

Core Curriculum

4th Year Syllabus

Commercial Curriculum 2022



Core Curriculum: Course Selection Per Year

4th Year Core		
	Grounding and Bonding, Level II, Based on the 2020 NEC	2.5
	Motors, Level I - 2nd Ed.	0.5
	Motors, Level II, Based on the 2020 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
	Introduction to Network Technologies, Level I	2
	Power Quality, Level I	2
	Photovoltaics, Level I	3
	Introduction to Programmable Logic Controllers	4.5
	Telephony, Level I	2
	Intrusion Detection, Level I - 2nd Ed.	1.5

Core Curriculum: 4th Year Core Courses

	Credits	Page	Date
Grounding and Bonding, Level II, Based on the 2020 NEC			
J210LM.L2	2.5	1	
Motors, Level I - 2nd Ed.			
J206LM.J1	0.5	2	
Motors, Level II, Based on the 2020 NEC - 2nd Ed.			
J206LM.J2_20	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	
Introduction to Network Technologies, Level I			
J145LM.1	2.0	8	
Power Quality, Level I			
J228LM.I1	2.0	9	
Photovoltaics, Level I			
≡ J230IG.J	3.0	10	
Introduction to Programmable Logic Controllers			
J162LM	4.5	11	

Core Curriculum: 4th Year Core Courses

	Credits	Page	Date
Telephony, Level I			
T262LM	2.0	12	
Intrusion Detection, Level I - 2nd Ed.			
J146LM.A1	1.5	13	

Core Curriculum: Course Level and Credit Summary

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

Item Code: J210LM.L2

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 (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

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

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

Introduction to Network Technologies, Level I

Item Code: J145LM.1

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

2.0

Course Prerequisite(s): Structured Cabling, Level I

Other Prerequisites: None

Required Material(s):

- ***Introduction to Network Technologies Textbook (S582)***

Lesson 1	Introduction to Networking
Lesson 2	Overview of Networking Components
Lesson 3	Understanding the OSI Model
Lesson 4	Ethernet
Lesson 5	Understanding Wireless Networking
Lesson 6	IPv4
Lesson 7	IPv6
Lesson 8	Networking Protocols

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

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

Introduction to Programmable Logic Controllers

Item Code: J162LM

Core Curriculum Year: Advanced

Core Credits

Advanced Credits

4.5

Course Prerequisite(s): Motor Control, Level I

Other Prerequisites: None

Required Material(s):

- ***Intro to Programmable Logic Controllers Textbook (S531)***

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

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