

## WTCS Repository

# Program Design

50-413-6 ELECTRIC LINE APPRENTICE

Description

This four-year Electric Lineworker Apprenticeship Program provides each apprentice with 8,000 hours of training in the field of electrical power distribution and related subjects which includes 7,360 hours of on-the-job training and 640 hours of related instruction. During the related instruction portion of the apprenticeship program, both overhead and underground distribution systems will be explored along with electrical theory and skill development in critical work processes.

Direct current theory and Ohm's Law will be explored as it relates to series, parallel, and combination circuits and its' practical applications for transmission and distribution lines. Distribution line specifications of overhead transmission and distribution power lines will be explored. Accident analysis and the critique of distribution and transmission safety practices will be examined using scenarios. The use and demonstration of climbing tools will be covered. Basic rigging knots and the use of safe rigging procedures will be explored and put to practical use. Safe chain saw operation and maintenance will be demonstrated for field work. Bucket truck and digger truck set-up, safety and operations will be performed.

Aluminum and copper conductor fundamentals will be covered with the calculation of voltage drop and paralleling conductor concepts. Single phase 3 wire service fundamentals will be explored so that you can predict, assess, and then trouble-shoot problems. The National Electric Safety Code (NESC) and Wisconsin Administrative Code Chapters 113 and 114 will be studied at length and apprentices will recite rules as they apply to the electric power industry.

Renewable distributed generation (RDG) is becoming more and more common in the electric distribution, generation, and transmission fields, especially as the price of energy continues to rise. Lineworkers will need to understand renewable energy generation, alternative power, smart grids, and more. “Green energy” modules that help the apprentice better understand and analyze system components, equipment, system design, interrelationships between components and technical information are included. The program is a progressive training program for electric utility distribution workers, and learning outcomes include both the fundamentals of electricity and skill development in critical trade work processes.

External Requirements

The following external requirements are approved by the Wisconsin DWD-Bureau of Apprenticeship Standards:
•4 year training program
•8,000 hours on-the-job training
•640 hours paid related instruction
•Apprentice must complete Red Cross First Aid and CPR courses and maintain certification throughout the apprenticeship
•Apprentice must in his/her final year complete the Transition-To-Trainer Course.

Trade Work Processes:

Electric line workers install, remove, maintain, and repair electric overhead and underground distribution, sub-transmission, and transmission systems.

They respond to 24 hour call out to restore electric service and ensure safety for protection of public and crews.

Install/repair poles, wire and electrical equipment associated with overhead electrical distribution and transmission systems.

Install/repair underground cable and electrical equipment associated with electrical distribution and transmission systems.

Ensure public and crew safety, including: personal protection equipment and emergency procedures and training.

Remain current with all construction, maintenance, safety and work methods, specifications, materials and practices.

Drive a variety of motor vehicles and operates hydraulic equipment; for example: back hoe trenchers, bucket trucks and digger derricks.

Use a variety of hand tools, including chain saws, shovels, drills and compression tools.

Maintain electronic and paper records, reports, etc.

###### Related Outcomes

### Program Outcomes

|  |  |
| --- | --- |
| 1 | Use mathematics related to the electrical trade problem-solving |
| 2 | Apply essential fundamentals of electricity as related to electrical distribution systems |
| 3 | Illustrate electrical circuits and components with acceptable drawings and sketches effectively and accurately |
| 4 | Apply state utility and National Electrical Safety Codes |
| 5 | Install electrical distribution systems, equipment and components |
| 6 | Operate electrical distribution systems, equipment and components |
| 7 | Repair electrical distribution systems, equipment and components |
| 8 | Maintain electrical distribution systems, equipment and components |
| 9 | Perform in a skilled and knowledgeable manner, and function as a journeyman lineman |
| 10 | Accept responsibility for the safety of yourself and those working around you |
| 11 | Integrate new and emerging green technologies into the trade and industry |
| 12 | Troubleshoot equipment and utility electrical systems |

### Program Configurations

## 50-413-6 Electric Line Worker Apprenticeship Related Instruction [2015-16]

Description

This program configuration model provides curriculum standards and a sequence of courses for related instruction across the WTCS colleges. The model includes the following:
• 640 hours of related instruction
• 40 hour 1-week block scheduled courses with 2 blocks per term and 8 terms
• 8 courses x 2.25-credits/course at 80 hours
• Transition to Trainer included in the last year of the apprenticeship
• Other: OSHA, CDL, CPR, First Aid, and other employer required training varies by employer

Credits

|  |  |
| --- | --- |
| 1 - Occupation Specific | 17.75 |
| 2 - Occupation Supportive |  |
|  | \_\_\_\_\_ |
| Total Credits | 17.75 |

## Year 1 Term 1

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-711 | Safety, Hazard Awareness, DC Electrical Theory & Orientation to the Trade | 2.25 |

## Year 1 Term 2

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-712 | Electrical Theory 2, Codes & Overhead Construction | 2.25 |

## Year 2 Term 1 (Term 3)

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-713 | AC Electrical Theory, Generation and Distribution Fundamentals, Voltage Regulation and Power Quality  | 2.25 |

## Year 2 Term 2 (Term 4)

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-714 | Underground Distribution Systems & Electrical Codes | 2.25 |

## Year 3 Term 1 (Term 5)

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-715 | Single Phase Equipment & Energized Line Safe Work Practices | 2.25 |

## Year 3 Term 2 (Term 6)

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-716 | Poly Phase Equipment & Construction | 2.25 |

## Year 4 Term 1 (Term 7)

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-717 | Poly Phase Power Fundamentals, Substations, and Metering | 2.25 |

## Year 4 Term 2 (Term 8)

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| 50-413-718 | Emergency Response for Line Workers & Renewable Energy Capstone Projects | 2 |
| 47-455-455 | Transition to Trainer: Your Role as a Journey Worker |  |

## Other Related Instruction

|  |  |  |
| --- | --- | --- |
| Course # | Course Title | Credits |
| Varies | CPR, First Aid and other employer requirements |  |
| Varies | OSHA Training as required |  |
| Varies | CDL License as required |  |

### Program Course List

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | Title | Credits | Description | Pre/Corequisites |
| 50-413-711 | Safety, Hazard Awareness, DC Electrical Theory & Orientation to the Trade | 2.25 | This course is designed to orient apprentices to the basics of electric power distribution systems and the work processes performed by line workers. Course competencies include basic DC electrical theory and their applications. Safety requirements and safe work practices will be taught and reinforced during hands-on learning activities at the school. DC electrical theory will explore wire sizing, grounding, and VOM meter use. Climbing techniques and safety are included. Skill building in chainsaw use and line clearance is included. Course provides two weeks of related instruction in a block scheduling format. | Registered apprentice. |
| 50-413-712 | Electrical Theory 2, Codes & Overhead Construction | 2.25 | Course examines the National Electric Safety Codes & Wisconsin PSC rules and regulations. In addition, competencies related to solving electrical problems, parallel and series circuits, power factors, circuit protection, metering, grounding, power quality and renewable energy are included. Apprentices will also build skills with using meters and test equipment. Apprentices will build skills applying OSHA 1910.269 and other safety requirements to troubleshooting equipment and components. Course provides two weeks of related instruction in a block scheduling format. | 50-413-711 is a suggested pre-requisite. |
| 50-413-713 | AC Electrical Theory, Generation and Distribution Fundamentals, Voltage Regulation and Power Quality  | 2.25 | Course competencies and learning objectives include an introduction to AC electrical theory and its applications; an examination of Ohm's Law and related principles; concepts pertaining to generation & distribution of AC energy; inductors and electric apparatus & equipment.  A review of 1st Year and OSHA 1910.269 safety requirements are included. Course provides two weeks of related instruction in a block scheduling format.  | 50-413-712 and/or successful completion of first year is suggested. |
| 50-413-714 | Underground Distribution Systems & Electrical Codes | 2.25 | Course competencies and learning objectives examine the Wisconsin Administrative Codes and PSC rules and regulations, equal-potential grounding, handling energized and de-energized cables and troubleshooting open neutral problems.  Apprentices will explore lightning arrestors, smart grid technologies, and street light maintenance and installation.  Underground distribution related competencies will focus on schematics, cable locating, fault detection, insulated cables, grounding practices, construction techniques, and maintenance.  Applicable OSHA 1910.269 requirements and PSC rules and regulations are reviewed. Course provides two weeks of related instruction in a block scheduling format. | 50-413-713 is a suggested prerequisite. |
| 50-413-715 | Single Phase Equipment & Energized Line Safe Work Practices | 2.25 | Apprentices will examine more of the National Electrical Safety Code and compare overhead construction techniques for primary and secondary lines. Course competencies also include concepts and principles associated with single phase power, equipment, and safe work practices for energized lines.  Training in confined space entry and aerial rescue will be included in this course. Course provides 2 weeks of related instruction in a block scheduling format.  | 50-413-714 and successful completion of years 1 and 2 is a suggested pre-requisite. |
| 50-413-716 | Poly Phase Equipment & Construction | 2.25 | Course examines poly phase equipment, apparatus and construction. Course competencies explore transformers, grounding requirements, load calculations, safety, and related concepts. OSHA 1910.269 and a review of 1st & 2nd years is included. Course provides 2 weeks of related instruction in a block schedule format. | 50-413-715 and successful completion of first and second years is a suggested pre-requisite. |
| 50-413-717 | Poly Phase Power Fundamentals, Substations, and Metering | 2.25 | Competencies and learning objectives in this course include three phase power; banking operations, safety; back-feeds; and high voltage. A transformer apparatus school and overhead school are included. Applicable OSHA 1910.269 requirements are reviewed and practiced.  This course also examines energized line work, substation operations and switching, three-phase metering applications and green energy power generation equipment or systems.  A review of applicable OSHA 1910.269 requirements and years 1-3 of related instruction are included.  Customer service skills are reinforced and applied to roles for line workers. Course provides 2 weeks of related instruction in a block scheduling format.   | 50-413-716 and successful completion of years 1,2 and 3. |
| 50-413-718 | Emergency Response for Line Workers & Renewable Energy Capstone Projects | 2 | Course competencies and learning objectives focus on emergency response roles for line workers and preparing the apprentice for a transition to journey level work.  A hands-on learning activity involving a car/pole accident response simulation provides for capstone project learning experiences.  Course also reviews for the JW exam offered through the college. Apprentices will complete a renewable & green energy research project and presentation as a second capstone learning experience.  The Transition to Trainer course is also taught during this term. Course provides 2 weeks of related instruction in a block scheduling format. | 50-413-717 and successful completion of years 1,2 and 3 are suggested pre-requisites. |
| 47-455-455 | Transition to Trainer: Your Role as a Journey Worker |  | Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade. You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job. |   |

50-413-711 Safety, Hazard Awareness, DC Electrical Theory & Orientation to the Trade

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | This course is designed to orient apprentices to the basics of electric power distribution systems and the work processes performed by line workers. Course competencies include basic DC electrical theory and their applications. Safety requirements and safe work practices will be taught and reinforced during hands-on learning activities at the school. DC electrical theory will explore wire sizing, grounding, and VOM meter use. Climbing techniques and safety are included. Skill building in chainsaw use and line clearance is included. Course provides two weeks of related instruction in a block scheduling format. |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | Registered apprentice. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Explore an orientation to the trade |
| 2. | Determine personal protective equipment requirements for utility line workers |
| 3. | Demonstrate fall protection & work positioning equipment safety |
| 4. | Explore environmental and job site hazards |
| 5. | Compare conductors and cables |
| 6. | Apply selected DC electrical theory to power distribution scenarios |
| 7. | Compare aerial rescue techniques involving pole top and bucket truck rescues |
| 8. | Demonstrate truck related safe work practices including digger derrick and bucket trucks |
| 9. | Establish work zone safety procedures for a variety of job sites |
| 10. | Rig loads for safe line work |
| 11. | Compare protective grounding fundamentals for distribution line safety |
| 12. | Perform line clearance and tree trimming |
| 13. | Operate chainsaws |
| 14. | Demonstrate skills using VOM meters and testing circuits |
| 15. | Explore arc flash hazards associated with utility lines and equipment |
| 16. | Examine the damaging effects of arc flash in a work setting |
| 17. | Climb poles using industry accepted procedures & safe work practices |

50-413-712 Electrical Theory 2, Codes & Overhead Construction

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Course examines the National Electric Safety Codes & Wisconsin PSC rules and regulations. In addition, competencies related to solving electrical problems, parallel and series circuits, power factors, circuit protection, metering, grounding, power quality and renewable energy are included. Apprentices will also build skills with using meters and test equipment. Apprentices will build skills applying OSHA 1910.269 and other safety requirements to troubleshooting equipment and components. Course provides two weeks of related instruction in a block scheduling format. |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-711 is a suggested pre-requisite. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Solve electrical problems using Ohm's Law and basic trade math |
| 2. | Analyze series and parallel circuits |
| 3. | Calculate power factors |
| 4. | Explore circuit and system protection strategies used by utilities |
| 5. | Compare Watt-hour mechanical metering systems to digital metering systems |
| 6. | Examine system and customer grounding techniques |
| 7. | Communicate green/renewable energy trends, equipment and technologies |
| 8. | Examine the overall structure of the NESC electrical codes and State rules & regulations |
| 9. | Summarize the rules [electrical codes] for the operation of electric supply and communications lines and equipment (NESC part 4) |
| 10. | Interpret maps and electrical symbols & schematics used by utilities |
| 11. | Relate the importance of conductor properties to power quality |
| 12. | Apply 3 wire service fundamentals to problem-solving and trouble-shooting |
| 13. | Compare overhead construction techniques used by utilities |
| 14. | Demonstrate skills required for overhead single phase transformer connections and installations |
| 15. | Investigate solutions to stray voltage/current problems |
| 16. | Examine various overhead utility and power transmission/distribution applications |
| 17. | Apply overhead construction troubleshooting skills to solve problems |

50-413-713 AC Electrical Theory, Generation and Distribution Fundamentals, Voltage Regulation and Power Quality

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Course competencies and learning objectives include an introduction to AC electrical theory and its applications; an examination of Ohm's Law and related principles; concepts pertaining to generation & distribution of AC energy; inductors and electric apparatus & equipment.  A review of 1st Year and OSHA 1910.269 safety requirements are included. Course provides two weeks of related instruction in a block scheduling format.  |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-712 and/or successful completion of first year is suggested. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Examine electric system generation, transmission, distribution, and grounding |
| 2. | Operate Volt-Ohm meters and digital multimeters on AC circuits |
| 3. | Use electrical testing equipment on AC circuits |
| 4. | Explore AC generation and power quality principles |
| 5. | Examine principles of AC electrical theory for transmission and distribution |
| 6. | Relate basic AC electrical theory to trade practices |
| 7. | Interpret AC fundamentals for electrical circuits found in the power industry |
| 8. | Examine the parts and operations of power capacitors and installations  |
| 9. | Calculate values for various types of AC circuits |
| 10. | Examine principles involved with inductors |
| 11. | Apply voltage regulation fundamentals to work performed by the trade |
| 12. | Investigate overcurrent protection strategies used by utilities |
| 13. | Demonstrate safe Kilowatt hour meter installation and service |
| 14. | Summarize the rules [electrical codes] for the installation and maintenance of electric supply stations and equipment (NESC part 1). |

50-413-714 Underground Distribution Systems & Electrical Codes

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Course competencies and learning objectives examine the Wisconsin Administrative Codes and PSC rules and regulations, equal-potential grounding, handling energized and de-energized cables and troubleshooting open neutral problems.  Apprentices will explore lightning arrestors, smart grid technologies, and street light maintenance and installation.  Underground distribution related competencies will focus on schematics, cable locating, fault detection, insulated cables, grounding practices, construction techniques, and maintenance.  Applicable OSHA 1910.269 requirements and PSC rules and regulations are reviewed. Course provides two weeks of related instruction in a block scheduling format. |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-713 is a suggested prerequisite. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Examine Wisconsin Administrative Codes and utility safe work practices |
| 2. | Summarize the rules [electrical codes] for the installation and maintenance of underground electric supply and communication lines (NESC part 3). |
| 3. | Apply basic electrical theories and principles to underground distribution systems |
| 4. | Demonstrate proper handling procedures of energized and de-energized underground cables |
| 5. | Troubleshoot open neutral problems associated with underground distribution equipment |
| 6. | Interpret maps, schematics and drawings for underground installations |
| 7. | Confirm underground cable location and fault detection |
| 8. | Examine the construction of underground insulated cables |
| 9. | Layout an underground residential distribution system |
| 10. | Demonstrate skills with underground residential distribution cable prep and termination |
| 11. | Demonstrate skills splicing underground residential distribution cables |
| 12. | Compare underground grounding practices |
| 13. | Analyze underground construction techniques |
| 14. | Demonstrate skills with switching single phase and three phase underground distribution |
| 15. | Demonstrate skills troubleshooting underground residential distribution |
| 16. | Apply basic pad mounted transformer and underground cable principles to field installations |
| 17. | Summarize smart grid technologies and residential local area networks |
| 18. | Explain lightning arrestor lead lengths and installations for various situations |
| 19. | Explore street light maintenance and installation |

50-413-715 Single Phase Equipment & Energized Line Safe Work Practices

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Apprentices will examine more of the National Electrical Safety Code and compare overhead construction techniques for primary and secondary lines. Course competencies also include concepts and principles associated with single phase power, equipment, and safe work practices for energized lines.  Training in confined space entry and aerial rescue will be included in this course. Course provides 2 weeks of related instruction in a block scheduling format.  |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-714 and successful completion of years 1 and 2 is a suggested pre-requisite. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Summarize the rules [electrical codes] for the installation and maintenance of overhead electric supply and communication lines (NESC Part 2). |
| 2. | Demonstrate skills used during construction of primary and secondary overhead power lines |
| 3. | Demonstrate skills with replacing overhead single phase conductors |
| 4. | Demonstrate skills repairing downed power lines |
| 5. | Demonstrate skills with outages and restoring power in a simulation training scenario |
| 6. | Demonstrate confined space safe work practices |
| 7. | Explore single phase distribution transformers connections and installations |
| 8. | Perform skills required for installing single phase transformers and verifying operations |
| 9. | Test single phase transformers and verify proper operation |
| 10. | Compare the risks, hazards, safeguards and procedures when working with potential back-feeds |
| 11. | Troubleshoot single phase equipment and devices |
| 12. | Examine overcurrent protection and protective devices. |
| 13. | Summarize the role and function of voltage regulators in single phase applications |
| 14. | Compare distribution line construction standards used by utilities |
| 15. | Examine safe work practices for energized lines and equipment |
| 16. | Demonstrate skills required for pole framing and cross-arm change outs on power lines |
| 17. | Demonstrate skills required for dead end insulator change outs on energized lines |
| 18. | Demonstrate skills required for jumper change outs on energized lines |

50-413-716 Poly Phase Equipment & Construction

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Course examines poly phase equipment, apparatus and construction. Course competencies explore transformers, grounding requirements, load calculations, safety, and related concepts. OSHA 1910.269 and a review of 1st & 2nd years is included. Course provides 2 weeks of related instruction in a block schedule format. |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-715 and successful completion of first and second years is a suggested pre-requisite. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Relate the NESC work rules for the installation, maintenance and operation of electric supply lines and equipment to OSHA safety standards (NESC Appendix B) |
| 2. | Compare the construction and operation of transmission lines and equipment |
| 3. | Examine three phase transformer characteristics |
| 4. | Apply electrical theory to three phase characteristics |
| 5. | Calculate three phase loads |
| 6. | Examine three phase banking operations & safety  |
| 7. | Explore three phase grounding requirements |
| 8. | Demonstrate skills working on high voltage three phase equipment safely |
| 9. | Demonstrate skills with replacing three phase conductors |
| 10. | Test three phase transformers and verify proper operation |
| 11. | Troubleshoot three phase equipment and devices |
| 12. | Apply customer service skills to various utility situations and scenarios |

50-413-717 Poly Phase Power Fundamentals, Substations, and Metering

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Competencies and learning objectives in this course include three phase power; banking operations, safety; back-feeds; and high voltage. A transformer apparatus school and overhead school are included. Applicable OSHA 1910.269 requirements are reviewed and practiced.  This course also examines energized line work, substation operations and switching, three-phase metering applications and green energy power generation equipment or systems.  A review of applicable OSHA 1910.269 requirements and years 1-3 of related instruction are included.  Customer service skills are reinforced and applied to roles for line workers. Course provides 2 weeks of related instruction in a block scheduling format.   |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2.25 |
|  | Total Hours | 80 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-716 and successful completion of years 1,2 and 3. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Compare and contrast three phase transformer settings |
| 2. | Examine three phase characteristics |
| 3. | Explore open delta banks |
| 4. | Diagram angular displacement |
| 5. | Construct three phase transformer settings |
| 6. | Apply three phase fundamentals to vectoring and paralleling banks |
| 7. | Troubleshoot customer problems and faults associated with three phase |
| 8. | Examine safety requirements for working with substation equipment, operations and switching |
| 9. | Explore substation map reading |
| 10. | Plan for substation equipment maintenance, servicing and troubleshooting |
| 11. | Demonstrate skills required for substation switching |
| 12. | Demonstrate skills working with three phase meters |
| 13. | Apply codes to three phase metering installations and trade work practices |
| 14. | Explore emerging technologies and work requirements for renewable distributed energy generation |

50-413-718 Emergency Response for Line Workers & Renewable Energy Capstone Projects

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Course competencies and learning objectives focus on emergency response roles for line workers and preparing the apprentice for a transition to journey level work.  A hands-on learning activity involving a car/pole accident response simulation provides for capstone project learning experiences.  Course also reviews for the JW exam offered through the college. Apprentices will complete a renewable & green energy research project and presentation as a second capstone learning experience.  The Transition to Trainer course is also taught during this term. Course provides 2 weeks of related instruction in a block scheduling format. |
|  | Instructional Level | Technical Diploma |
|  | Total Credits | 2 |
|  | Total Hours | 72 |

Pre/Corequisites

|  |  |
| --- | --- |
| Prerequisite | 50-413-717 and successful completion of years 1,2 and 3 are suggested pre-requisites. |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Apply the rules [electrical codes] for the installation and operation of electric supply equipment and devices (NESC Appendix A). |
| 2. | Investigate emergency response roles and responsibilities for line workers |
| 3. | Plan an emergency response to a car/pole scenario selected by the instructor |
| 4. | Respond to a car-pole accident safely and in accordance with industry practices |
| 5. | Relate the results of the emergency response to continuous improvement  |
| 6. | Investigate renewable energy & green technologies being employed by businesses and residential customers |
| 7. | Investigate an emerging trend or technology impacting the field/occupation |
| 8. | Prepare for your role as a journey level worker in the trade |
| 9. | Apply Tailgating & Job Briefings to safe work practices and utility processes |

47-455-455 Transition to Trainer: Your Role as a Journey Worker

# Course Outcome Summary

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Description | Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade. You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job. |
|  | Total Hours | 8 |

### Course Competencies

|  |  |
| --- | --- |
| 1. | Value your role as a journey worker trainer |
| 2. | Serve as a mentor and job coach |
| 3. | Foster a positive work environment by acting as an ally/advocate |
| 4. | Provide hands-on skills training |
| 5. | Provide feedback on apprentice performance |