

Core Curriculum

4th Year Syllabus

Commercial Curriculum 2020



Core Curriculum: Course Selection Per Year

4th Year Core	
Grounding and Bonding, Level II, Based on the 2017 NEC	2.5
AC Theory, Level III featuring the Electrical Theory Simulator - 2nd Ed.	1
Motors, Level I - 2nd Ed.	0.5
Motors, Level II, Based on the 2017 NEC - 2nd Ed.	1.5
Motors, Level III - 2nd Ed.	2
Motor Control, Level I	3.5
Motor Control, Level II	4
Motor Control, Level III	1.5
Power Quality, Level I	2
Programmable Logic Controllers, Level I	2.5
Photovoltaics, Level I	3
Telephony, Level I	2
Intrusion Detection, Level I - 2nd Ed.	1.5
OSHA 30 Hour	2.5

Core Curriculum: 4th Year Core Courses

	Credits	Page	Date
Grounding and Bonding, Level II, Based on the 2017 NEC			
J210LM.K2	2.5	1	
AC Theory, Level III featuring the Electrical Theory Simulator - 2nd Ed.			
J203LM.J3	1.0	2	
Motors, Level I - 2nd Ed.			
J206LM.J1	0.5	2	
Motors, Level II, Based on the 2017 NEC - 2nd Ed.			
J206LM.J2_17	1.5	3	
Motors, Level III - 2nd Ed.			
J206LM.J3	2.0	4	
Motor Control, Level I			
J209LM.H1	3.5	5	
Motor Control, Level II			
≡ J209IG.H	4.0	6	
Motor Control, Level III			
J209LM.H3	1.5	7	
Power Quality, Level I			
J228LM.I1	2.0	8	
Programmable Logic Controllers, Level I			
J237LM.J1	2.5	9	
Photovoltaics, Level I			
≡ J230IG.J	3.0	10	

Core Curriculum: 4th Year Core Courses

	Credits	Page	Date
Telephony, Level I			
T262LM	2.0	11	
Intrusion Detection, Level I - 2nd Ed.			
J146LM.A1	1.5	12	
OSHA 30 Hour			
≡ J050/J051	2.5	13	

Core Curriculum: Course Level and Credit Summary

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

Item Code: J210LM.K2

Core Curriculum Year: 4

Core Credits

Advanced Credits

2.5

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

Other Prerequisites: None

Required Material(s):

- *Grounding and Bonding Textbook (S36817)*
- *National Electrical Code - 2017 (S950)*
- *Test Instruments Textbook (S471)*
- *Test Instruments Applications Manual (J285AM)*

- 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

AC Theory, Level III featuring the Electrical Theory Simulator - 2nd Ed.

Item Code: J203LM.J3

Core Curriculum Year: Advanced

Core Credits

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

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 2017 NEC - 2nd Ed.

Item Code: J206LM.J2_17

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 - 2017 (S950)*
- *Code Calculations Textbook - 2017 (S00817)*

- 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

Motors, Level III - 2nd Ed.

Item Code: J206LM.J3

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

2.0

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

Other Prerequisites: None

Required Material(s):

- *Motors Textbook (S649)*

Lesson 1	Synchronous Motors
Lesson 2	Braking
Lesson 3	Multispeed Motors
Lesson 4	Adjustable-Speed Drives
Lesson 5	Bearings
Lesson 6	Drive Systems and Clutches
Lesson 7	Motor Alignment
Lesson 8	Troubleshooting Motors
Lesson 9	Special-Application Motors

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: J209IG.H

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 10 Basic Electronics for Motor Control Devices

Lesson 11 More Electronics for Motor Control Devices

Lesson 12 Solid-State Motor Control Pilot Devices

Lesson 13 Solid-State Relays

Lesson 14 Motor Control Centers

Lesson 15 Special Purpose Starters

Lesson 16 Electronic Programmable Timers

Lesson 17 Special Control Components

Lesson 18 AC Motor Speed Control

Core Curriculum: Course Level and Credit Summary

Motor Control, Level III

Item Code: J209LM.H3

Core Curriculum Year: Advanced

Core Credits

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

Core Curriculum: Course Level and Credit Summary

Power Quality, Level I

Item Code: J228LM.I1

Core Curriculum Year: Advanced

Core Credits

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

Programmable Logic Controllers, Level I

Item Code: J237LM.J1

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

2.5

Course Prerequisite(s): Motor Control, Level I

Other Prerequisites: None


Required Material(s):

- ***Programmable Logic Controllers 2nd Ed (S597)***

Lesson 1	Introduction to Programmable Logic Controllers
Lesson 2	PLC System Elements
Lesson 3	PLC Control Panel Implementation and Installation
Lesson 4	Introduction to PLC Programming
Lesson 5	Programming Timers
Lesson 6	Programming Counters
Lesson 7	Mathematical and Move Instructions
Lesson 8	Conversion and Comparison Instructions
Lesson 9	Program Control Instructions
Lesson 10	Indirect and Indexed Addressing
Lesson 11	Data-Handling Instructions
Lesson 12	Sequencer Instructions
Lesson 13	Monitoring Analog Inputs and Controlling Analog Outputs

Core Curriculum: Course Level and Credit Summary

Photovoltaics, Level I

 Item Code: J230IG.J

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

3.0

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

Other Prerequisites: None

Required Material(s):

- *Photovoltaic Systems Textbook, 3rd Ed. (S674)*
- *National Electrical Code - 2011 (S650)*
- *OSHA Standards for the Construction Industry (S125)*

Lesson 1	Introduction to Photovoltaic Systems
Lesson 2	Fundamentals of Solar Radiation
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 11	Inverters
Lesson 14	Electrical Integration I
Lesson 16	Utility Interconnection

Core Curriculum: Course Level and Credit Summary

Telephony, Level I

Item Code: T262LM

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- ***The Harris Handbook on Basic Telephony (S281)***

Lesson 1	Telephone Definitions
Lesson 2	Understanding a Telephone System
Lesson 3	Introduction to Telephone Circuitry
Lesson 4	Basic Telephone Wiring
Lesson 5	Analog Signals vs Digital Signals
Lesson 6	Electronic Key Systems Overview
Lesson 7	Electronic Key Systems Applications
Lesson 8	Electronic Key Systems Components
Lesson 9	Electronic Key Systems Installation
Lesson 10	PBX Telephone Systems
Lesson 11	PBX System Components
Lesson 12	PBX System Installation Requirements
Lesson 13	EKS/PBX Troubleshooting Practices

Core Curriculum: Course Level and Credit Summary

Intrusion Detection, Level I - 2nd Ed.

Item Code: J146LM.A1

Core Curriculum Year: Advanced

Core Credits

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

OSHA 30 Hour

 Item Code: J050/J051

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

2.5

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):