Core Curriculum

2nd Session Syllabus

2025-2026 2nd year only

electrical training
IBEW - NECA
ALLIANCE

electrical training
IBEW - NECA
ALLIANCE
electrical training ALLIANCE

Core Curriculum: Course Selection Per Session

2nd Session Core	
IBEW Orientation	1
Conduit System Fabrication 2 - CML	4
Code, Standards, and Practices 1, Based on the 2023 NEC - CML	1.5
Electrical Theory 2: AC Systems - CML	3
Code, Standards, and Practices 2, Based on the 2023 NEC - CML	4
Electrical Theory 3: Alternating Current - CML (**Instructor Preview Only**)	12
Fundamental Code Calculations, Based on the 2023 NEC - CML	2.5
Code, Standards, and Practices 3, Based on the 2023 NEC - CML	2.5
Code, Standards, and Practices 6, Based on the 2023 NEC - CML	1.5
Electrical Safety-Related Work Practices, Based on the 2024 70E - CML	4
Transformer Principles and Applications 1 - CML	3
Transformer Principles and Applications 2 - CML	3
Transformer Code Calculations, Based on the 2023 NEC - CML	2
Electrical Industry Applications Manual, Lesson 5 - Proper Device Installation Techniques, GFCI Rough-In	0.25
Electrical Industry Applications Manual, Lesson 6 - Using Anchors to Install a Metal Enclosure	0.25
Electrical Industry Applications Manual, Lesson 10 - Erecting an Extension Ladder	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 15 - Threading Conduit (Tapered Thread)	0.25
Electrical Industry Applications Manual, Lesson 16 - Installing Flexible Metallic Conduit	0.25
Electrical Industry Applications Manual, Lesson 17 - Installing Armor Clad and Metal Clad Cables	0.25
Electrical Industry Applications Manual, Lesson 20 - Wire Pulling Techniques	0.25

Core Curriculum: 2nd Session Core Courses

Notes:

	Credits	Page	Date
IBEW Orientation			
J200LM.J3	1.0	1	
Conduit System Fabrication 2 - CML			
J204LM.I2	4.0	2	
Code, Standards, and Practices 1, Based on the 2023 NEC - CML			
J231LM.N	1.5	2	
Electrical Theory 2: AC Systems - CML			
J103LM.M	3.0	3	
Code, Standards, and Practices 2, Based on the 2023 NEC - CML			
J232LM.N1	4.0	3	
Electrical Theory 3: Alternating Current - CML (Instructor Preview Only**)**			
J203LM.M	12.0	4	
Fundamental Code Calculations, Based on the 2023 NEC - CML			
J227LM.N1	2.5	5	
Code, Standards, and Practices 3, Based on the 2023 NEC - CML			
J233LM.N	2.5	6	
Code, Standards, and Practices 6, Based on the 2023 NEC - CML			
J236LM.N	1.5	7	
Electrical Safety-Related Work Practices, Based on the 2024 70E - CML			
J444LM.N	4.0	7	
Transformer Principles and Applications 1 - CML			
J205LM.J1	3.0	8	

Core Curriculum: 2nd Session Core Courses

Notes:

	Credits	Page	Date
Transformer Principles and Applications 2 - CML			
J205LM.J2	3.0	9	
Transformer Code Calculations, Based on the 2023 NEC - CML			
J227LM.N4	2.0	9	
Electrical Industry Applications Manual, Lesson 5 - Proper Device Installation			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 6 - Using Anchors to Install a Metal			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 10 - Erecting an Extension Ladder			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 13 - Cutting a Hole in a Metal Enclosure			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 15 - Threading Conduit (Tapered			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 16 - Installing Flexible Metallic Conduit			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 17 - Installing Armor Clad and Metal			
Ξ J300.K	0.25	10	
Electrical Industry Applications Manual, Lesson 20 - Wire Pulling Techniques			
Ξ J300.K	0.25	10	

Core Curriculum: Course Level and Credit Summary

IBEW Orientation

Item Code: J200LM.J3

Core Curriculum Year: 2	Core Credits	Advanced Credits
	1.0	

Course Prerequisite(s): Introduction to Apprenticeship

Other Prerequisites: None

Required Material(s):

Lesson 1	Becoming Familiar with the IBEW Constitution
Lesson 2	Understanding Your Local Union By-Laws
Lesson 3	Parliamentary Procedure and How It Works
Lesson 4	An Introduction to The COMET Program

Conduit System Fabrication 2 - CML

Item Code: J204LM.I2

Core Curriculum Year: 2	Core Credits	Advanced Credits
	4.0	

Course Prerequisite(s): Conduit Fabrication, Level I

Other Prerequisites: None

Required Material(s):

- ***Conduit Bending and Fabrication Textbook (S495)***

Lesson 1	Mechanical and Electric Benders
Lesson 2	Hydraulic Benders
Lesson 3	Advanced Bending Techniques
Lesson 4	Resources
Lesson 5	Support - Labs

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 1, Based on the 2023 NEC - CML

Item Code: J231LM.N

Core Curriculum Year: 2	Core Credits	Advanced Credits
	1.5	

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2023 (S1150)***
- ***Electrical Systems Textbook (S1170)***

Lesson 1	Introduction to the *NEC*
Lesson 2	Interpreting Language of the *NEC*
Lesson 3	Understanding and Applying Article 110

Electrical Theory 2: AC Systems - CML

Item Code: J103LM.M

Core Curriculum Year: 2	Core Credits	Advanced Credits
	3.0	

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

Other Prerequisites: None

Required Material(s):

- ***AC Theory Textbook (S641)***
- ***DC Theory Textbook (S640)***
- ***TI-30X IIS Solar Calculator (S159)***
- ***Student Notebook 2 (N203)***

Lesson 1	Electrical Theory Review
Lesson 2	Effects of Electromagnetism
Lesson 3	DC Theory Review
Lesson 4	Circuit Calculations for Basic Two-Wire Systems
Lesson 5	Understanding Vectors
Lesson 6	Elements of AC Generation
Lesson 7	Resources
Lesson 8	Support - Labs

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 2, Based on the 2023 NEC - CML

Item Code: J232LM.N1

Core Curriculum Year: 2	Core Credits	Advanced Credits
	4.0	

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

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2023 (S1150)***
- ***Electrical Systems Textbook (S1170)***

Lesson 1	An Introduction to Branch Circuits
Lesson 2	Feeders and Outside Branch Circuits
Lesson 3	Services
Lesson 4	Conduit Raceway Basics
Lesson 5	*NEC* Requirements for Cable Assemblies
Lesson 6	General Requirements for Wiring Methods and Materials
Lesson 7	Conductors for General Wiring

Core Curriculum: Course Level and Credit Summary

*Electrical Theory 3: Alternating Current - CML (**Instructor Preview*

Item Code: J203LM.M

Core Curriculum Year: 2	Core Credits	Advanced Credits
	12.0	

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

Other Prerequisites: None

Notifications:

Course coming soon.

Required Material(s):

- ***AC Theory Textbook (S641)***
- ***TI-30X IIS Solar Calculator (S159)***
- ***Student Notebook 2 (N203)***

Lesson 1	Introduction to Alternating Current
Lesson 2	Inductors, Inductance, XL, L, and RL
Lesson 3	Capacitors, Capacitance, X_C, C, and RC
Lesson 4	Series LC and RLC Circuits
Lesson 5	Lesson 5: Parallel RL, RC, RLC, and LC Circuits
Lesson 6	Comparing Series and Parallel RLC Circuits and Analyzing Combination RLC Circuits
Lesson 7	Introduction to AC Applications
Lesson 8	Resources
Lesson 9	Support - Labs

Core Curriculum: Course Level and Credit Summary

Fundamental Code Calculations, Based on the 2023 NEC - CML

Item Code: J227LM.N1

Core Curriculum Year: 2 | Core Credits: 2.5 | Advanced Credits

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

Other Prerequisites: None

Required Material(s):

- *National Electrical Code - 2023 (S1150)*
- *Code Calculations Textbook - 2023 (S00823)*
- ***Electrical Systems Textbook (S1170)***

Lesson 1	Beginning to Calculate Conductor Ampacity
Lesson 2	Determining Conductor Ampacity
Lesson 3	Special Ampacity Considerations
Lesson 4	Finalizing Ampacity Calculations
Lesson 5	Calculating Voltage Drop in Feeders and Branch Circuits
Lesson 6	Identifying Boxes and Fittings as Defined by the *NEC*
Lesson 7	Performing Box Size and Fill Calculations
Lesson 8	Calculating Raceway Fill

Core Curriculum: Course Level and Credit Summary

Code, Standards, and Practices 3, Based on the 2023 NEC - CML

Item Code: J233LM.N

Core Curriculum Year: 2	Core Credits	Advanced Credits
	2.5	

Course Prerequisite(s): Elect. Code Calc., Lvl I or FCC CML; Code, Standards, and Practices 2, Level II

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2023 (S1150)***

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

Code, Standards, and Practices 6, Based on the 2023 NEC - CML

Item Code: J236LM.N

Core Curriculum Year: Advanced	Core Credits	Advanced Credits
		1.5

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

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2023 (S1150)***

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

Core Curriculum: Course Level and Credit Summary

Electrical Safety-Related Work Practices, Based on the 2024 70E - CML

Item Code: J444LM.N

Core Curriculum Year: 2	Core Credits	Advanced Credits
	4.0	

Course Prerequisite(s): None

Other Prerequisites: None

Required Material(s):

- ***Electrical Safety-Related Work Practices Textbook (S1044)***

Lesson 1	Electrical Safety Culture
Lesson 2	Electrical Hazard Awareness
Lesson 3	Introduction to OSHA and the Control of Hazardous Energy
Lesson 4	Introduction to *NFPA 70E*®
Lesson 5	Work Involving Electrical Hazards
Lesson 6	Fault Current Fundamentals
Lesson 7	Identifying Overcurrent Protective Device Types
Lesson 8	Methods to Select Arc Flash PPE
Lesson 9	Maintenance Considerations
Lesson 10	Eliminating or Reducing Hazards by Design and Upgrades

Transformer Principles and Applications 1 - CML

Item Code: J205LM.J1

Core Curriculum Year: 2	Core Credits	Advanced Credits
	3.0	

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

Other Prerequisites: None

Required Material(s):

- ***Transformer Principles and Applications Textbook (S576)***

Lesson 1	Transformer Operation
Lesson 2	Transformer Classification
Lesson 3	Single-Phase Transformer Connections
Lesson 4	3-Phase Transformer Connections
Lesson 5	Resources
Lesson 6	Support - Labs

Transformer Principles and Applications 2 - CML

Item Code: J205LM.J2

Core Curriculum Year: 2	Core Credits	Advanced Credits
	3.0	

Course Prerequisite(s): Transformers 1 CML

Other Prerequisites: None

Required Material(s):

- ***Transformer Principles and Applications Textbook (S576)***

Lesson 1	Power Generation and Distribution
Lesson 2	Harmonics
Lesson 3	Autotransformers
Lesson 4	Buck-Boost Transformers
Lesson 5	Special Transformers
Lesson 6	Resources
Lesson 7	Support - Labs

Transformer Code Calculations, Based on the 2023 NEC - CML

Item Code: J227LM.N4

Core Curriculum Year: 2	Core Credits	Advanced Credits
	2.0	

Course Prerequisite(s): Elect. Code Calc., Lvl I or FCC CML; Transformers 1 CML

Other Prerequisites: None

Required Material(s):

- ***National Electrical Code - 2023 (S1150)***
- ***Code Calculations Textbook - 2023 (S00823)***

Lesson 1	Understanding the Basics
Lesson 2	Understanding Transformer Overcurrent Selection
Lesson 3	Transformer Overcurrent Protection with Associated Secondary Conductor Rules
Lesson 4	Special Scenarios in Transformer Protection and Conductor Sizing

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 session, and four out of the remaining Applications to be presented to students during the second session. Any Applications presented above the four per session must be matched with additional classroom time beyond 180 hours.