FY15 QTR 4 CONSTRUCTION

PENNSYLVANIA APPRENTICESHIP AND TRAINING COUNCIL
NEW PROGRAM INFORMATION

Program #: PA006-15-8447

ATR: Steve Myers

SPONSOR INFORMATION

Organization: MCGEE ELECTRIC LLC
Address: 72 ROBINSON STREET
City, State, Zip Code: POTTSTOWN, PA 19464

PROGRAM INFORMATION

Registration Date: October 8, 2015
EIN: [redacted]
Program Type: Individual Non-Joint
Bargaining Agency: None
National Affiliation: NONE
Number of Employers: 1
Size of Workforce: 11
Waiver: No
NAICS Code: 238210
NAICS Category: Electrician
Prisoner Indicator: No

PROGRAM SPONSOR CONTACT INFORMATION

Name: ADAM MCGEE
Phone: (484) 955-0211 **Ext.** **Cell:**
Fax: (610) 327-1850
E-Mail: MCGEEELECTRIC@COMCAST.NET

NEW PROGRAM* --- *Legal Working Age --- Regular PATC Ratio

Occupation Information

First Occupation:	Type	Term (Hours)	Journey Wage	Journey Workers	Number of Apprentice Registrations
ELECTRICIAN (0159)	Time	8,000	$20.00	5	2

Term (hours)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
Percentage	50.0 %	55.0 %	60.0 %	65.0 %	70.0 %	75.0 %	80.0 %	85.0 %	%	%

RTI Provider Name: BERKS CAREER & TECHNOLOGY CENTER
Method: Vocational Education
Length of Instruction: 780
Contact: Annie Neuin
Phone: (610) 743-7630

Second Occupation:	Type	Term (Hours)	Journey Wage	Journey Workers	Number of Apprentice Registrations
( )	Time				

Term (hours)										
Percentage	%	%	%	%	%	%	%	%	%	%

RTI Provider Name:
Method: Vocational Education
Length of Instruction:
Contact:
Phone:

STANDARDS OF APPRENTICESHIP

MCGEE ELECTRIC LLC

(EMPLOYER)

[redacted]

72 ROBINSON STREET

(ADDRESS)

POTTSTOWN, PA 19464

Registered With

Pennsylvania Apprenticeship and Training Council

Bureau of Apprenticeship and Training

United States Department of Labor Cooperating

1. DEFINITIONS

"Employer means" **McGEE ELECTRIC LLC**
who is subscribing to and has signed these Standards of Apprenticeship.

"Council" means the Pennsylvania Apprenticeship and Training Council of the Department of Labor and Industry, Harrisburg, Pennsylvania.

"Apprenticeship Agreement" means an Agreement signed by the Employer and the Apprentice. The signature of a parent or guardian is required if the Apprentice is a minor.

"Apprentice" means an employee of the establishment who is engaged in learning a recognized apprenticeable trade; as defined in Title 34, Labor and Industry, Chapter 83, Welfare of Apprentices, Par. 83.2.

"Bureau" means the Bureau of Apprenticeship and Training of the United States Department of Labor.

2. POLICY

On and after the date these Standards of Apprenticeship are duly executed, it shall be the policy of the Employer that all Apprentices employed in the trades covered herein shall be governed by the terms of these Standards of Apprenticeship.

3. TERM OF APPRENTICESHIP

Apprentices will be given practical training, under supervision for the period set forth under "Work Training Schedule" of the designated apprenticeable trade. The first **1000** hours of apprenticeship will be a period of probation, during which time either party to the Apprenticeship Agreement may terminate the Agreement by notifying the other. However, notification of such cancellations, separations, or releases will be forwarded to the Council.

4. APPRENTICESHIP AGREEMENT

The Apprentices will be placed under a written Apprenticeship Agreement, executed in triplicate, and registered with the Council. After registration of this Agreement, the Employer and the Apprentice will each receive one copy and one copy will be retained by the Council.

5. QUALIFICATIONS FOR APPRENTICESHIP

Apprentices shall be of legal working age.

6. EQUAL OPPORTUNITY PLEDGE

"The recruitment, selection, employment and training of Apprentices during their apprenticeship, shall be without discrimination because of race, color, religion, national origin, or sex. The sponsor will take affirmative action to provide equal opportunity in apprenticeship and operate the apprenticeship program as required under Title 29 of the Code of Federal Regulations, Part 30," and Title 34, Labor and Industry, Chapter 81, Equal Opportunity in Apprenticeship Programs.

If and when more than four apprentices are to be employed at one time, affirmative action plans which include selection procedures will be developed in accordance with regulations.

7. CREDIT FOR PREVIOUS EXPERIENCE

An applicant for apprenticeship may be allowed credit on the term of apprenticeship for that portion of his/her experience, whether with the Employer or elsewhere, which is equivalent to any he/she would receive under these Standards of Apprenticeship. Previous experience, with commensurate wages, will be granted only after the record of the applicant has been checked and approved by the Committee. The Council shall be advised of the source and content of such experience.

8. RESPONSIBILITIES OF THE APPRENTICE

Each Apprentice employed under this Program is expected to apply himself/herself with diligence and care to the various tasks assigned to him/her; to protect the property and interests of the Employer in a proper manner; to respect and to obey the rules of the Employer, realizing that much time, money and effort is expended in affording him/her the opportunity to become a skilled craftsman.

9. SUPERVISION OF APPRENTICES

The Employer will designate a qualified person with the authority to supervise the training of apprentices. The supervisor will arrange the training under this Program, and keep a simplified but practical report on the shop progress and classroom activities. He/she will be further authorized to adjust any differences with the Apprentices which may arise from time to time, subject however to the Employer's approval.

10. WORK TRAINING SCHEDULE

Each Apprentice will be given work experience in the major basic trade elements as set forth in the schedule for the designate trade which is attached to these Standards of Apprenticeship, and made a part hereof. The Apprentice shall be trained in safety practices related to operations performed.

11. SAFETY AND HEALTH TRAINING

The Employer shall instruct the Apprentice in safe and healthful work practices and shall insure that the Apprentice is trained in facilities and other environments that are in compliance with either the Occupational Safety and Health Standards promulgated by the Secretary of Labor under Public Law 91-596, dated December 29, 1970, or State standards that have been found to be at least as effective as the Federal Standards.

12. RELATED INSTRUCTION

The Apprentice shall attend classes of theoretical instruction related to his/her trade for a minimum of 144 hours per year for each year of his/her apprenticeship. Where classes are not available through the local school, other trade, industrial or correspondence courses of equal value may be substituted. Time spent at related trade studies is not to be considered hours of work, nor is the Employer required to pay wages for time spent at related studies, except if required during regular working hours.

Related instructions are to be conducted at **BERKS CAREER & TECHNOLOGY CENTER**
3307 FRIEDENSBURG ROAD
OLEY, PA

13. PERIODIC REVIEW OF PROGRESS

The progress of the Apprentice shall be subject to review by the Employer. Failure to make satisfactory progress by the Apprentice may result in suspension or cancellation of the Apprenticeship Agreement.

14. HOURS OF WORK

Hours of work for Apprentices shall be the same as for Journeyperson's designated trade; except that no apprentice shall be required to work such hours as would interfere with his or her required related studies.

15. NUMBER OF APPRENTICES

The following ratio will be adhered to:

1 – 4 Journeypersons	:	1 Apprentice
5 – 9 Journeypersons	:	2 Apprentices
10-14 Journeypersons	:	3 Apprentices

For each additional unit of five journeypersons regularly employed, one additional apprentice may be employed

16. CERTIFICATE OF COMPLETION OF APPRENTICESHIP

Upon satisfactory completion of training in both practical and related phases, the Employer shall request from the Council a Certificate of Completion. The letter from the Employer will certify where and when related training was obtained and that the Apprentice(s) has demonstrated competency in all phases of the trade.

17. INTERPRETATION

If a difference of opinion should arise in the interpretation of these Standards of Apprenticeship which cannot be adjusted satisfactorily by the Committee, either party to the Apprenticeship Agreement may consult with the Council for clarification.

18. MODIFICATION

These Standards of Apprenticeship may be modified jointly by the Employer upon approval by the Council. Modification shall not alter effective Apprenticeship Agreements without the consent of all parties concerned. The Council shall be notified of all such modifications.

19. COMPLIANCE

The sponsors of these Standards of Apprenticeship certify that they are in full compliance with all applicable Federal, State, and Local laws and regulations.

20. PROCESSING OF ALL PAPERS PERTINENT TO STANDARDS

All materials pertinent to these Standards of Apprenticeship shall be forwarded to the Council through the local office of the Bureau of Apprenticeship and Training, United States Department of Labor.

21. DISTRIBUTION OF OFFICIALLY SIGNED STANDARDS OF APPRENTICESHIP

The following parties shall receive a copy of the officially signed and properly executed Standards of Apprenticeship:

1 - The Employer 2 - The Council 3 – The Bureau of Apprenticeship and Training

22. APPRENTICE WAGE SCALE – ELECTRICIAN

This employer is covered by the Fair Labor Standards Act; therefore, overtime will be paid at the required rates. The minimum wages to be paid apprentices will be the following rates:

1st	1000 Hours		50	%	of	Journeyperson's	Rate
2nd	1000 Hours		55	%	"	"	"
3rd	1000 Hours		60	%	"	"	"
4th	1000 Hours		65	%	"	"	"
5th	1000 Hours		70	%	"	"	"
6th	1000 Hours		75	%	"	"	"
7th	1000 Hours		80	%	"	"	"
8th	1000 Hours		85	%	"	"	"
9th				%	"	"	"
10th				%	"	"	"

Journeyperson's Rate as of (Date) 8/11/15 is $20.00 per hour

APPROVED: Adam McGee

McGEE ELECTRIC LLC

(Signature)

Date 8/11/15

SIGN & DATE

REGISTERED WITH PENNSYLVANIA APPRENTICESHIP AND TRAINING COUNCIL

Chairman

Secretary

Date

ELECTRICIAN

WORK TASK		Approx. Hrs.
A.	**Project Layout and Planning**	**200**
1.	Reading and interpreting blueprints and specifications	
2.	Coordination between crafts, engineers and architects	
3.	Laying out feeders, risers and branch circuits	
B.	**Underground Installations**	**300**
1.	Trenching and ditch digging	
2.	Direct burial	
3.	Installing PVC/rigid conduit (including bender usage)	
4.	Installing grounding electrode systems	
C.	**Thinwall Conduit Raceway Systems**	**1200**
1.	Selecting and installing fastening and support devices	
2.	Conduit fabrication	
3.	Installation of conduit, fittings and boxes	
D.	**Rigid Conduit Raceway Systems**	**800**
1.	Selecting and installing fastening and supporting devices	
2.	Bender machine setup and operation	
3.	Conduit fabrication	
4.	Installation of conduit, fittings and boxes	
E.	**Installing Services, Switchboards and Panels**	**500**
1.	Mounting devices	
2.	Breaker installation	
3.	Terminations	
F.	**Floor Duct Installation**	**200**
1.	Shooting transit/grade establishment	
2.	Installing duct and fittings	
3.	Core drilling and outlet installation	
G.	**Motor Control Center Installation**	**100**
1.	Rigging and mounting	
2.	Terminating feeders, branch circuits and control wiring	
H.	**Installing, Splicing and Terminating Wires and Cables**	**1200**
1.	Establishing temporary power	
2.	Installing feeders and branch circuits	
3.	Installing control wiring	
4.	Performing splices, taps and terminations	
I.	**Lighting System Installation**	**1000**
1.	Installing outlet boxes and conductors	

2. Installing fixtures and lamps
3. Installing control devices

J. Testing and Troubleshooting Feeders, Motors and Branch Circuits **100**
1. Checking circuit continuity
2. Identifying fault current to ground
3. Meggering and Hi Potting
4. Certifying system operation
5. Repair and maintenance
6. Ground verification

K. Motor Installation **400**
1. Rigging and setting
2. Alignment
3. Installing circuiting and terminations
4. Testing

L. Control System Installation **200**
1. Blueprint and specification interpretation
2. Layout and circuit installation
3. Installing and certifying distributed control system

M. Installing and Programming Programmable Logic Controllers **100**
1. Module installation
2. Installing control wiring and devices
3. Programming)

N. Installing Instrumentation and Process Control Systems **300**
1. Blueprint and specification interpretation
2. Layout and installation
3. Calibration

O. Installing Sound and Communications Systems **150**
1. Blueprint and specification interpretation
2. Layout
3. Conduit and box installation
4. Installing panels and network devices
5. Circuit installation
6. Terminating and testing circuits

P. Installing and Terminating Transformers **100**
1. Rigging and mounting
2. Terminating primary and secondary cables
3. Testing and troubleshooting

Q. Installing and Maintaining GeneracGenerators **700**
1. Approved methods for sizing Generac Generators
2. Generac Air-Cooled product training and review

3. Installation guidelines per Township and manufactures specifications
4. Proper methods for maintenance practices
5. Proper methods for testing and troubleshooting for repairs
6. Proper methods for operational testing

R. <u>Service and Troubleshooting</u> 150

1. Testing, analysis and repair of electrical/electronic components of: motors, transformers, electrical devices, electronic devices, magnetic devices, lighting and power circuits, equipment and machinery, control circuits and devices

S. <u>Material Handling and Pre-Fabrication</u> 100

1. Awareness of materials and equipment of the trade
2. Handling materials of the trade
3. Fabrication for field installation

T. <u>Safety Awareness, Processing Required Paperwork and Other Specialized Areas</u> 200

1. All apprentices will be trained in all safety facets as they relate to each task performed.
2. OSHA 10 Hour Course

Total Minimum Hours of On-the-Job Training 8000

BERKS CAREER & TECHNOLOGY CENTER

ELECTRICAL APPRENTICESHIP PROGRAM

Year One: 180 Hours

Instructor: Tim Moll

LEARNING OBJECTIVES:

- To teach the fundamentals of math used in electrical applications, types of fasteners and conduits, and basic installation techniques, as well as blueprint reading.
- To provide education in the safety concerns of OSHA and the correct use of tools and equipment.
- To cover both residential and commercial wiring basics.
- To foster an appreciation for the role of the apprentice.
- To encourage responsible, ethical behavior of an electrical employee.

TEXTBOOK/MATERIALS:

NCCER *Core Curriculum: Introductory Craft Skills*
Basic Safety-15 hours; Introduction to Construction Mathy-15 hours; Basic Employability Skills-15 hours

NCCER *Electrical Level One*

METHODS:

- Classroom Lecture with Audio-Visual Supplements
- Student Discussion Groups
- Modular Testing
- Guest Speakers
- Field trips

COMPETENCIES:

Students completing Electrical Level One will be able to:

- Explain safety issues concerning lockout/tagout procedures, personal protection using assured grounding and isolation programs, confined space entry, respiratory protection, and fall protection systems.
- Identify the methods of hand bending conduit.
- Cut, ream, and thread conduit.
- Demonstrate the correct applications for fasteners and anchors.
- Installation of fasteners and anchors, raceways in boxes, conductors.
- Using the formula for Ohm's law, calculate an unknown value.
- Use Kirchhoff's voltage law.
- Find the total amount of resistance in a series circuit.
- Explain the difference between digital and analog meters.
- Understand and explain the purpose and history of the National Electrical Code.

- Understand and explain the different types of conductors and conduit systems.
- Identify common symbols used in blueprints and the architect's and engineer's scales.
- Explain commercial and industrial wiring: switches, relays, circuits.
- Understand residential wiring equipment, circuitry and systems.

Students will demonstrate proficiencies in the required skills areas that follow. This is measured through demonstration and written tests with each of the following NCCER modules:

00101-4 to 00108-4 Core Competencies (72.5 hours)
26101-05 Safety (12.5 hours)
26102-05 Hand Bending (7.5 hours)
26103-05 Fasteners & Anchors (7.5 hours)
26104-05 Electrical Theory One (7.5 hours)
26105-05 Electrical Theory Two (7.5 hours)
26106-05 Electrical Test Equipment (7.5 hours)
26107-05 Introduction To The National Electrical Code (2.5 hours)
26108-05 Raceways, Boxes, and Fittings (12.5 hours)
26109-05 Conductors (15 hours)
26110-05 Introduction to Electrical Blueprints (7.5 hours)
26111-05 Wiring: Commercial & Industrial (7.5 hours)
26112-05 Wiring: Residential (15 hours)

COURSE OUTLINE:

I. Electrical Wiring-Residential

Unit 1 General Information for Electrical Installations
Unit 2 Electrical Symbols and Outlets
Unit 3 Determining the Number of Circuits Required
Unit 4 Conductor Sizes and Types
Unit 5 Switch Control of Lighting Circuits
Unit 6 Lighting Branch Circuit for Bedroom #2
Unit 7 Lighting Branch Circuit for Bedroom #1
Unit 8 Lighting Branch Circuit for Bathroom and Passage
Unit 9 Lighting Branch Circuit for the Hall and Front Entrance
Unit 10 Lighting Branch Circuits of the Kitchen and Rear Entry and Small Appliance Circuits for Kitchen
Unit 11 Lighting Branch Circuit for the Living Room
Unit 12 Lighting Branch Circuit for the Dining Area, Porch and Cornice Garage Storage Area and Attic
Unit 13 Lighting Branch Circuit for the Garage
Unit 14 Lighting and Receptacle Branch Circuits of the Terrace Recreation Room and Utility Room
Unit 15 Lighting and Convenience Receptacle Branch Circuits for the Lavatory, Workshop and Storage Room
Unit 16 Special-Purpose Outlets for Portable Heating Units
Unit 17 Special-Purpose Outlets for a Water Pump and a Water Heater for Residential Use
Unit 18 Special-Purpose Outlets for a Dryer and the Overhead Garage Door Openers

Unit 19 Special-purpose Outlets for the Refrigerator-Freezer, Counter-Mounted Cooking Unit and Wall-Mounted Oven Circuits
Unit 20 Special-Purpose Outlets for a Food Waste Disposer and a Dishwasher
Unit 21 Special-Purpose Outlets for the Bathroom Ceiling Heater and Attic Exhaust Fan
Unit 22 Television, Telephone and Signal Systems
Unit 23 Electric Heating and Air Conditioning
Unit 24 Oil Burner Hot Water Heating System
Unit 25 Gas Burner Heating Systems
Unit 26 Heat and Smoke Detectors
Unit 27 Service Entrances and Equipment
Unit 28 Service-Entrance Calculations
Unit 29 Remote-Control Systems for Lighting Circuits
Unit 30 Swimming Pools, Spas and Hot Tubs

II. Electrical Wiring-Commercial

Unit 1 Commercial Building Plans and Specifications
Unit 2 The Electric Service
Unit 3 Reading Electrical Drawings (prints)-Drugstore
Unit 4 Branch Circuit Requirements
Unit 5 Low-Voltage Remote-Control Lighting
Unit 6 Reading Electrical Drawings-Bakers
Unit 7 Switch Control of Lighting Circuits
Unit 8 Branch-Circuit Installation
Unit 9 Appliance Circuits
Unit 10 Reading Electrical Drawings-Insurance Office
Unit 11 The Cooling System
Unit 12 Special Systems
Unit 13 Reading Electrical Drawings- Beauty Salon
Unit 14 Lamps for Lighting
Unit 15 Luminaries
Unit 16 Special Circuits (Owner's Circuits)
Unit 17 Emergency Power Systems
Unit 18 Overcurrent Protection: Fuses and Circuit Breakers
Unit 19 Short-Circuit Calculations and Coordination of Overcurrent Protective Devices
Unit 20 Panelboard Selection and Installation

Year Two: **180 Hours**

Instructor: **Richard Linderman**

LEARNING OBJECTIVES:

- To provide a thorough background in AC and DC motors, circuit breakers, fuses, grounding and conductors of all types.
- To focus on NEMA and NEC installation requirements for cable installations.
- To reinforce the overall objectives of apprenticeship.
- To continue to expand the work ethic and soft skills areas of electrical apprenticeship.

TEXTBOOK/MATERIALS:

- NCCER *Electrical Level Two*
- *Electrical Grounding and Bonding,* Thompson

METHODS:

- Classroom Lecture
- Group Discussion
- Modular Testing
- Overheads and other audio-visual materials
- Field trips

COMPETENCIES:

Basically, each student by the end of Electrical Year Two will be able to:

- Describe the voltage and current transients that occur in a capacitive circuit.
- Define inductive reactance and state how it is affected by frequency.
- Explain alternating and direct current systems.
- Understand motor theory and application.
- Explain the purpose of grounding and the scope of *NEC Article 250.*
- Explain the *NEC* requirements for grounding and bonding.
- Identify all parts of popular electric and hydraulic benders.
- Understand the purpose, requirements and installation of boxes.
- Identify *NEMA* standards for cable tray installations.
- Describe how to make good Conductor terminations.
- Explain how to use hand and power tools for crimping.
- Select the most suitable overcurrent device for the application.
- Describe troubleshooting and maintenance techniques for overcurrent devices.

Students will be tested at the end of each NCCER study module to demonstrate their proficiency in the areas covered in the following outline:

26201-05 Alternating Current (15 hours)
26202-05 Motors: Theory and Application (20 hours)
26203-05 Grounding (12.5 hours)
26204-05 Conduit Bending (15 hours)
26205-05 Boxes and Fittings (10 hours)
26206-05 Conductor Installations (10 hours)
26207-05 Cable Tray (15 hours)
26208-05 Conductor Terminations & Splices (7.5 hours)
26209-05 Installation of Electric Services (15 hours)
26210-05 Circuit Breakers and Fuses (12.5 hours)
26211-05 Contactors and Relays (10 hours)
26212-05 Electric Lighting (10 hours)

COURSE OUTLINE:

I. Electricity I

Unit 1 Introduction
Unit 2 Electron Theory and Ohm's Law
Unit 3 Series Circuits
Unit 4 Parallel Circuits
Unit 5 Series-Parallel Circuits
Unit 6 Electrical Energy and Power
Unit 7 Batteries
Unit 8 Electrical Conductors and Wire Sizes
Unit 9 Voltage Drop Across Conductors
Unit 10 Summary Review of Units 1-9
Unit 11 Magnets and Magnetic Fields
Unit 12 Electromagnetism
Unit 13 Generation of Electromotive Force
Unit 14 Direct-Current Motor Principles
Unit 15 Summary Review of Units 11-14
Unit 16 Typical Bell Circuits
Unit 17 Switch Control of Lighting Circuits
Unit 18 Wiring Materials
Unit 19 Remote Control Systems for Lighting Circuits

II. Electricity II

Unit 1 Alternating-Current Principles
Unit 2 Inductance and Inductive Reactance
Unit 3 Capacitance and Capacitive
Unit 4 Series Circuit: Resistance and Inductance
Unit 5 Series Circuit: Resistance and Capacitance
Unit 6 Series Circuit: Resistance, Inductance and Capacitance
Unit 7 AC Parallel Circuits Containing Inductance
Unit 8 AC Parallel Circuits Containing Inductance and Capacitance
Unit 9 AC Power, Power Factor and Power Factor Correction
Unit 10 Summary Review of Units 1-9
Unit 11 Single-Phase, Three-Wire Service Entrance
Unit 12 Installation of a Single-Phase, Three-Wire Service Entrance for an Apartment Building
Unit 13 Installation of a Three-Phase, Three Wire Service Entrance
Unit 14 Introduction to Fluorescent Lighting
Unit 15 Installation of Fluorescent Lighting

YEAR THREE: 180 Hours

INSTRUCTOR: Kyle Kintner

LEARNING OBJECTIVES:

- To develop good work ethics and reaffirm the benefits of Apprenticeships.
- To provide a thorough understanding of the principles of motors, generators and motor controls, relays, switches and drives.
- To continue developing mastery of codes related to Level 3 course content.

TEXTBOOKS/MATERIALS:

- NCCER *Electrical Level 3*
- Ugly's *Electrical References*

METHODS:

- Classroom Instruction
- Demonstration of Techniques
- Group Discussions
- Field trips to industry
- Guest Speakers
- Modular Testing

COMPETENCIES:

Students completing Electrical Year 3 will be able to:
(Fill in)

Students will demonstrate their proficiency at the end of each NCCER study module in the following outline:

26301-05 Load Calculations-Branch Feeders and Circuits (12.5 hours)
26302-05 Conductor Selection and Calculations (15 hours)
26303-05 Overcurrent Protection (12.5 hours)
26304-05 Raceway, Box and Fitting Fill Requirements (12.5 hours)
26305-05 Wiring Devices (10 hours)
26306-05 Distribution Equipment (12.5 hours)
26307-05 Distribution System Transformers (15 hours)
26308-05 Lamps, Ballasts, and Components (5 hours)
26309-05 Motor Calculations (12.5 hours)
26310-05 Motor Maintenance, Part 1 (12.5 hours)
26311-05 Motor Controls (20 hours)
25312-05 Hazardous Locations (15 hours)

COURSE OUTLINE:

I. Electricity

Unit 1 Operating Principles of DC Generators
Unit 2 The Separately-Excited DC Generators
Unit 3 The Self-Excited Shunt Generator
Unit 4 Compound-Wound DC Generator
Unit 5 The DC Shunt Motor
Unit 6 The Dc C Series Motor .
Unit 7 DC Compound Motors
Unit 8 Summary Review of Units 1-7
Unit 9 Manual Starting Rheostats for DC Motors
Unit 10 Special DC Starting Rheostats and Controllers
Unit 11 Basic Principles of Automatic Motor Control
Unit 12 The DC Counter EMF Motor Controller and DC Variable Speed Motor Drives
Unit 13 The DC Voltage Drop Accelerator Controller
Unit 14 The DC Series Lockout Relay Accelerator Controller
Unit 15 Dynamic Braking with a DC Motor Reversal Control
Unit 16 Summary Review of Units 9-15
Unit 17 Introduction to Polyphase Circuits
Unit 18 The Three-Phase Wye Connections
Unit 19 The Three-Phase Delta Connections
Unit 20 Summary Review of Units 17-19
Unit 21 Basic Principles of Transformers
Unit 22 Single-Phase Transformers
Unit 23 Single-Phase, Three-Wire Secondary System
Unit 24 Single-Phase Transformers Connected in Delta
Unit 25 Single-Phase Transformers in a Wye Installation
Unit 26 Wye and Delta Connections of Single-Phase Transformers
Unit 27 Instrument Transformers
Unit 28 National Electric Code Requirements for Transformer Installations
Unit 29 Summary Review of Units 21-28

II. Electric Motor Control

Unit 1 General Principles of Electric Motor Control
Unit 2 Fractional and Integral Horsepower Manual Motor Starters
Unit 3 Magnetic Line Voltage Starters
Unit 4 Symbols
Unit 5 Interpretation and Application of Simple Wiring and Elementary Diagrams
Unit 6 Push Bottoms and Control Stations
Unit 7 Relays and Contactors
Unit 8 Timing Relays
Unit 9 Pressure Switches and Regulators
Unit 10 Float Switches
Unit 11 Flow Switches
Unit 12 Limit Switches and Proximity Controls
Unit 13 Phase Failure Relays
Unit 14 Solenoid Valves

Unit 15 Temperature Switches
Unit 16 Two-Wire Controls
Unit 17 Three -ire and Separate Controls
Unit 18 Hands-off Automatic Controls
Unit 19 Multiple Push-Button Stations
Unit 20 Interlocking Methods for Reversing Control
Unit 21 Sequence Control
Unit 22 Time-Delay, Low Voltage Release Relay
Unit 23 The Motor and Starting Methods
Unit 24 Primary Resistor-Type Starters
Unit 25 Autotransformer Starters
Unit 26 Part Winding Motor Starters
Unit 27 Automatic Starters for Star-Delta Motors
Unit 28 AC Solid-State Reduced Voltage Controller
Unit 29 Controllers for Two-Speed, Two Winding (Separate Winding) Motors
Unit 30 Two-Speed, One-Winding (Consequent Pole) Motor Controller
Unit 31 Four-Speed, Two-Winding (Consequent Pole) Motor Controller
Unit 32 Would Rotor Motors and Manual Speed Control
Unit 33 Push-Button Speed Selection
Unit 34 Automatic Acceleration for Wound Rotor Motors
Unit 35 Automatic Speed Control for Would Rotor Motors
Unit 36 Solid-State Adjustable Speed Controller for AC Would Rotor Motors
Unit 37 Synchronous Motor Operations
Unit 38 Push-Button Synchronizing
Unit 39 Time Semiautomatic Synchronizing
Unit 40 Synchronous Automatic Motor Starter
Unit 41 About DC Motors
Unit 42 Across-the Line Starting
Unit 43 Use of Series Starting Resistance
Unit 44 Manual Faceplate Starters
Unit 45 Compensating and Definite Time Control Starting
Unit 46 Solid-State Adjustable Speed Control
Unit 47 Jogging (inching) Control Cirucuits
Unit 48 Plugging
Unit 49 Electric Brakes
Unit 50 Dynamic and Regenerative Braking
Unit 51 Electric and Electronic Braking
Unit 52 Direct Drives and Pulley Drives
Unit 53 Gear Motors
Unit 54 Variable Frequency Mechanical Drives
Unit 55 AC Adjustable Frequency Solid-State Drives
Unit 56 Magnetic Clutch and Magnetic Drive
Unit 57 DC Variable Speed Control-Motor Drives
Unit 58 Programmable and Motion Control
Unit 59 Motor Startup and Troubleshooting Basics

YEAR FOUR: 180 Hours

INSTRUCTOR: Michael Grainger

LEARNING OBJECTIVES:

- To prepare students thoroughly for successful completion of the Electric License Exam.
- To review all texts allowed in the testing area.
- To reinforce the positive attitude of students to the Apprenticeship Program in general and the electric trade, specifically.

TEXTS/MATERIALS:

- *NEC 2008 Code*
- Mike Holt's *NEC Exam Preparation*
- *Soares, Electrical Grounding and Bonding,* IAEI
- *Tom Henry's Key Word Index*
- *Ugly's Electrical References*

METHODS:

- Class lecture
- Group discussions
- Testing of competencies
- Field trip
- Guest speaker

COMPETENCIES:

Students at the end of Electrical-Year 4 will demonstrate proficiency in the *NEC 2005 Code* and be ready to sit for their license exam for the City of Reading, etc. They will understand the purpose, the history and the applications of the code.

COURSE OUTLINE:

I. National Electric Code

Unit 1 General Wiring and Fundamentals
Unit 2 Wire, Conduit and Box Sizing
Unit 3 Outlets, Lighting, Appliances and Heating
Unit 4 Services and Feeder Calculations
Unit 5 Grounding and Bonding
Unit 6 Overcurrent Protection
Unit 7 Motor Circuit Wiring
Unit 8 Transformers
Unit 9 Hazardous Location Wiring
Unit 10 Health Care Facilities

Unit 11 Emergency and Alternate Power Systems
Unit 12 Industrial Electric applications
Unit 13 Commercial Wiring Applications
Unit 14 Special Applications Wiring
Unit 15 Review

II. Review of Years 1, 2, and 3

REGISTRATION AGENCY
PENNSYLVANIA APPRENTICESHIP AND TRAINING COUNCIL
APPRENTICESHIP AGREEMENT
BETWEEN APPRENTICE AND SPONSOR

This AGREEMENT may be terminated by either of the parties, citing cause(s) with notification to the registration agency, in compliance with Title 34, Part IV, Chapter 83.

PRIVACY ACT STATEMENT
The information requested herein is used for apprenticeship program statistical purposes and may not be otherwise disclosed without the express permission of the undersigned apprentice.
Privacy Act of 1974 – P.L. 93-579

1. AGREEMENT BETWEEN APPRENTICE AND:- *("X" one)*
   a. ☒ Employer
   b. ☐ Joint Committee
   c. ☐ Non-Joint Committee

2. PROGRAM NUMBER: PA006158447

3. NAME OF APPRENTICESHIP STANDARDS *(Name & Address of Sponsor)*
   McGEE ELECTRIC LLC
   72 ROBINSON STREET
   POTTSTOWN, PA 19464

The program sponsor and apprentice agree to the terms of the apprenticeship standards as incorporated as part of this agreement. The sponsor will not discriminate in the selection and training of the apprentice in accordance with the Equal Opportunity Standards in Section 30.3, Title 29, Code of Federal Regulation, Part 30.

4. NAME OF APPRENTICE *(Last, First, Middle)*: [redacted]

5. DATE OF BIRTH *(Mo., Day, Year)*: [redacted]

6. SEX *("X" one)*
   a. ☒ Male
   b. ☐ Female

7. SOCIAL SECURITY NO.: [redacted]

8. APPRENTICE'S ADDRESS *(No., Street, City, County, State, ZIP Code)*: [redacted] Berks

9a. RACE *("X" one or more)*
   a. ☐ Am. Indian or Alaskan Nat.
   b. ☐ Asian
   c. ☐ Black or African American
   d. ☐ Native Hawaiian or other Pacific Islander
   e. ☒ White

9b. ETHNIC GROUP *("X" one)*
   a. ☐ Hispanic or Latino
   b. ☒ Not Hispanic or Latino

10. VETERAN STATUS *("X" one)*
   a. ☒ Non-Veteran
   b. ☐ Veteran

11. HIGHEST EDUCATION LEVEL *("X" one)*
   a. ☐ 8th grade or less
   b. ☐ 9th to 12th grade
   c. ☐ GED
   d. ☒ High School or greater

12. CAREER LINKAGE OR DIRECT ENTRY *("X" one)*
   ☒ None ☐ Adult ☐ Youth ☐ HUD/STEP-UP ☐ School-to-Registered-Apprenticeship
   ☐ Incumbent Worker ☐ Job Corps ☐ Dislocated Worker ☐ Direct Entry: _____

13. SIGNATURE OF APPRENTICE: Ronald D. Baker Jr — DATE:

14. SIGNATURE OF PARENT/GUARDIAN *(if minor)* — DATE:

15a. TRADE: ELECTRICIAN

15b. RAIS Code: 0159

16. TERM *(Hours, Months, Years)*: 8,000 Hours

17. PROBATIONARY PERIOD *(Hours, Months, Years)*: 1,000 Hours

18. CREDIT FOR PREVIOUS EXPERIENCE *(Hrs., Mos., Yrs.)*: 0

19. TERM REMAINING *(Hrs., Mos., Yrs.)*: 8000

20. DATE APPRENTICESHIP BEGINS *(Indenture Date)*: 10-8-15

21. RELATED INSTRUCTION TRAINING *(No. Hrs. per Yr.)*: 144 hours per year

22. RELATED INSTRUCTION SOURCE
   BERKS CAREER & TECHNOLOGY CENTER
   3307 FRIENDENSBURG ROAD
   OLEY, PA

23. APPRENTICE WAGES FOR RELATED INSTRUCTION TRAINING *("X" one)*
   a. ☐ will be paid
   b. ☒ will not be paid

24. PRESENT JOURNEYMAN'S HOURLY WAGE RATE: $20.00

25. APPRENTICE WAGES: *The apprentice schedule of pay shall be listed for each advancement period. The work processes listed in the standards (item3 above) are a part of this agreement.*

PERIOD a.	TERM (Mo./Yr.) b.	% c.	DOLLAR AMOUNT (in dollars & cents) d.	PERIOD a.	TERM (Mo./Yr.) b.	% c.	DOLLAR AMOUNT (in dollars & cents) d.
1	1000 Hours	50%	$10.00	6	1000 Hours	75%	$15.00
2	1000 Hours	55%	$11.00	7	1000 Hours	80%	$16.00
3	1000 Hours	60%	$12.00	8	1000 Hours	85%	$17.00
4	1000 Hours	65%	$13.00	9		%	$0.00
5	1000 Hours	70%	$14.00	10		%	$0.00

26. SIGNATURE OF SPONSOR REPRESENTATIVE
   a. [signature] — DATE SIGNED:

27.

SIGNATURE OF SPONSOR REPRESENTATIVE
   b. — DATE SIGNED:

28. SIGNATURE *(Director, Pennsylvania Apprenticeship & Training Council)*

DATE REGISTERED: 10-8-15

LLC-56 9-05

REGISTRATION AGENCY
PENNSYLVANIA APPRENTICESHIP AND TRAINING COUNCIL
APPRENTICESHIP AGREEMENT
BETWEEN APPRENTICE AND SPONSOR

This AGREEMENT may be terminated by either of the parties, citing cause(s) with notification to the registration agency, in compliance with Title 34, Part IV, Chapter 83.

PRIVACY ACT STATEMENT
The information requested herein is used for apprenticeship program statistical purposes and may not be otherwise disclosed without the express permission of the undersigned apprentice.
Privacy Act of 1974 – P.L. 93-579

1. AGREEMENT BETWEEN APPRENTICE AND:- *("X" one)*
   a. ☒ Employer
   b. ☐ Joint Committee
   c. ☐ Non-Joint Committee

2. PROGRAM NUMBER: PA006158447

3. NAME OF APPRENTICESHIP STANDARDS *(Name & Address of Sponsor)*
McGEE ELECTRIC LLC
72 ROBINSON STREET
POTTSTOWN, PA 19464

The program sponsor and apprentice agree to the terms of the apprenticeship standards as incorporated as part of this agreement. The sponsor will not discriminate in the selection and training of the apprentice in accordance with the Equal Opportunity Standards in Section 30.3, Title 29, Code of Federal Regulation, Part 30.

4. NAME OF APPRENTICE *(Last, First, Middle)*: [redacted]

5. DATE OF BIRTH *(Mo., Day, Year)*: [redacted]

6. SEX *("X" one)*
   a. ☒ Male
   b. ☐ Female

7. SOCIAL SECURITY NO.: [redacted]

8. APPRENTICE'S ADDRESS *(No., Street, City, County, State, ZIP Code)*: [redacted]

9a. RACE *("X" one or more)*
   a. ☐ Am. Indian or Alaskan Nat.
   b. ☐ Asian
   c. ☐ Black or African American
   d. ☐ Native Hawaiian or other Pacific Islander
   e. ☒ White

9b. ETHNIC GROUP *("X" one)*
   a. ☐ Hispanic or Latino
   b. ☒ Not Hispanic or Latino

10. VETERAN STATUS *("X" one)*
   a. ☒ Non-Veteran
   b. ☐ Veteran

11. HIGHEST EDUCATION LEVEL *("X" one)*
   a. ☐ 8th grade or less
   b. ☐ 9th to 12th grade
   c. ☐ GED
   d. ☒ High School or greater

12. CAREER LINKAGE OR DIRECT ENTRY *("X" one)*
☒ None ☐ Adult ☐ Youth ☐ HUD/STEP-UP ☐ School-to-Registered-Apprenticeship
☐ Incumbent Worker ☐ Job Corps ☐ Dislocated Worker ☐ Direct Entry: _____

13. SIGNATURE OF APPRENTICE: Ronald D. Baker Jr. — DATE:

14. SIGNATURE OF PARENT/GUARDIAN *(if minor)* — DATE:

15a. TRADE: ELECTRICIAN

15b. RAIS Code: 0159

16. TERM *(Hours, Months, Years)*: 8,000 Hours

17. PROBATIONARY PERIOD *(Hours, Months, Years)*: 1,000 Hours

18. CREDIT FOR PREVIOUS EXPERIENCE *(Hrs., Mos., Yrs.)*: 0

19. TERM REMAINING *(Hrs., Mos., Yrs.)*: 8000

20. DATE APPRENTICESHIP BEGINS *(Indenture Date)*: 10-8-15

21. RELATED INSTRUCTION TRAINING *(No. Hrs. per Yr.)*: 144 hours per year

22. RELATED INSTRUCTION SOURCE
BERKS CAREER & TECHNOLOGY CENTER
3307 FRIENDENSBURG ROAD
OLEY, PA

23. APPRENTICE WAGES FOR RELATED INSTRUCTION TRAINING *("X" one)*
   a. ☐ will be paid
   b. ☒ will not be paid

24. PRESENT JOURNEYMAN'S HOURLY WAGE RATE: $20.00

25. APPRENTICE WAGES: *The apprentice schedule of pay shall be listed for each advancement period. The work processes listed in the standards (item3 above) are a part of this agreement.*

PERIOD a.	TERM (Mo./Yr.) b.	% c.	DOLLAR AMOUNT (in dollars & cents) d.	PERIOD a.	TERM (Mo./Yr.) b.	% c.	DOLLAR AMOUNT (in dollars & cents) d.
1	1000 Hours	50%	$10.00	6	1000 Hours	75%	$15.00
2	1000 Hours	55%	$11.00	7	1000 Hours	80%	$16.00
3	1000 Hours	60%	$12.00	8	1000 Hours	85%	$17.00
4	1000 Hours	65%	$13.00	9		%	$0.00
5	1000 Hours	70%	$14.00	10		%	$0.00

26. SIGNATURE OF SPONSOR REPRESENTATIVE
a. [signature] — DATE SIGNED:

27.

SIGNATURE OF SPONSOR REPRESENTATIVE
b. — DATE SIGNED:

28. SIGNATURE *(Director, Pennsylvania Apprenticeship & Training Council)* — DATE REGISTERED: 10-9-15

LLC-56 9-05

REGISTRATION AGENCY
PENNSYLVANIA APPRENTICESHIP AND TRAINING COUNCIL
APPRENTICESHIP AGREEMENT
BETWEEN APPRENTICE AND SPONSOR

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PRIVACY ACT STATEMENT
The information requested herein is used for apprenticeship program statistical purposes and may not be otherwise disclosed without the express permission of the undersigned apprentice.
Privacy Act of 1974 – P.L. 93-579

1. AGREEMENT BETWEEN APPRENTICE AND:- *("X" one)*
   a. ☒ Employer
   b. ☐ Joint Committee
   c. ☐ Non-Joint Committee

2. PROGRAM NUMBER: PA

3. NAME OF APPRENTICESHIP STANDARDS *(Name & Address of Sponsor)*
McGEE ELECTRIC LLC
72 ROBINSON STREET
POTTSTOWN, PA 19464

The program sponsor and apprentice agree to the terms of the apprenticeship standards as incorporated as part of this agreement. The sponsor will not discriminate in the selection and training of the apprentice in accordance with the Equal Opportunity Standards in Section 30.3, Title 29, Code of Federal Regulation, Part 30.

4. NAME OF APPRENTICE *(Last, First, Middle)*: [redacted]

5. DATE OF BIRTH *(Mo., Day, Year)*: [redacted]

6. SEX *("X" one)*
   a. ☒ Male
   b. ☐ Female

7. SOCIAL SECURITY NO.: [redacted]

8. APPRENTICE'S ADDRESS *(No., Street, City, County, State, ZIP Code)*: [redacted]

9a. RACE *("X" one or more)*
   a. ☐ Am. Indian or Alaskan Nat.
   b. ☐ Asian
   c. ☐ Black or African American
   d. ☐ Native Hawaiian or other Pacific Islander
   e. ☒ White

9b. ETHNIC GROUP *("X" one)*
   a. ☐ Hispanic or Latino
   b. ☒ Not Hispanic or Latino

10. VETERAN STATUS *("X" one)*
   a. ☒ Non-Veteran
   b. ☐ Veteran

11. HIGHEST EDUCATION LEVEL *("X" one)*
   a. ☐ 8th grade or less
   b. ☐ 9th to 12th grade
   c. ☐ GED
   d. ☒ High School or greater

12. CAREER LINKAGE OR DIRECT ENTRY *("X" one)*
☒ None ☐ Adult ☐ Youth ☐ HUD/STEP-UP ☐ School-to-Registered-Apprenticeship
☐ Incumbent Worker ☐ Job Corps ☐ Dislocated Worker ☐ Direct Entry: _____

13. SIGNATURE OF APPRENTICE: Cory Kudrewicz — DATE:

14. SIGNATURE OF PARENT/GUARDIAN *(if minor)* — DATE:

15a. TRADE: ELECTRICIAN

15b. RAIS Code: 0159

16. TERM *(Hours, Months, Years)*: 8,000 Hours

17. PROBATIONARY PERIOD *(Hours, Months, Years)*: 1,000 Hours

18. CREDIT FOR PREVIOUS EXPERIENCE *(Hrs., Mos., Yrs.)*: 0

19. TERM REMAINING *(Hrs., Mos., Yrs.)*: 8000

20. DATE APPRENTICESHIP BEGINS *(Indenture Date)*: 10-8-15

21. RELATED INSTRUCTION TRAINING *(No. Hrs. per Yr.)*: 144 hours per year

22. RELATED INSTRUCTION SOURCE
BERKS CAREER & TECHNOLOGY CENTER
3307 FRIENDENSBURG ROAD
OLEY, PA

23. APPRENTICE WAGES FOR RELATED INSTRUCTION TRAINING *("X" one)*
   a. ☐ will be paid
   b. ☒ will not be paid

24. PRESENT JOURNEYMAN'S HOURLY WAGE RATE: $20.00

25. APPRENTICE WAGES: *The apprentice schedule of pay shall be listed for each advancement period. The work processes listed in the standards (item3 above) are a part of this agreement.*

PERIOD a.	TERM (Mo./Yr.) b.	% c.	DOLLAR AMOUNT (in dollars & cents) d.	PERIOD a.	TERM (Mo./Yr.) b.	% c.	DOLLAR AMOUNT (in dollars & cents) d.
1	1000 Hours	50%	$10.00	6	1000 Hours	75%	$15.00
2	1000 Hours	55%	$11.00	7	1000 Hours	80%	$16.00
3	1000 Hours	60%	$12.00	8	1000 Hours	85%	$17.00
4	1000 Hours	65%	$13.00	9		%	$0.00
5	1000 Hours	70%	$14.00	10		%	$0.00

26. SIGNATURE OF SPONSOR REPRESENTATIVE
a. [signature] — DATE SIGNED:

27.

SIGNATURE OF SPONSOR REPRESENTATIVE
b. — DATE SIGNED:

28. SIGNATURE *(Director, Pennsylvania Apprenticeship & Training Council)* — DATE REGISTERED: 10-8-15

LLC-56 9-05