year: Advanced

Local Advanced Credits

1.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

Harassment Prevention: Awareness and Responsibilities - 2023 - CML

Item Code: J158LM.D

Core Curriculum Year: 1

Core Credits

Advanced Credits

0.0

Course Prerequisite(s): None

Other Prerequisites: None

Notifications:

This course meets DOL and Committee requirements to provide anti-harassment training to apprentices

Required Material(s):

Lesson 1 Prohibited Harassment

Lesson 2 Sexual Harassment

Lesson 3 Reporting Harassment

Core Curriculum: Course Level and Credit Summary

Transformers, Level I - 2nd Ed.

Item Code: J205LM.I1

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): AC Theory, Level I/II; Code and Practices 2, Level I/II

Other Prerequisites: None

Required Material(s):

- *Transformers Principles and Applications Textbook (S476)*

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

AC Systems, Level I - 3rd Ed.

Item Code: J103LM.K1

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): DC Theory, Level I/IV

Other Prerequisites: None

Required Material(s):

- *AC Theory Textbook (S641)*
- *National Electrical Code - 2017 (S950)*
- *Building a Foundation in Mathematics (S665)*

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

Core Curriculum: Course Level and Credit Summary

AC Theory, Level I - 3rd Ed.

Item Code: J203LM.K1

Core Curriculum Year: 2

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): DC Theory, Level I/IV; AC Systems, Level I

Other Prerequisites: None

Required Material(s):

- *AC Theory Textbook (S641)*

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

Core Curriculum: Course Level and Credit Summary

AC Theory, Level II - 3rd Ed.

Item Code: J203LM.K2

Core Curriculum Year: 2

Core Credits

Advanced Credits

4.0

Course Prerequisite(s): AC Theory

Other Prerequisites: None

Required Material(s):

• *AC Theory Textbook (S641)*

• *Building a Foundation in Mathematics (S665)*

- Lesson 1 Comprehending the Parameters of Series RL Circuits
- Lesson 2 Comprehending the Parameters of Series RC Circuits
- Lesson 3 Comprehending and Analyzing Series RLC Circuits
- Lesson 4 Understanding and Working with Parallel RL Circuits
- Lesson 5 Understanding and Working with Parallel RC Circuits
- Lesson 6 Comprehending and Analyzing Parallel RLC Circuits
- Lesson 7 Identifying and Working with LC Circuits
- Lesson 8 Comparing Series and Parallel RLC Circuits
- Lesson 9 Analyzing and Working with Combination RLC Circuits

Core Curriculum: Course Level and Credit Summary

Codeology, Based on the 2020 NEC

Item Code: J207LM.L

Core Curriculum Year: 2

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): Job Information, Level I

Other Prerequisites: None

Required Material(s):

• *Applied Codeology Textbook (S01720)*

• *National Electrical Code - 2020 (S1050)*

- Lesson 1 Overview, Organization, and Chapter 1 of the *National Electrical Code*
- Lesson 2 *NEC* Chapter 2: Planning the Installation
- Lesson 3 *NEC* Chapter 3: Building the Installation
- Lesson 4 *NEC* Chapter 4: Using the Electricity
- Lesson 5 *NEC* Chapter 5: Special Occupancies
- Lesson 6 *NEC* Chapter 6: Special Equipment of the *NEC*
- Lesson 7 *NEC* Chapter 7: Special Conditions
- Lesson 8 *NEC* Chapter 8: Communications
- Lesson 9 *NEC* Chapter 9: Tables and the Informative Annexes
- Lesson 10 The *Codeology* Method

Core Curriculum: Course Level and Credit Summary

Blueprints, Level I

Item Code: J244LM.I1

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.5

Course Prerequisite(s): Codeology or CSP1

Other Prerequisites: None

Required Material(s):

- *Blueprint Reading for Electricians Textbook (S648)*
- *Residential Blueprints (S135.H)*

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

Code, Standards, and Practices 2, Level I, Based on the 2020 NEC

Item Code: J232LM.L1

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Code, Standards, and Practices 1, Level I

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *Electrical Systems Textbook (S1070)*

- Lesson 1 Understanding the Principles Involved in the Sizing of Building Wire
- Lesson 2 Branch Circuits I
- Lesson 3 Branch Circuits II
- Lesson 4 Feeders and Outside Branch Circuits and Feeders
- Lesson 5 Services
- Lesson 6 Switches, Receptacles, and Luminaires

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 2, Level II, Based on the 2020 NEC

Item Code: J232LM.L2

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Code, Standards, and Practices 2, Level I

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *Electrical Systems Textbook (S1070)*

- Lesson 1 Conduit and Raceway Basics
- Lesson 2 NEC Requirements for Cable Assemblies
- Lesson 3 General Requirements for Wiring Methods and Materials
- Lesson 4 Conductors for General Wiring
- Lesson 5 Electrical Nonmetallic Tubing (ENT)
- Lesson 6 Liquidtight Flexible Conduit: Types LFMC and LFNC

Electrical Code Calculations, Level I, Based on the 2020 NEC

Item Code: J227LM.L1

Core Curriculum Year: 2

Core Credits

Advanced Credits

1.0

Course Prerequisite(s): Code, Standards, and Practices 2, Level II

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *Code Calculations Textbook - 2020 (S00820)*
- *Electrical Systems Textbook (S1070)*

- Lesson 1 Beginning to Calculate Conductor Ampacity
- Lesson 2 Determining Conductor Ampacity
- Lesson 3 Finalizing Ampacity Calculations
- Lesson 4 Identifying Boxes and Fittings as Defined by the NEC
- Lesson 5 Performing Box Size and Fill Calculations
- Lesson 6 Calculating Raceway Fill

Core Curriculum: Course Level and Credit Summary

Electrical Safety-Related Work Practices, Level I, Based on the 2021 70E

Item Code: J444LM.M1

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Code, Standards, and Practices 3

Other Prerequisites: None

Required Material(s):

- *Electrical Safety-Related Work Practices Textbook (S944)*

- Lesson 1 Electrical Safety Culture
- Lesson 2 Electrical Hazard Awareness
- Lesson 3 OSHA Considerations
- Lesson 4 Introduction to Lockout, Tagging, and the Control of Hazardous Energy
- Lesson 5 Fault Current Fundamentals

Orientation, Level II

Item Code: J200LM.I2

Core Curriculum Year: 2

Core Credits

Advanced Credits

1.5

Course Prerequisite(s): Orientation, Level I

Other Prerequisites: None

Required Material(s):

- Lesson 1 Avoiding the Hazards of Drug Abuse
- Lesson 2 Becoming Familiar with the IBEW Constitution
- Lesson 3 Understanding Your Local Union By-Laws
- Lesson 4 Parliamentary Procedure and How It Works
- Lesson 5 An Introduction to The COMET Program
- Lesson 6 American Labor History
- Lesson 7 Pride in Your Industry

Core Curriculum: Course Level and Credit Summary

Emotional Intelligence

Item Code: J161LM

Core Curriculum Year: Advanced

Advanced Credits

1.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- Lesson 1 What is Emotional Quotient?
- Lesson 2 Internal Distractions, Part 1
- Lesson 3 Internal Distractions, Part 2
- Lesson 4 The “Mental 5” Critical Thinking Skills
- Lesson 5 The Big 4 Navy Seals Brain Training Techniques
- Lesson 6 Six Cylinder Theory
- Lesson 7 Windows of Self-Concept
- Lesson 8 Critical Advisors

AC Theory, Level III - 3rd Ed.

Item Code: J203LM.K3

Core Curriculum Year: 3

Core Credits

Advanced Credits

3.0

Course Prerequisite(s): AC Theory, Level I/II

Other Prerequisites: None

Required Material(s):

• *AC Theory Textbook (S641)*

• *Test Instruments and Applications Textbook (S571)*

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

Core Curriculum: Course Level and Credit Summary

Fire Alarm Systems, Level I, Based on the 2020 NEC

Item Code: J211LM.L1

Core Curriculum Year: Advanced

Advanced Credits

2.0

Course Prerequisite(s): DC Theory, Level I/IV; Job Information, Level I

Other Prerequisites: None

Required Material(s):

• *Fire Alarm Systems Textbook (S946)*

• *National Electrical Code - 2020 (S1050)*

Lesson 1 Introduction to Fire Alarm Systems

Lesson 2 Fundamentals and System Requirements

Lesson 3 Initiating Devices

Lesson 4 Notification Appliances

Lesson 5 Wiring and Wiring Methods

Lesson 6 System Interfaces and Safety Control Functions

Lesson 7 Emergency Communications Systems and Emergency Voice/Alarm Communications Systems

Lesson 8 Plans and Specifications

Core Curriculum: Course Level and Credit Summary

Grounding and Bonding, Level I, Based on the 2020 NEC

Item Code: J210LM.L1

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): AC Theory, Level II/III

Other Prerequisites: None

Required Material(s):

• *Grounding and Bonding Textbook (S36820)*

• *National Electrical Code - 2020 (S1050)*

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

Core Curriculum: Course Level and Credit Summary

Rigging, Hoisting, and Signaling, Level I

Item Code: J241LM.J1

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): None

Other Prerequisites: 4000 Hours of OJT

Required Material(s):

- *Rigging, Hoisting, Signaling Practices Textbook (S661)*

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

Core Curriculum: Course Level and Credit Summary

Blueprints, Level II

Item Code: **J244LM.I2**

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Blueprints, Level I

Other Prerequisites: None

Required Material(s):

- *Blueprint Reading for Electricians Textbook (S648)*
- *Commercial Blueprints (S136.H)*

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

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 3, Based on the 2020 NEC

Item Code: J233LM.L

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Code, Standards, and Practices 2, Level II

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2020 (S1050)***

- Lesson 1 Purpose of Overcurrent Protection and Types of Overcurrents
- Lesson 2 Overcurrent Protective Device Categories
- Lesson 3 Overcurrent Protective Device Ratings
- Lesson 4 Types of OCPDs—Circuit Breakers
- Lesson 5 Types of OCPDs—Fuses
- Lesson 6 Practical Guidelines for OCPD Ampere Rating Sizing
- Lesson 7 Special Conductor Overcurrent Protection Permitted, Including Taps
- Lesson 8 Calculation of Available Fault Current
- Lesson 9 Panelboards, Switchboards, and Switchgear SCCR—NEC 408.6

Core Curriculum: Course Level and Credit Summary

Electrical Safety-Related Work Practices, Level II, Based on the 2021 70E

Item Code: J444LM.M2

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Electrical Safety-Related Work Practices, Level I

Other Prerequisites: None

Required Material(s):

- ***Electrical Safety-Related Work Practices Textbook (S944)***

- Lesson 1 Introduction to *NFPA 70E*®
- Lesson 2 Work Involving Electrical Hazards
- Lesson 3 Identifying OCPD Types
- Lesson 4 Methods to Select Arc Flash PPE
- Lesson 5 Maintenance Considerations
- Lesson 6 Eliminating or Reducing Hazards by Design and Upgrades

Core Curriculum: Course Level and Credit Summary

Grounding and Bonding, Level II, Based on the 2020 NEC

Item Code: J210LM.L2

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.5

Course Prerequisite(s): Grounding and Bonding, Level I

Other Prerequisites: None

Required Material(s):

- *Grounding and Bonding Textbook (S36820)*
- *National Electrical Code - 2020 (S1050)*
- *Test Instruments and Applications Textbook (S571)*

- Lesson 1 Grounding at Separate Buildings or Structures
- Lesson 2 Grounding Electrical Systems
- Lesson 3 Grounding Requirements for Separately Derived Systems
- Lesson 4 Special Occupancies and Conditions
- Lesson 5 Grounding Special Equipment
- Lesson 6 Grounding and Bonding for Communications Systems and Equipment
- Lesson 7 Ground-Fault Circuit Interrupters (GFCI) and Ground-Fault Protection of Equipment (GFPE)

- Lesson 8 Grounding Rules for Medium- and High-Voltage Systems
- Lesson 9 Grounding Systems and Earth Ground Test Instruments

Core Curriculum: Course Level and Credit Summary

Lightning Protection, Level I

Item Code: J276LM.J1

Core Curriculum Year: Advanced

Advanced Credits

1.0

Course Prerequisite(s): Grounding and Bonding, Level I

Other Prerequisites: None

Required Material(s):

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

Transformers, Level II, Based on the 2020 NEC - 2nd Ed.

Item Code: J205LM.I2_20

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Code Calc Lvl II OR Elec Code Calc Lvl I; Transformers, Level I

Other Prerequisites: None

Required Material(s):

- *Transformers Principles and Applications Textbook (S476)* • *National Electrical Code - 2020 (S1050)*
- *Code Calculations Textbook - 2020 (S00820)*

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

Core Curriculum: Course Level and Credit Summary

Health Care Facility Electrical Systems, Level I, Based on the 2021 NFPA

Item Code: J260LM.L1

Core Curriculum Year: Advanced

Advanced Credits

1.0

Course Prerequisite(s): Code and Practices 3, Level I

Other Prerequisites: None

Required Material(s):

- *Health Care Systems Textbook (S898)*

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

Core Curriculum: Course Level and Credit Summary

Preparing for Leadership: Personal Qualities - 2nd Ed.

Item Code: J900LM.A

Core Curriculum Year: 3

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): None

Other Prerequisites: None

Notifications:

Instructors must have satisfactorily completed the TTT version of this course to be enrolled into this

Required Material(s):

- *Effective Leadership Skills Textbook (\$197)*

- Lesson 1 The Contracting Business
- Lesson 2 Personal Qualities: Professionalism And Respect
- Lesson 3 Personal Qualities: Credibility and Character
- Lesson 4 Personal Qualities: Ethics and Integrity
- Lesson 5 Personal Qualities: Teaching and Learning
- Lesson 6 Communications: Effective Communication
- Lesson 7 Planning: The Importance of Planning
- Lesson 8 Planning: Planning Challenges
- Lesson 9 Communications: Crew Support and Morale
- Lesson 10 Communications: Disruptive Behaviors

Core Curriculum: Course Level and Credit Summary

Digital Electronics, Level I

Item Code: J240LM.I1

Core Curriculum Year: Advanced

Advanced Credits

5.0

Course Prerequisite(s): DC Theory, Level I/IV

Other Prerequisites: None

Required Material(s):

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

AC Theory, Level IV - 3rd Ed.

Item Code: J203LM.K4

Core Curriculum Year: Advanced

Advanced Credits

1.0

Course Prerequisite(s): AC Theory, Level II/III

Other Prerequisites: None

Required Material(s):

- *AC Theory Textbook (S641)*

- | | |
|----------|--|
| Lesson 1 | Series Resonance |
| Lesson 2 | Parallel Resonance |
| Lesson 3 | Series-Parallel Resonant Circuit Comparisons |
| Lesson 4 | Filters |

Core Curriculum: Course Level and Credit Summary

Blueprints, Level III

Item Code: J244LM.I3

Core Curriculum Year: 4

Core Credits

Advanced Credits

1.0

Course Prerequisite(s): Blueprints, Level II

Other Prerequisites: None

Required Material(s):

• *Blueprint Reading for Electricians Textbook (S648)*

• *Industrial Blueprints (S137)*

Lesson 1 Review and Introduction

Lesson 2 Industrial Specifications

Lesson 3 Industrial Prints I

Lesson 4 Industrial Prints II

Lesson 5 Industrial Prints III

Building Automation 1: Control Devices and Applications, Level I

Item Code: J238LM.H1

Core Curriculum Year: Advanced

Advanced Credits

1.5

Course Prerequisite(s): None

Other Prerequisites: 4000 Hours of OJT

Required Material(s):

• *Building Automation: Control Devices (S518)*

Lesson 1 Introduction to Building Automation

Lesson 2 Electrical Systems

Lesson 3 Lighting Sources and Controls

Lesson 4 Lighting System Control Devices

Lesson 5 HVAC Systems

Lesson 6 HVAC System Applications

Lesson 7 Automated Building Operation and Applications

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 4, Based on the 2020 NEC

Item Code: J234LM.L

Core Curriculum Year: 4

Core Credits

Advanced Credits

1.0

Course Prerequisite(s): Code, Standards, and Practices 3

Other Prerequisites: None

Required Material(s):

• *National Electrical Code - 2020 (S1050)*

• *Electrical Systems Textbook (S1070)*

- Lesson 1 Special Occupancies
- Lesson 2 Electrical Equipment
- Lesson 3 Special Equipment
- Lesson 4 Introduction to Cable Tray Systems
- Lesson 5 Installing Surface Metal Raceways

Code, Standards, and Practices 5, Based on the 2020 NEC

Item Code: J235LM.L

Core Curriculum Year: 4

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Code, Standards, and Practices 4

Other Prerequisites: None

Required Material(s):

• *National Electrical Code - 2020 (S1050)*

• *Significant Changes to the NEC (S1053)*

- Lesson 1 Installing Electrical Services
- Lesson 2 Swimming Pools, Fountains, and Similar Installations
- Lesson 3 Understanding Emergency and Standby Systems Installation Requirements
- Lesson 4 Over 1,000-Volt Installations
- Lesson 5 Remote-Control, Signaling, and Power-Limited Circuits
- Lesson 6 2020 NEC Changes – Part I
- Lesson 7 2020 NEC Changes – Part II

Core Curriculum: Course Level and Credit Summary

Introduction to Programmable Logic Controllers - 2nd Ed.

Item Code: J162LM.A

Core Curriculum Year: Advanced

Advanced Credits

4.5

Course Prerequisite(s): Motor Control, Level I

Other Prerequisites: None

Required Material(s):

- ***Programmable Logic Controllers Textbook (S631)***

- Lesson 1 Programmable Logic Controllers and Critical Safety Practices
- Lesson 2 PLC Electrical Principles, Ratings, and Circuit Calculations
- Lesson 3 PLC Programming Symbols, Diagrams, and Logic Functions
- Lesson 4 PLC Hardware, Memory, and Operating Cycle
- Lesson 5 PLC Systems, Circuits, and Interface Devices
- Lesson 6 PLC Programming Diagrams, Addresses, and Bit Instructions
- Lesson 7 PLC Programming Timer and Counter Instructions
- Lesson 8 PLC Analog Device Installation, Programming, and Troubleshooting
- Lesson 9 PLC Installations and Startup
- Lesson 10 Troubleshooting Methods and Test Instrument Operation
- Lesson 11 Testing and Troubleshooting Electrical Devices and PLC Hardware
- Lesson 12 Troubleshooting with PLC Software
- Lesson 13 PLC System Maintenance

Core Curriculum: Course Level and Credit Summary

Lighting Essentials, Level I - 2nd Ed.

Item Code: J259LM.K1

Core Curriculum Year: Advanced

Advanced Credits

1.5

Course Prerequisite(s): None

Other Prerequisites: 4000 Hours of OJT

Required Material(s):

- *Lighting Design Basics Textbook (\$699)*

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

Core Curriculum: Course Level and Credit Summary

Lighting Essentials, Level II - 2nd Ed.

Item Code: J259LM.K2

Core Curriculum Year: Advanced

Advanced Credits

1.5

Course Prerequisite(s): Lighting Essentials, Level I - 2nd Ed.

Other Prerequisites: None

Required Material(s):

- ***Lighting Design Basics Textbook (S699)***

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

Core Curriculum: Course Level and Credit Summary

Motor Control, Level I

Item Code: J209LM.H1

Core Curriculum Year: 4

Core Credits

Advanced Credits

3.5

Course Prerequisite(s): Motors, Level I/II

Other Prerequisites: None

Required Material(s):

- ***Fundamentals of Motor Control (S547)***

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

Core Curriculum: Course Level and Credit Summary

Motor Control, Level II

Item Code: J209LM.H2

Core Curriculum Year: 4

Core Credits

Advanced Credits

4.0

Course Prerequisite(s): Motor Control, Level I

Other Prerequisites: None

Required Material(s):

- *Fundamentals of Motor Control (S547)*

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

Core Curriculum: Course Level and Credit Summary

Motor Control, Level III

Item Code: J209LM.H3

Core Curriculum Year: Advanced

Advanced Credits

1.5

Course Prerequisite(s): Motor Control, Level II

Other Prerequisites: None

Required Material(s):

- *Fundamentals of Motor Control (S547)*

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

Motors, Level I - 2nd Ed.

Item Code: J206LM.J1

Core Curriculum Year: 4

Core Credits

Advanced Credits

0.5

Course Prerequisite(s): AC Theory, Level I/II; Code and Practices 3, Level I

Other Prerequisites: None

Required Material(s):

- *Motors Textbook (S649)*

- Lesson 1 Magnetism and Induction
- Lesson 2 Motor Nameplates
- Lesson 3 AC Alternators
- Lesson 4 Three-Phase Motors
- Lesson 5 Squirrel-Cage Motors

Core Curriculum: Course Level and Credit Summary

Motors, Level II, Based on the 2020 NEC - 2nd Ed.

Item Code: J206LM.J2_20

Core Curriculum Year: 4

Core Credits

Advanced Credits

1.5

Course Prerequisite(s): Motors, Level I - 2nd Ed.

Other Prerequisites: None

Required Material(s):

- *Motors Textbook (S649)*
- *National Electrical Code - 2020 (S1050)*
- *Code Calculations Textbook - 2020 (S00820)*

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

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 6, Based on the 2020 NEC

Item Code: J236LM.L

Core Curriculum Year: Advanced

Advanced Credits

1.5

Course Prerequisite(s): Code, Standards, and Practices 3

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2020 (S1050)***

- Lesson 1 Reviewing Key OCPD Concepts
- Lesson 2 Motor Branch-Circuit Devices and Protection – NEC Article 430
- Lesson 3 Motor Branch Circuits and Air-Conditioning and Refrigeration Equipment
- Lesson 4 Transformer Protection—Article 450
- Lesson 5 Interrupting Rating: Fully Rated and Series Rated Systems
- Lesson 6 Equipment Short-Circuit Protection
- Lesson 7 Selective Coordination
- Lesson 8 Ground-Fault Protection of Equipment

Core Curriculum: Course Level and Credit Summary

Electric Vehicle Charging Systems (EVCS-17) - 2nd Ed. w/ 2020 NEC

Item Code: J138LM.B

Core Curriculum Year: Advanced

Advanced Credits

0.5

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

Lesson 1	Electric Vehicles
Lesson 2	Electric Vehicle Charging Equipment
Lesson 3	The 2017 National Electrical Code (NEC)
Lesson 4	Advanced Load Calculations, Based on the 2017 NEC
Lesson 5	Site Assessment
Lesson 6	Commissioning
Lesson 7	Troubleshooting
Lesson 8	Code Supplement
Lesson 9	Course Completion Document

Core Curriculum: Course Level and Credit Summary

Building Automation 2: System Integration with Open Protocols, Level I L

Item Code: J239LM.I1L

Core Curriculum Year: Advanced

Advanced Credits

2.0

Course Prerequisite(s): Building Automation 1, Level I

Other Prerequisites: None

Required Material(s):

- ***Building Automation: System Integration (S519)***

Lesson 1	Building Automation Interoperability
Lesson 2	Control Concepts
Lesson 3	Communication Fundamentals
Lesson 4	Introduction to LonWorks
Lesson 5	LonWorks Network Architecture
Lesson 6	LonWorks Nodes
Lesson 7	LonWorks Programming
Lesson 8	LonWorks Network Testing
Lesson 9	LonWorks Network Maintenance

Core Curriculum: Course Level and Credit Summary

Distributed Generation, Level I

Item Code: J229LM.I1

Core Curriculum Year: Advanced

Advanced Credits

0.5

Course Prerequisite(s): AC Theory, Level II/III

Other Prerequisites: None

Required Material(s):

- | | |
|----------|---|
| Lesson 1 | Information Technology Sites and Critical Loads |
| Lesson 2 | UPS — Uninterruptible Power Supplies |
| Lesson 3 | Infrastructure Components |
| Lesson 4 | Critical UPS Systems Design Configurations |
| Lesson 5 | UPS Installation |
| Lesson 6 | Critical Systems Service |
| Lesson 7 | Fuel Cell Basics and Applications |
| Lesson 8 | Fuel Cell Installation |

Intrusion Detection, Level I - 2nd Ed.

Item Code: J146LM.A1

Core Curriculum Year: Advanced

Advanced Credits

1.5

Course Prerequisite(s): DC Theory, Level I/IV

Other Prerequisites: None

Notifications:

This course replaces Intrusion Detection, Level I - 1st Ed.

Required Material(s):

- | | |
|----------|---|
| Lesson 1 | Terms and Definitions |
| Lesson 2 | Introduction to Security Systems |
| Lesson 3 | Specific Applications for Magnetic Contacts |
| Lesson 4 | Motion Sensors |
| Lesson 5 | Glassbreak Sensors |
| Lesson 6 | Control Panels, Keypads, and Modules |
| Lesson 7 | Security System Design |

Core Curriculum: Course Level and Credit Summary

Orientation, Level III

Item Code: J200LM.I3

Core Curriculum Year: 5

Core Credits

Advanced Credits

1.0

Course Prerequisite(s): Orientation, Level II

Other Prerequisites: None

Required Material(s):

- Lesson 1 The National Electrical Benefit Fund (NEBF)
- Lesson 2 After Apprenticeship
- Lesson 3 Soon To Be A Journey-Level Worker
- Lesson 4 This is a National Program
- Lesson 5 Keys to Success-Motivation and Leadership
- Lesson 6 The National Labor Relations Board
- Lesson 7 The Economics of Unemployment
- Lesson 8 The Realities of Construction

Core Curriculum: Course Level and Credit Summary

Power Quality, Level I

Item Code: J228LM.I1

Core Curriculum Year: Advanced

Advanced Credits

2.0

Course Prerequisite(s): AC Theory, Level II/III; DC Theory, Level II/V

Other Prerequisites: None

Required Material(s):

- *Power Quality Textbook (S569)*

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

Core Curriculum: Course Level and Credit Summary

Structured Cabling - 2nd Ed.

Item Code: **J271LM.J1**

Core Curriculum Year: Advanced

Advanced Credits

3.0

Course Prerequisite(s): AC Theory, Level II/III

Other Prerequisites: None

Required Material(s):

• ***Structured Cabling Textbook (S681)***

• ***National Electrical Code - 2020 (S1050)***

- Lesson 1 The Need for Structured Cabling Systems
- Lesson 2 Introduction to Structured Cabling Standards and Codes
- Lesson 3 Structured Cabling Standards
- Lesson 4 Cables and Connectors
- Lesson 5 Structured Cabling System Performance
- Lesson 6 Unshielded Twisted Pair Connecting Hardware
- Lesson 7 Telecommunications Pathways and Spaces
- Lesson 8 Telecommunications Cabling Administration
- Lesson 9 Telecommunications Grounding and Bonding
- Lesson 10 Configuring Structured Cabling Systems
- Lesson 11 Residential Cabling Systems
- Lesson 12 Certifying the UTP Cabling System

Core Curriculum: Course Level and Credit Summary

Torque, Level I

Item Code: **J242LM.1**

Core Curriculum Year: 5

Core Credits

Advanced Credits

0.5

Course Prerequisite(s): None

Other Prerequisites: 4000 Hours of OJT

Required Material(s):

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

Core Curriculum: Course Level and Credit Summary

Photovoltaic Systems Workbook SW

 Item Code: J230SW.J

Core Curriculum Year: Advanced

Advanced Credits

3.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- **Photovoltaic Systems Textbook, 3rd Ed. (S674)**

- Lesson 1 Introduction to Photovoltaic Systems
- Lesson 2 Fundamentals of Solar Radiation
- Lesson 3 Sun-Earth Relationships
- Lesson 4 Solar Radiation Data and Measurements
- Lesson 5 Site Surveys and Planning
- Lesson 6 Photovoltaic Systems and Components
- Lesson 7 Fundamentals of Photovoltaic Devices
- Lesson 8 Photovoltaic Modules and Arrays
- Lesson 9 Batteries
- Lesson 10 Charge Controllers
- Lesson 11 Inverters
- Lesson 12 System Sizing
- Lesson 13 Mechanical Integration
- Lesson 14 Electrical Integration I
- Lesson 15 Electrical Integration II
- Lesson 16 Utility Interconnection
- Lesson 17 Permitting and Inspection
- Lesson 18 Commissioning, Maintenance, and Troubleshooting
- Lesson 19 Economic Analysis

Core Curriculum: Course Level and Credit Summary

Electrical Code Calculations, Level II, Based on the 2020 NEC

Item Code: J227LM.L2

Core Curriculum Year: 5

Core Credits

Advanced Credits

1.0

Course Prerequisite(s): Electrical Code Calculations, Level I

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *Code Calculations Textbook - 2020 (S00820)*

- Lesson 1 Calculating Voltage Drop in Feeders and Branch Circuits
- Lesson 2 Introduction to Electrical Load Calculations
- Lesson 3 Range and Appliance Calculations
- Lesson 4 Calculating the Parameters of Residential Loads in Accordance with the *NEC*
- Lesson 5 Calculating the Parameters of Multifamily Dwelling Loads in Accordance with the *NEC*
- Lesson 6 Calculating the Parameters of Commercial Loads in Accordance with the *NEC*

Electrical Code Calculations, Level III, Based on the 2020 NEC

Item Code: J227LM.L3

Core Curriculum Year: Advanced

Advanced Credits

0.5

Course Prerequisite(s): Electrical Code Calculations, Level II

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2020 (S1050)*
- *Code Calculations Textbook - 2020 (S00820)*

- Lesson 1 Cable Tray Fills
- Lesson 2 Ampacity of Conductors in Cable Trays
- Lesson 3 Electric Welders

Core Curriculum: Course Level and Credit Summary

OSHA 30 Hour

 Item Code: **J050/J051**

Core Curriculum Year: Advanced

Advanced Credits

2.5

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):