

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrician Construction Program
Revision Date: November 21, 2024

I. CATALOG DESCRIPTION

Course Number: ELET1710
Course Title: DC Theory, Conduit Fab and NEC
Prerequisite(s): Successful completion of SCC and IBEW entrance requirements.
Corequisite(s): None
Catalog Description: An introductory course in electricity and electrical construction work. Covers the basics of electrical theory, material and tool identification, DC electrical circuits, conduit bending and installation applications. Includes the interpretation and application of selected articles of the National Electrical Code (NEC).
Credit Hours: 4
Class Hours: 45
Lab Hours: 45
Total Contact Hours: 90

II. COURSE OBJECTIVES: *Course will:*

- A. Provide the student with the foundation of skills in material and tool identification.
- B. Introduce the student to the National Electrical Code and cover the scope and definitions of the code.
- C. Instruct the learner on the concepts of Conduit Bending, which would include both hand and mechanical bending.
- D. Instruct the student on the proper use and care of ladders, a review of mathematics, safety basics, and industry work process applications that they will need to be successful in the electrical industry.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Identify basic hand and power tools used in the electrical industry.
 - 2. Demonstrate the proper use and care of ladders.
 - 3. Demonstrate how to properly read a tape measure to 100% accuracy.
 - 4. Identify the different types of raceway systems used in electrical construction.
 - 5. Demonstrate the different ways to thread Rigid Metal Conduit to 100% accuracy.
 - 6. Demonstrate the ability to hand fabricate 90° stub ups, back to back 90° bends, offsets and kicks using EMT to 100% accuracy.
 - 7. Demonstrate the ability to hand fabricate 90° stub ups, back to back 90° bends, offsets and kicks using RMC to 100% accuracy.
 - 8. Identify the different types of conductor materials used.
 - 9. Demonstrate the proper way to firestop penetrations in rates firewalls.
 - 10. Develop the skill needed to properly bend conduit and pull wires according to the NEC.
 - 11. Demonstrate how to wire multiple types of devices to 100% accuracy.
 - 12. Demonstrate understanding of Articles 90, 100 and 110 of the NEC.
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO #5: Analytical, Quantitative, and Scientific Reasoning

Outcome 3: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.

IV. CONTENT/TOPICAL OUTLINE

A. SECTION 1

1. How to study this course and achieve your personal goals.
2. The attributes of an IBEW/NECA apprenticeship.
3. Knowing your apprenticeship and your responsibilities.
4. The IBEW and its history.
5. NECA's structure and heritage.
6. Your job and the future it holds for you.
7. Keys to success-motivation and leadership.
8. This is a national program.
9. Safety never takes a break.

B. SECTION 2

1. Identifying some basic tools of the trade.
2. The workplace of an electrical worker.
3. The proper use and care of ladders.
4. Choosing and installing the correct masonry fastener.
5. Alignment and measurement.
6. The reality of electrical shock.
7. Electrical Safety.
8. Understanding the function and design of ground fault circuit interrupters.
9. Caution: overhead work in progress
10. Using and installing twist on wire connectors.

C. SECTION 3

1. How to work with fractions.
2. Using basic trigonometric functions.
3. Introduction to conduit bending.
4. Conduit types.
5. Conduit threading techniques.
6. Hand fabrication of 90° stubs.
7. Hand fabrication of back-to-back bends.
8. Hand bending offsets and kicks.

D. SECTION 4

1. Building wire construction and insulation properties.
2. How building wire is sized.
3. Working properly with aluminum conductors.
4. Identifying commonly used electrical materials.
5. Working with prefixes and powers of 10.
6. Using the metric system and metrication changes.
7. How to solve basic algebraic equations.
8. Introduction to firestopping.
9. Fire resistant wall and floor assembly penetrations.
10. Firestop applications.
11. Wire-pulling techniques.

E. SECTION 5

1. An introduction to the National Electrical Code (NEC)
2. Interpreting the language of NEC-Article 100.
3. Understanding and applying article 110 of the NEC – part one.
4. Understanding and applying article 110 of the NEC – part two.

5. General Building wire properties and the NEC.
6. Understanding conductor insulation and NEC specification.
7. Introduction to wiring devices.
8. General requirements related to installing wiring devices.
9. General requirements related to installing industrial wiring devices.
10. Specific receptacle installation requirements.
11. Specific switch installation requirements.

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s):
 1. *Electrical Industry Applications Manual, ETA*
 2. *Blueprint Reading for Electricians, ETA*
 3. *Building a Foundation in Mathematics Textbook, ETA*
 4. *Conduit Bending and Fabrication Textbook, ATP*
 5. *Conduit Fabrication Lab Manual, ATP*
 6. *DC Theory Textbook, ATP*
 7. *Electrical Systems based on 2023 NEC – ATP*
 8. *Residential Blueprints, ETA*
 9. *Test Instruments – ATP*
 10. *Ugly's Electrical References Book -2023 Edition*
 11. *NFPA 70 National Electrical Code – 2023 Edition*
- B. Other Resources: Instructor handouts, National Electric Code and References available at the Lincoln Electrical Joint Apprenticeship and Training Committee Training Center.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture
 2. Discussions
 3. Demonstration.

VII. METHODS OF EVALUATION

- A. Methods of evaluation typically include a combination of the following:
 1. Quizzes
 2. Tests and exams.

VIII. SPECIFIC COURSE REQUIREMENTS

- A. The students will maintain an average of 80% (B) or more on the quizzes, tests and exams or the IBEW can drop them from the program.
- B. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination