
Lineman
Program Duration: 4 Years (48 Months)
(Revision Date: August 2023)

The following is an outline of the subjects to be covered in the supplementary classroom and home study training:

<u>Process</u>	<i>Overhead</i>	<u>Hours</u>
Framing, installation and removal of poles, arms guys, fixtures, conductors		1380
Repairing fixtures and conductors		700
Stringing and sagging conductors		380
Install pole mounted switches, cutouts, and special devices		340
OH transformers – install and connect		280
OH services – install and connect		180
Live line work – hot stick		300
Live line work - rubber goods		200
Transmission work experience		490
	Total Overhead Hours	4,250

<u>Process</u>	<i>Underground</i>	<u>Hours</u>
UG primary cable – installing, splicing, and terminating		1,250
UG switches – installing or repairing		200
UG transformers – install and connect		350
UG services – install and connect		200
Hot stick primary – switching, phasing, sensing, etc.		120
Rubber glove – 600V and below		120
	Total Underground Hours	2,240

Process

Safety

Safety meetings, safety rule book, CPR, and first aid	48
Pole top and vault rescue	12
Total Safety Hours	60

Process

General

Use and operation of line trucks and aerial lift equipment	320
Company standards (OH & UG line construction)	40
Install and repair street lighting	5
Use of voltmeters, phase sequence indicators	5
Field switching (procedures and clearances)	120
System control rotation	40
Electric meter operations rotation	10
Substation, system protection and transformer shop rotation	150
Installation of substructures (with Inspector)	40
Troubleshooting & trouble rotation	120
Supplementary training	600
Total General Hours	1,450

Total OJT Hours Recommended 8,000

First Six Months (0 months to 6 months)

Apprentice will receive orientation of their on-the-job (OJT) card completion and submission along with how to properly complete his/her timecard.

Apprentice should be assigned to an overhead crew and should be allowed to climb as much as possible. It is the responsibility of foreman to ensure apprentice receives this experience. Apprentice will be restricted to all types of line work on de-energized equipment, working with or under the direct supervision of company foreman or company journeyman, excluding contracted employees.

Apprentice may be rotated among overhead and underground crews to gain a varied experience.

Apprentice will be required to attend a one-day class to study effective listening skills and field ambassador training.

Apprentice will be required to attend a five-day class to study basic electricity, secondary and metering. Apprentice will be required to pass a test demonstrating knowledge learned in the course.

Second Six Months (6 months to 1 Year)

Working with or under the direction of a company foreman or company journeyman, excluding contracted employees, apprentice will perform all types of line work on de-energized equipment and on energized lines and equipment not to exceed 600 volts (hot secondary).

Apprentice will be required to attend a five-day basic transformer class. Apprentice will be required to successfully complete a written test at the end of class.

Third Six Months (1 Year to 1.5 Years)

Working with or under the direction of a company foreman or company journeyman, excluding contracted employees apprentice will perform all types of line work on de-energized equipment and on energized lines and equipment not to exceed 600 volts (hot secondary).

Apprentice will be required to attend a 10-day advanced transformer class. Apprentice will be required to successfully complete a test demonstrating knowledge learned in the course.

Apprentice will attend a two-day class on construction standards, how to read work orders, how to check materials and mapping. Apprentice will be required to successfully complete a test demonstrating knowledge learned in the course.

Apprentice will be required to attend a fifteen-day hot stick / rubber gloving class and will be required to successfully complete a test demonstrating knowledge learned in the course.

Fourth Six Months (1.5 Years to 2 Years)

Apprentice may begin to work on energized primary lines based upon a written recommendation from his/her foreman, supervisor and after having successfully passed a proficiency evaluation. This evaluation will cover only those areas apprentice has been exposed to, had classes on or is covered in the home study coursework. Apprentice should be assigned to work with a company journeyman and/or company foreman, excluding contracted employees, on all types of overhead and underground line work. This shall include as much hot line work as possible, in accordance with company safety rules. Apprentice will become proficient in the use of live line tools, rubber goods and all personal protective equipment (hot primary).

Based upon apprentice's ability, he/she may begin hot primary work at any time during this fourth step. However, if apprentice's ability has not reached this level by the end of fourth step, apprentice will be frozen until able to do so. The freeze shall be in accordance with the Apprenticeship Agreement (Section II F.).

Fifth Six Months (2 Years to 2.5 Years)

Apprentice will be required to attend a five-day class on transmission line maintenance and equipment. Transmission rotations will be scheduled throughout their apprenticeship and shall be completed by the eighth step. The time with the transmission crew is to be coordinated with leadership to ensure the work being done is of a learning nature and will be of a benefit to the apprentice.

Apprentice will be required to attend a five-day switching class. Apprentice will be required to successfully complete a test demonstrating knowledge learned in the course.

Apprentice will be permitted to be scheduled to work with inspector, troubleman, system control, substation, system protection, transformer shop and electric meter operations. The hours for each group to be completed by eighth step.

Sixth Six Months (2.5 Years to 3 Years)

Apprentice will be required to attend a 5-day review class on transformers, hot sticks, and related equipment. Apprentice will be required to complete a hands-on demonstrated test.

Seventh Six Months (3 Years to 3.5 Years)

Apprentice will be required to attend a three-day grounding and bonding class.

Apprentice will be required to attend a five-day overhead procedures class.

Apprentice will be required to attend a three-day underground operating procedures class.

Eighth Six Months (3.5 Years to 4 Years)

Apprentice will be required to attend a five-day journeyman top out prep test class. This class will help prepare apprentice for their one-day journeyman top out test. During the last six months of the apprenticeship no additional formal curriculum is required. This timeframe will be used to reinforce hours, demonstrate on the job skills and prepare for journeyman status.

During apprentice's last six months, he/she will be given the responsibility of job planning and leading the crew through completion of the job. This will be scheduled and coordinated by supervisor and will be evaluated by foreman and supervisor.

By the end of the eighth month, the apprentice will have completed 490 hours with transmission, 40 hours with inspection, 120 hours with troubleman, 40 hours with system control, and 150 hours with substation, system protection and transformer shop, and 10 hours with electric meter operations.

General

In conjunction with the performance of work assignments, instruction on the following safety practices will be included with the on-the-job and classroom training:

- Care and use of personal tools
- Care and use of crew tools and equipment, proper operation of aerial and line trucks
- Field switching and line clearance
- Clearing and grounding of lines and equipment
- Care and use of hot line tools
- Care and use of protective equipment, rubber goods, etc.
- Pole top and vault rescue
- Company electric construction standards
- Basic first aid and CPR
- Tailboard briefings
- Climbing instructions and practice

Apprentices should be encouraged to discuss their problems with their foremen, supervisors and instructors. Foremen, supervisors and instructors will assist and encourage apprentice in their work.

Supplementary Classroom Training

There will be two kinds of supplementary training provided: (1) a supplementary study course to take place on the apprentice's own time, and (2) a supplementary training course on company time. Supplementary study and training will be in an amount at least equal to 600 hours.

1. Supplementary Study Course –

Shall be that course known as the “Electrical Apprenticeship Training: Outside”, developed by the IBEW – NECA, as amended by agreement between union and company members of the JATC-1245.

A copy of the “Electrical Apprenticeship Training: Outside” and the reference textbooks needed will be supplied by the company to each apprentice assigned to the apprentice lineman classification at no cost to the apprentice, but with the requirement that the books supplied shall remain the property of company until the apprenticeship is successfully completed. At that time, the books will become the property of the apprentice.

Company will provide a classroom and instructor to meet with the apprentice and provide instruction and review for the course on a scheduled basis, such schedule to prove those classes will be held for up to six (6) hours, meeting once per month.

Apprentice shall study prepared lesson units and complete checkup questions on his/her own time; however, apprentice may be given the unit test bi-monthly. If the apprentice does not show up to class with lesson units completed or pass test, his/her progress may be reviewed by JATC-1245 who will recommend freezing the apprentice pursuant to Apprenticeship Agreement (Section II F.). Additionally, apprentice may be restricted from attending monthly class if not fully prepared and would require scheduling make-up class later.

Apprentice records, progress records and records of examination grade will be made by instructor. Records shall be kept on file in the training department. Records shall be available to the apprentice, instructors, union's business representative and to the members of the JATC-1245. All permanent apprenticeship records shall be forwarded in accordance with apprenticeship agreement and JATC-1245 procedures.

2. Supplementary Training Course –

Training department will be responsible for coordinating and ensure scheduling of specified training in conjunction with supervisors. Training shall consist of either classroom training or “in-the-field” training on such subjects as climbing, use and care of hot line tools, rigging, basic electric theory, safety, first aid, pole top and vault rescue, CPR, care and inspection of tools and equipment, use and care of personal protective equipment, transformer hookups, reading and understanding mapping, basic metering, switching procedures, overhead procedures, underground procedures, etc., and shall be made available to the apprentice on a scheduled basis of not less than ten work days per year with qualified instructors provided by the company.

Apprentice records, progress records and records of examination grade will be made by instructor. Records shall be kept on file in the training department. Records shall be available to the apprentice, instructors, union's business representative and to the members of the JATC-1245. All permanent apprenticeship records shall be forwarded in accordance with apprenticeship agreement and JATC-1245 procedures.

Tests

Grading of tests shall be done by the instructor. The apprentice shall be notified of grades earned. Lesson tests determine the apprentice's progress in the supplementary study course and shall be given upon completion of each lesson of the course and shall be prescribed for the course or as approved by the training department. The grades shall be made a part of the apprentice's record.

In an effort for an apprentice to top out, the following guidelines may be used; apprentice will be given a final test before topping out, a written and demonstrated skills test will be the company's journeyman lineman test or its equivalent, and written test will be administered within apprentices last month prior to his/her completion date.

Learning References

The apprentice will be instructed on the lessons contained in the IBEW - NECA Program. As part of the lessons, the following reference and study materials will be used to supplement the required lessons.

Building a Foundation in Mathematics
2nd ED. By NJATC/Delmar Cengage Learning

Promoting a Culture of Safety in the Electrical Industry
By NJATC

Underground Distribution
2nd ED. By NJATC/ Alexander Publishing

The Lineworkers Rigging Handbook
2nd ED. By NJATC/ Alexander Publishing

The Guidebook for Linemen and Cablemen
By Wayne Van Soelen

D.C. Theory
2nd ED. By NJATC/Delmar Cengage Learning

Transformation for Lineworkers
2nd ED. By NJATC/Delmar Cengage Learning

Test Instruments
By Glen Mazur

Terminations & Splicing Theory- Practice
4th ED. By NJATC Special Printing

Flaggers Certification Handbook
2005 ED. By Evergreen Safety Council

Distribution Volume I; Transformer Theory for Line People
1983 ED. By Robert A. Billing/NJATC Special Printing

A.C. Theory
3rd ED. By NJATC/Delmar Cengage Learning

Substation Construction Guidelines
1st ED. By NJATC/ Alexander Publishing

Personal Protective Grounding for Worker Safety
By NJATC

Live Line Work Practices
2nd ED. By Alexander Publishing

"Hot Sticks" A Manual on High Voltage Line Maintenance
Rev. 9/95 By A.B. Chance

Distribution Volume II; Capacitors, Regulators, Circuit Protection
1987 ED. By Robert A. Billing/NJATC Special Printing

Reference Guide to Fiber Optics
2009, 2013 ED. By NJATC & FOA

Subsequent edition/volume changes of textbooks are approved for use through the discretion of the program.

First Year Lineman Apprentice
First Six Months

Outside 1st Year, Level I – ProTech Skills Institute **30 hours**

This course begins with a lesson that instructs the student on how to study the course and gives helpful pointers on negotiating the course materials. The next lessons present the responsibilities of the apprentice and the advantages of an IBEW/NECA apprenticeship. Other lessons teach the student about safety and hazard awareness and how to identify and care for basic tools of the trade. An introduction to OSHA is given and then the last lessons cover topics such as fall protection, climber cutouts, climbing poles, and pole top and bucket rescues.

National Electrical AJATC Course Test 1-1 **2 hours**

Outside 1st Year, Level II – ProTech Skills Institute **30 hours**

This course covers a wide variety of topics. Students learn about how to avoid sexual harassment and the dangers of drug use. They also gain a thorough understanding of the history of the IBEW and NECA. Lessons cover the care and use of rubber gloves and protective line devices. The apprentice will learn how to work in a confined space and how to work with powered equipment, wood poles, and energized circuits. Safety topics and hand signals will also be covered.

National Electrical AJATC Course Test 1-2 **2 hours**

Outside 1st Year, Level III – ProTech Skills **30 hours**

The course opens with an introduction to whole numbers, fractions, decimals, and percentages. Lessons then transition to electron theory and electrical units. The apprentice also learns about ropes, knots, hitches and splices, ladders, powered equipment safety pertaining to underground, and digger derricks. The last lessons cover hazard communication and personal protective equipment.

National Electrical AJATC Course Test 1-3 **2 hours**

6 Month Progression Written & Skills Test **8 hours**

Effective Listening – NV Energy **4 hours**

At the end of this course, apprentice's listening skills should have improved. This will assist the apprentice to be more effective on the job and will assist him in taking directions from the journeyman. The course is designed to help apprentice assess his/her personal listening habits and skills, identify difficult listening events in his/her job, and develop specific strategies for improved listening.

Field Ambassador – NV Energy**4 hours**

At the end of this class, apprentice will be able to convert difficult customer situations into positive experiences. This course covers customer relationship models, handling mistakes, handling requests, and responding to angry or upset customers.

Basic Electricity, Secondary and Metering – NV Energy**40 hours**

In this class the apprentice will understand basic electricity, secondary and metering. This class utilizes lecture room, videos, and hands-on implementation.

Total Hours Year 1 First Six Months:152

**First Year Lineman Apprentice
Second Six Months**

Outside 1st Year, Level IV – ProTech Skills **30 hours**

To be successful in this industry, an outside technician must be knowledgeable about mathematics and Ohm's Law. This course covers solving basic algebraic equations and solving power calculations. Students will learn about resistance, current, voltage and power in series circuits. Lessons explore the use and operation of blocks, slings, and chokers as well as various rigging tools and equipment. Guy types, anchors, line conductors, crossarms, and insulators also are covered.

National Electrical AJATC Course Test 1-4 **2 hours**

Outside 1st Year, Level V – ProTech Skills **30 hours**

To be successful in this industry, an Outside technician must be knowledgeable about mathematics and Ohm's Law. This course covers solving basic algebraic equations and solving power calculations. Students will learn about resistance, current, voltage and power in series circuits. Lessons explore the use and operation of blocks, slings, and chokers as well as various rigging tools and equipment. Guy types, anchors, line conductors, crossarms, and insulators also are covered.

National Electrical AJATC Course Test 1-5 **2 hours**

Outside 1st Year, Level VI – ProTech Skills **30 hours**

This course begins with lessons on resistance, current, voltage, and power in combination circuits. The student will then learn about two-way radios, underground systems, and excavation and shoring. Laying conduit and pulling cable are covered. The next lessons touch on manholes, underground systems, basket, aerial lifts, and platforms. The course closes with discussions on grounding and protective grounds, taking a line out of service, and lockout/tagout applications.

National Electrical AJATC Course Test 1-6 **2 hours**

National Electrical AJATC Course 1st Year Final Examination **2 hours**

12 Month Progression Written & Skills Test **8 hours**

Basic Transformer Class **40 hours**

Apprentice will have a basic understanding of single-phase transformers. This class utilizes lecture room, videos, and hands-on implementation.

Total Hours 2nd Six Months:146

Second Year Lineman Apprentice

Third Six Months

Outside 2nd Year, Level I – ProTech Skills Institute **30 hours**

The course opens with lessons that cover organizational topics such as the national program, the IBEW constitution, parliamentary procedure and how it works, and understanding local union bylaws. It then covers professional personal conduct, absenteeism, working outdoors, and emergency response. The course closes with lessons on reviewing the applications of DC theory, fundamentals of alternating current, understanding how the DC generator works, and understanding the design and function of AC generators.

National Electrical AJATC Course Test 2-1 **2 hours**

Outside 2nd Year, Level II – ProTech Skills Institute **30 hours**

Level II focuses primarily on transformers. It opens with lessons on test instruments, and then covers transformer construction, characteristics, operation, polarity, tap changers, installation, load checks, and protection. The last lesson in the course will teach students about vectors.

National Electrical AJATC Course Test 2-2 **2 hours**

Outside 2nd Year, Level III – ProTech Skills Institute **30 hours**

Successful qualified electrical workers must possess a strong knowledge of math. Level III opens with the student covering working with prefixes and powers of 10, the customary and metric systems of measurements, the circle, area and volume, and measuring and drawing angles. It then transitions to blueprint fundamentals, electrical drawings and diagrams, and civil drawings. It closes with lessons on staking sheets and stakes and measuring and leveling devices.

National Electrical AJATC Course Test 2-3 **2 hours**

18 Month Progression Written & Skills Test **8 hours**

Advanced Transformer Class **80 hours**

Apprentice will be instructed on three-phase wye, delta, bank and vector transformer connections.

Mapping, Work Orders & Standards Class **16 hours**

Apprentice will understand of how to interpret mapping, read work orders, and understand construction standards.

Hot stick / Rubber Gloving Class **120 hours**

Apprentice will understand the use of live line tools, rubber goods, and personal protective equipment.

Total Hours 3rd Six Months Hours: 320

**Second Year Lineman Apprentice
Fourth Six Months**

Outside 2nd Year, Level IV – ProTech Skills Institute **30 hours**

Level IV opens with introduction to inductance and continues with lessons on voltage drop, metering, overvoltage protection, fault indicator, tower footings, tower erection, joining high-line conductors, and sagging conductors. The course also covers dampers, hold down weights, and armor rods, phasing and tying in circuits, overload capabilities of electrical equipment, phase sequence, back-feed, and locating faults and restoring service.

National Electrical AJATC Course Test 2-4 **2 hours**

Outside 2nd Year, Level V – ProTech Skills Institute **30 hours**

Cabling splicing is the main focus of Level V. Topics covered include safety, materials and tools, preparation, terminations, elbows, grounding cables, pulling, insulation testing, and manufacturers' kits. Students will learn how to use a megohmmeter and gain experience in cable fault locating, underground troubleshooting, and confined spaces.

National Electrical AJATC Course Test 2-5 **2 hours**

Outside 2nd Year, Level VI – ProTech Skills Institute **30 hours**

Crane and traffic signal practices are covered in the course. Crane topics include mobile cranes, boom capacities and load charts, rigging vectors, and lifting and digging operations. After gaining an overview of the traffic signal industry, students will focus on flagging, signs, and barricades, traffic control devices, hardware, and equipment. The course closes with lessons on caissons, basic signal blueprints, cabinets, and phasing and traffic flow.

National Electrical AJATC Course Test 2-6 **2 hours**

National Electrical AJATC Course 2nd Year Final Examination **2 hours**

24 Month Progression Written & Skills Test **8 hours**

Total Hours 4th Six Months Hours: 106

Third Year Lineman Apprentice Fifth Six Months

Outside 3rd Year, Level I – ProTech Skills Institute 30 hours

Level I opens with lessons on taking pride in the industry, an introduction to the COMET program, and productivity. Students will then learn about distribution circuits, alternating current, inductance and capacitors. The course closes with lessons on transformers—3-phase voltages and connections and single-phase connections. Students also will learn about troubleshooting 3-phase banks.

National Electrical AJATC Course Test 3-1 2 hours

Outside 3rd Year, Level II – ProTech Skills Institute 30 hours

Level II starts with a lesson on labor-management relations but is primarily about personal protective grounding. Topics covered include body currents, basic electric circuits, grounding history, equipotential zone grounding, equipment selection, installation of grounds and step and touch potential. Including lessons on induced voltage and multiple grounds, truck grounding, underground distribution grounding, and grounding in substations. The last two lessons are on testing ground resistance and lightning protection.

National Electrical AJATC Course Test 3-2 2 hours

Outside 3rd Year, Level III – ProTech Skills Institute 30 hours

Level III focuses on live-line tools and work practices. The beginning of the course covers applying rubber protective devices and the identification and care of tools. The next lessons are on maintenance with hot sticks. The students then will learn about insulator and crossarm changes, helicopter timber changes, and special practices. The course closes with lessons on primary and single-phase revenue metering.

National Electrical AJATC Course Test 3-3 2 hours

30 Month Progression Written & Skills Test 8 hours

Transmission Lines Class 40 hours

Apprentice will gain working knowledge of the transmission line maintenance and equipment.

Switching Class 40 hours

Apprentice will have an understanding and working knowledge of the routine substation and overhead line switching tasks and how they are carried out in a safe consistent manner. Areas that will be addressed in this class are the scope and definitions, tagging rules, substation switching procedures, and overhead line switching procedures.

Total Hours Fifth Six Months Hours: 184

**Third Year Lineman Apprentice
Sixth Six Months**

Outside 3rd Year, Level IV – ProTech Skills Institute **30 hours**

Level IV covers substation construction. Instruction includes safety procedures, federal regulations, print reading, making connections, and function and types of stations. The student will then move on to spill prevention, containment, and countermeasure plans. The remaining lessons cover foundations, installing grout, underground power cables, grounding grids, steel superstructure assembly, and installing insulators, control cables, and devices.

National Electrical AJATC Course Test 3-4 **2 hours**

Outside 3rd Year, Level V – ProTech Skills Institute **30 hours**

Level V continues the study of substations. Lessons cover equipment identification, oil circuit breakers, batteries, oil care and filtering, and air switches. Other topics included in this course are fuse principles, reclosers and sectionalizers, fault current, voltage regulations, tap changing, and capacitors. The course closes with lessons on power factor and power harmonics.

National Electrical AJATC Course Test 3-5 **2 hours**

Outside 3rd Year, Level VI – ProTech Skills Institute **30 hours**

Level VI prepares the student for life after class. Topics include the economics of unemployment, motivation and the National Electrical Benefit Fund. Fiber optics, alternative energy sources and high voltage lines are also covered. The course ends with lessons on foremanship and journeyman responsibilities.

National Electrical AJATC Course Test 3-6 **2 hours**

National Electrical AJATC Course 3rd Year Final Examination **2 hours**

36 Month Progression Written & Skills Test **8 hours**

Transformer/Hot Stick Review Class **40 hours**

This class reemphasizes the use of hot sticks in the field and the theory and workings of transformers. This is a hands-on class designed to answer and address questions and situations an apprentice may have faced during on-the-job training.

Total Hours Sixth Six Months Hours: 146

**Fourth Year Apprentice
Seventh Six Months**

42 Month Progression Written & Skills Test **8 hours**

Grounding & Bonding Class **24 hours**

Apprentice will learn theory and practices of proper grounding and bonding.

Overhead Procedures Class **40 hours**

Apprentice will learn through a hands-on approach about switching procedures and practices in the field. Apprentice will become familiar with tools and equipment found in their overhead work such as capacitor banks, regulator banks, transformer banks, and line reclosers. They will learn how to handle the mental and physical process of switching in the field, how to write switching procedures, and the proper use of the apparatus and tools.

Underground Operating Procedures **24 hours**

Apprentice will review operating procedures, troubleshoot a metering board, make up splices and termination, and become familiar with various cable testing devices.

Total 7th Six Month Hours: 96

**Fourth Year Apprentice
Eighth Six Months**

Prep Test Class **40 hours**

Apprentice will attend a five-day prep test class. This class will get them prepared to take their journeyman top out test. During these last six months the hours will be watched to make sure that the apprentice isn't missing any hours.

Top Out Test **8 hours**

In the last month, Apprentice will take their top out test. Refer to Section XIV Progression & Testing "Final Exam (Top Out Test)" for applicable provisions.

Total 8th Six Month Hours: 48

Approximate Total Program Hours: 1,198

Wages

Wage Schedule for Apprentice Lineman – See Collective Bargaining Agreement but should be reflected of prorated portions of the Journeyman Wage. The current wage scale (on the check) outlined in the Collective Bargaining Agreement.