

# Core Curriculum

## 2nd Year Syllabus

### Commercial Curriculum 2022



## Core Curriculum: Course Selection Per Year

2nd Year Core	
Codeology, Level I, Based on the 2017 NEC	3
Blueprints, Level II	2
Blueprints, Level III	1
AC Systems, Level I - 3rd Ed.	2
AC Theory, Level I - 3rd Ed.	3
AC Theory, Level II - 3rd Ed.	4
Electrical Safety-Related Work Practices, Level I, Based on the 2015 70E	2
Code, Standards, and Practices 2, Level I, Based on the 2017 NEC	2
Code, Standards, and Practices 2, Level II, Based on the 2017 NEC	2
Electrical Code Calculations, Level I, Based on the 2017 NEC	1
Transformers, Level I - 2nd Ed.	2
Lighting Essentials, Level I - 2nd Ed.	1.5
Applications Manual, Lesson 7 - Installing a Retrofit "Old Work" Electrical Box	0.25
Applications Manual, Lesson 11 - Hand Bending a 90° Stub-up	0.25
Applications Manual, Lesson 12 - Hand Bending a Box Offset	0.25
Applications Manual, Lesson 18 - Installing a Luminaire (Recessed "Can" Fixture)	0.25

# Core Curriculum: 2nd Year Core Courses

	Credits	Page	Date
<b>Codeology, Level I, Based on the 2017 NEC</b>			
J207LM.K1	3.0	1	
<b>Blueprints, Level II</b>			
J244LM.I2	2.0	2	
<b>Blueprints, Level III</b>			
J244LM.I3	1.0	3	
<b>AC Systems, Level I - 3rd Ed.</b>			
J103LM.K1	2.0	3	
<b>AC Theory, Level I - 3rd Ed.</b>			
J203LM.K1	3.0	4	
<b>AC Theory, Level II - 3rd Ed.</b>			
J203LM.K2	4.0	4	
<b>Electrical Safety-Related Work Practices, Level I, Based on the 2015 70E</b>			
J444LM.K1	2.0	5	
<b>Code, Standards, and Practices 2, Level I, Based on the 2017 NEC</b>			
J232LM.K1	2.0	6	
<b>Code, Standards, and Practices 2, Level II, Based on the 2017 NEC</b>			
J232LM.K2	2.0	6	
<b>Electrical Code Calculations, Level I, Based on the 2017 NEC</b>			
J227LM.K1	1.0	7	
<b>Transformers, Level I - 2nd Ed.</b>			
J205LM.I1	2.0	7	

# Core Curriculum: 2nd Year Core Courses

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	Credits	Page	Date
<b>Lighting Essentials, Level I - 2nd Ed.</b>			
J259LM.K1	1.5	8	
<b>Applications Manual, Lesson 7 - Installing a Retrofit "Old Work" Electrical Box</b>			
≡ J300.K	0.25	8	
<b>Applications Manual, Lesson 11 - Hand Bending a 90° Stub-up</b>			
≡ J300.K	0.25	8	
<b>Applications Manual, Lesson 12 - Hand Bending a Box Offset</b>			
≡ J300.K	0.25	8	
<b>Applications Manual, Lesson 18 - Installing a Luminaire (Recessed "Can" Fixture)</b>			
≡ J300.K	0.25	8	



# Core Curriculum: Course Level and Credit Summary

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

Item Code: J207LM.K1

Core Curriculum Year: 2

Core Credits

Advanced Credits

3.0

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

***Other Prerequisites: None***

***Required Material(s):***

• *Codeology Textbook (S01717)*

• *National Electrical Code - 2017 (S950)*

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

# Core Curriculum: Course Level and Credit Summary

## **Blueprints, Level II**

Item Code: J244LM.I2

Core Curriculum Year: 2

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

## **Blueprints, Level III**

Item Code: J244LM.I3

Core Curriculum Year: 2

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

# Core Curriculum: Course Level and Credit Summary

## **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 - 2011 (S650)*
- *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

## **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

## ***Electrical Safety-Related Work Practices, Level I, Based on the 2015 70E***

Item Code: J444LM.K1

Core Curriculum Year: 2

Core Credits

Advanced Credits

2.0

*Course Prerequisite(s): None*

*Other Prerequisites: None*

*Required Material(s):*

- *Electrical Safety-Related Work Practices Textbook (S744)* • *National Electrical Code - 2014 (S750)*
- *NFPA 70E Textbook (S35915)*

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 Fundamentals of 3-Phase Bolted Fault Currents

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

Item Code: J232LM.K1

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 - 2017 (S950)*
- *Electrical Systems Textbook (S970)*

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 2017 NEC***

Item Code: J232LM.K2

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 - 2017 (S950)*

• *Electrical Systems Textbook (S970)*

- 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 2017 NEC***

Item Code: J227LM.K1

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 - 2017 (S950)*

• *Code Calculations Textbook - 2017 (S00817)*

• *Electrical Systems Textbook (S970)*

- 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

## **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

## **Lighting Essentials, Level I - 2nd Ed.**

Item Code: J259LM.K1

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

1.5

*Course Prerequisite(s): None*

*Other Prerequisites: 4000 Hours of OJT*

*Required Material(s):*

- *Lighting Design Basics Textbook (S599)*

- 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

## ***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.***