To address the need for one standardized and nationally recognized Power Line Worker curriculum, NCCER has developed Power Line Worker Level One. Common to transmission, distribution, and substation, Power Line Worker Level One addresses the fundamental aspects of power line work to include safety, electrical theory, climbing techniques, aerial framing and rigging, and operating utility service equipment. After Level One, the training program diverges into the three specialty areas (transmission, distribution, and substation) for two additional years of skills training.

Climbing Wooden Poles (80 Hours)
(Module ID 49105-11) Describes how to safely climb a wooden utility pole. Covers climbing equipment, inspection of equipment, pole inspection, climbing techniques, and pole-top rescue.

Climbing Structures Other Than Wood (40 Hours)
(Module ID 49106-11) Explains the equipment, safety practices, and climbing techniques required to climb towers. Hazards associated with the environment, such as snakes, birds, insects, and weather hazards, are also covered.

Tools of the Trade (10 Hours)
(Module ID 49107-11) Covers the specialized tools used by line workers, including hot sticks, as well as universal tool accessories. Also covers ladders and work platforms; crimpers; cable cutters; pneumatic tools; and powder-actuated tools.

Aerial Framing and Associated Hardware (80 Hours)
(Module ID 49108-11) Explains how to install guys to support a utility pole, as well as how to install the equipment on the pole to support conductors. Includes procedures for the installation of cross-arms, transformers, and conductors.

Utility Service Equipment (75 Hours)
(Module ID 49109-11) Provides descriptions and operations instructions for use of the digger derrick, bucket truck, crane truck, and aerial lift. Also covers safety requirements; inspection and maintenance; driving and setup operations; and emergency procedures.

Rigging (12.5 Hours)
(Module ID 49110-11) Explains how to select and use rigging equipment. Covers common rigging equipment and rigging methods that are likely to be used by power line workers. Also covers hand signals and other methods of communication between the rigger and the crane operator.

Setting and Pulling Poles (20 Hours)
(Module ID 49111-11) Provides instructions for the storage, loading, and transport of wooden utility poles. Includes use of the digger derrick to dig the hole and install the pole. Also covers pole removal using a hydraulic jacking device.

Trenching, Excavating, and Boring Equipment (7.5 Hours)
(Module ID 49112-11) Covers the use and maintenance of trenching equipment, backhoes/loaders, and horizontal directional drilling equipment for the installation of direct-buried power lines. Includes a review of safety guidelines related to buried utilities.

Introduction to Electrical Test Equipment (7.5 Hours)
ISBN 978-0-13-266338-0
(Module ID 49113-11) Introduces the basic test equipment used by electrical workers to test and troubleshoot electrical circuits. Also covers specialized line worker test equipment, including the high-voltage detector, phase rotation tester, megohmmeter, phasing stick, and hi-pot tester.
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

### L2 POWER LINE WORKER: DISTRIBUTION

- **Curriculum Notes**
  - 157.5 Hours
  - Published: 2011
  - Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

**PAPERBACK**
Trainee Guide: $99.99

**MODULUS**
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Alternating Current and Three-Phase Systems
(Module ID 80201-11) Introduces the development of both single- and three-phase alternating current. Analyzes the balance of AC phases and introduces key components used to refine AC power. Discusses the operation of transformers and introduces advanced AC concepts such as reactive power and the power factor.

- **ISBN 978-0-13-274259-7**

#### Aerial Distribution Equipment
(Module ID 80202-11) Identifies the various equipment components found on overhead distribution system poles and describes the function of each, including transformers, reclosers, fuses, sectionalizers, capacitor banks, and voltage regulators.

- **ISBN 978-0-13-274260-3**

#### Cable and Conductor Installation and Removal
(Module ID 80203-11) Describes the types of conductors and cables used in overhead and underground residential distribution systems and the equipment and procedures used to install and remove them. Includes methods used to splice conductors.

- **ISBN 978-0-13-274261-0**

#### Live-Line Work
(Module ID 80301-12) Covers tools such as hot sticks, shotgun sticks, and wire tongs, along with the PPE and safe work practices that are critical elements of live line and bare hand work. Includes coverage of various live-line tasks such as different methods of moving conductors and replacing insulators, cross-arms, and poles.

- **ISBN 978-0-13-296759-4**

#### Three-Phase URD Systems
(Module ID 80302-12) Covers safety practices associated with three-phase URD systems; describes vault and manhole applications; and explains different transformer configurations and sectionalizing equipment used in three-phase URD systems. Also covers three-phase cables and how cable is pulled through conduit.

- **ISBN 978-0-13-296760-0**

#### Introduction to Smart Grids
(Module ID 80303-12) Provides an overview of monitoring and protection systems and reviews the key components that make them work. Describes feeder diagrams and their use in locating and identifying components.

- **ISBN 978-0-13-296761-7**

#### Electricity Demand
(Module ID 80304-12) Covers basic leadership skills and explains different leadership styles, communication, delegating, and problem solving. Jobsite safety and the crew leader's role in safety are discussed, as well as project planning, scheduling, and estimating. Includes performance tasks to assist the learning process.

- **ISBN 978-0-13-296762-4**

### L3 POWER LINE WORKER: DISTRIBUTION

- **Curriculum Notes**
  - 145 Hours
  - Published: 2012
  - Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

**PAPERBACK**
Trainee Guide: $99.99

**MODULUS**
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Introduction to Substations
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**(20 Hours)**

#### Live-Line Work
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**(40 Hours)**

#### Troubleshooting
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**(40 Hours)**

#### System Protection and Monitoring
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**(7.5 Hours)**

#### Live-Line Work
---
**(40 Hours)**

#### Troubleshooting
---
**(40 Hours)**

#### System Protection and Monitoring
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**(7.5 Hours)**

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**Continued on following page**
Power Line Worker: Substation Level 2

**MODULES**

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only. 

**Introduction to Substations** (10 Hours)  
ISBN 978-0-13-296779-2 (Module ID 82201-12) Provides an overview of the different types and functions of substations. Identifies the various voltage classes and introduces the primary equipment and components found in substations. Safe work practices and access issues related to substations are presented, as well as an introduction to one-line diagrams.

**Managing Electrical Hazards** (12.5 Hours)  
ISBN 978-0-13-294869-2 (Module ID 26501-12; from Power Line Worker: Distribution Level Two) Introduces the development of both single- and three-phase alternating current. Analyzes the relationship of AC phases and introduces key components used to refine AC power. Discusses the operation of transformers and introduces advanced AC concepts such as reactive power and the power factor.

**Conductors and Cables** (10 Hours)  
ISBN 978-0-13-296780-8 (Module ID 82202-12) Identifies the many types, sizes, and applications of conductors and cables. Fiber-optic cable is also introduced. Reviews the use of cable drawings and schedules. Provides coverage of the methods of routing cables underground in the substation environment.

**Cable Tray** (7.5 Hours)  

**Conduit Bending** (15 Hours)  

**Conductor Installations** (10 Hours)  

**Conductor Terminations and Splicing** (7.5 Hours)  

**Alternating Current and Three-Phase Systems** (17.5 Hours)  
ISBN 978-0-13-274259-7 (Module ID 80201-12; from Power Line Worker: Distribution Level Two) Introduces the development of both single- and three-phase alternating current. Analyzes the relationship of AC phases and introduces key components used to refine AC power. Discusses the operation of transformers and introduces advanced AC concepts such as reactive power and the power factor.

**Grounding Systems** (12.5 Hours)  

**Grades** (15 Hours)  

**Concrete Work** (35 Hours)  
ISBN 978-0-13-296783-9 (Module ID 82204-12) Provides comprehensive coverage of concrete pouring and finishing techniques. Includes detailed information on concrete types and their uses. Form layout and construction, along with basic surveying skills, is presented. Also provides detailed coverage of rebar types and their common geometric forms.

**Mechanical Construction Methods and Materials** (17.5 Hours)  
ISBN 978-0-13-296784-6 (Module ID 82205-12) Covers the diverse types of substation structures and their composition. Identifies components commonly supported by structures and the various bus forms and materials of construction. Includes thorough coverage of threaded fasteners along with mechanical torquing tools and procedures.

**Intermediate Rigging** (70 Hours)  

**Medium- and High-Voltage Equipment Installation** (25 Hours)  
ISBN 978-0-13-296792-1 (Module ID 82302-12) Presents the typical installation procedures for primary substation components. Identifies the common and unique factors related to the proper installation of transformers, circuit breakers, capacitors, reactors, bus systems, and insulators. A discussion of corona and how proper installation techniques can prevent it is also included.

**Control House** (20 Hours)  
ISBN 978-0-13-296793-8 (Module ID 82303-12; from Intermediate Rigger, Second Edition) Provides an overview of the substation control house and its function in the substation. The components and protective systems generally contained within a control house are examined, including the essential DC power systems and emergency power supplies. Coverage of racking systems and their layout is also included.

*Continued on following page*
Connectors, Conductor Terminations, and Splicing (25 Hours)
(Module ID 82304-12) Describes the procedures and materials required to prepare and complete terminations and splices on insulated and non-insulated conductors and cables. Coverage is provided for both medium- and high-voltage circuits. Hydraulic presses and crimpers are introduced, along with hi-pot testing procedures for terminations and splices.

Equipment Testing and Maintenance (30 Hours)
(Module ID 82305-12) Identifies the testing procedures required and explains how to properly maintain substation components. Coverage of testing and maintenance procedures is provided for power transformers, potential devices, various circuit breakers, disconnects and switches, capacitors, and reactors.

System Protection and Control (12.5 Hours)
(Module ID 82306-12) Describes the protective functions required in the substation environment to defend against overloads, fault currents, and other incidents that can disrupt service or damage the system. Offers coverage of the components used to provide both protection and system control. An introduction to the various protective relay schemes used in today’s substations is included.

Alternating Current and Three-Phase Systems (17.5 Hours)
(Module ID 80201-11; from Power Line Worker: Distribution Level Two) Introduces the development of both single- and three-phase alternating current. Analyzes the relationship of AC phases and introduces key components used to refine AC power. Discusses the operation of transformers and introduces advanced AC concepts such as reactive power and the power factor.

Transmission Structure Rigging (17.5 Hours)
(Module ID 81201-11) Covers rigging equipment and practices specific to transmission structures. Coverage includes slings, crane stability, and the safe use of personnel platforms.

Transmission Structure Erection (50 Hours)
(Module ID 81202-11) Describes the erection requirements for various types of transmission structures, including steel towers, wood structures, and different types of poles. Covers general construction requirements, as well as right-of-way clearing, foundations, framing and erection, guying and anchoring, and grounding and bonding.

Construction, Maintenance, and Repair – Live-Line Barehand (40 Hours)
(Module ID 81301-12) Describes the methods used to work on live transmission lines by bonding to the line. Covers safety practices and PPE, and includes coverage of bonded buckets, non-conductive suits, insulated ladders, banding jumpers, and rescue procedures.

Reconductoring Transmission Lines (40 Hours)
(Module ID 81302-12) Describes the replacement of existing transmission conductors as contrasted with installation of new conductors. Coverage includes pulling equipment setup, guard structures, and permit requirements. Includes live-line replacement as well as use of the existing conductors to pull the replacement conductors.

Fundamentals of Crew Leadership (20 Hours)
(Module ID 46101-11, Second Edition) Covers basic leadership skills and explains different leadership styles, communication, delegating, and problem solving. Jobsite safety and the crew leader’s role in safety are discussed, as well as project planning, scheduling, and estimating. Includes performance tasks to assist the learning process.

Transmission Equipment Installation (50 Hours)
(Module ID 81203-11) Focuses on the safe installation of insulators and conductors. Coverage includes stringing and splicing of conductors, conductor terminations, conductor sagging, clipping in, and the installation of accessories such as vibration dampers, spacers, warning lights, and day markers.

Transmission System Maintenance (40 Hours)
(Module ID 81204-11) Coverage includes safety practices related to working with helicopters, as well as inspection of insulators, towers, and poles. Discusses clearance procedures and environmental concerns such as protection of wetlands, waterways, and wildlife.

L2 POWER LINE WORKER: TRANSMISSION

Curriculum Notes

- 175 Hours
- Published: 2011
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK
Trainee Guide: $99.99
978-0-13-273033-4

MODULES
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

L3 POWER LINE WORKER: TRANSMISSION

Curriculum Notes

- 200 Hours
- Published: 2012
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK
Trainee Guide: $99.99
978-0-13-294867-8

MODULES
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Construction, Maintenance, and Repair – Live-Line Barehand (40 Hours)
(Module ID 81301-12) Describes the methods used to work on live transmission lines by bonding to the line. Covers safety practices and PPE, and includes coverage of bonded buckets, non-conductive suits, insulated ladders, banding jumpers, and rescue procedures.

Construction, Maintenance, and Repair – Hot Stick (80 Hours)
(Module ID 81303-12) Covers tools such as hot sticks, shotgun sticks, and wire ropes, along with the PPE and safe work practices that are critical elements of live-line and bare-hand work. Includes coverage of live-line tasks such as replacing insulators, cross-arms, and spacers.

Lift Planning (40 Hours)
(Module ID 38302-11; from Advanced Rigger, First Edition) Discusses lift plan implementation, including reference information, calculations, single- and multiple-cranes lifting, critical lifts, and engineering considerations.