SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrician Construction Program
Revision Date: January 11, 2021
Syllabus Statements

I. CATALOG DESCRIPTION

Course Number:	ELET1716
Course Title:	AC Theory, NEC, NFPA 70E Blueprint Reading
Prerequisite(s):	ELET1711 and ELET1713
Corequisite(s):	ELET1718
Catalog Description:	The theory of Alternating Current (AC) circuits are analyzed and calculated. Learn how to properly use test instruments through lab exercises. An in-depth study of how the NEC is constructed along with a study of what each chapter covers. Wire sizing for branch circuits and Feeders are analyzed and calculations made. The next level of Blueprint Reading is covered, and Electrical Safe Work Practices are introduced.
Credit Hours:	4
Class Hours:	45
Lab Hours:	45
Total Contact Hours:	90

II. COURSE OBJECTIVES: *Course will:*

A. Continue to build upon what was learned in course ELET1711 as well as introduce new concepts and work processes.

B. Continue learning about Blueprint Reading and the importance of understanding the role of the specifications on a project.

C. Discuss how the National Electrical Code is put together, how to navigate it and some of the calculations associated with this very important document.

D. Identify hazards involved in working with electricity and the different safety related work practices they can implement in order to reduce and/or eliminate the hazards.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

A. Student Learning Outcomes: *Student will be able to:*

1. Describe the process of the National Electrical Code.
2. Discuss the arrangement of the NEC.
3. Recognize the language of the NEC.
4. Demonstrate how the different chapters of the NEC apply to electrical installations.
5. Compare AC and DC circuits.
6. Recognize the basic characteristics of AC circuits.
7. Examine the electrical safety culture.
8. Recall the History, evolution, layout, style, and scope of NFPA 70E.
9. Demonstrate the processes used to identify the hazards of working with electricity to 100% accuracy.
10. Demonstrate the proper lock-out/tag-out procedures with 100% accuracy.
11. Recognize the tables used in the NEC for sizing building wire.
12. Demonstrate how to properly size building wire in multiple applications with 100% accuracy.

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.** Avoiding the hazard of drug abuse.
- **2.** Becoming familiar with the IBEW constitution.
- **3.** Understanding your local union by-laws.
- **4.** Parliamentary procedure and how it works.
- **5.** An introduction to the COMET Program.
- **6.** American labor history.
- **7.** Pride in your industry.

B. SECTION 2
- **1.** Developing NEC skills.
- **2.** The National Electrical Code process.
- **3.** The arrangement of the NEC.
- **4.** The structure of the NEC.
- **5.** The language of the NEC.
- **6.** Codeology fundamentals.
- **7.** Article 90 introduction.
- **8.** Applying the NEC's "General" chapter.
- **9.** Applying the NEC's "PLAN" chapter.
- **10.** Applying the NEC's "USE" chapter.
- **11.** Applying the NEC's "Build" chapter.
- **12.** Interpreting the NEC's "Special" chapters.
- **13.** Applying chapter 8, chapter 9 tables, and the NEC exam preparation skills.

C. SECTION 3
- **1.** Reviewing the application of DC theory.
- **2.** Understanding vectors and how to use them effectively.
- **3.** Comparing direct current to alternating current.
- **4.** Making circuit calculations for basic systems.
- **5.** Becoming familiar with AC resistive circuits.
- **6.** Understanding the basic characteristics of AC circuits.

D. SECTION 4
- **1.** Introduction to NFPA 70E.
- **2.** Electrical safety culture.
- **3.** Electrical hazard awareness.
- **4.** OSHA considerations.
- **5.** Introduction to lockout, tagging, and the controls of hazardous energy.
- **6.** Fundamentals of three-phase bolted fault currents.

E. SECTION 5
- **1.** Understanding the principles involved in the sizing of building wire.
- **2.** Branch circuits I.
- **3.** Branch circuits II.
- **4.** Feeders and outside branch circuits and feeders.
- **5.** Services.
- **6.** Switches, receptacles and luminaires.
- **7.** Conduit and Raceway basics.
- **8.** NEC requirements for cable assemblies.
- **9.** General requirements for wiring methods and materials.

10. Conductors for general wiring.
11. Electrical nonmetallic tubing (ENT).
12. Liquidtight flexible metal conduit: Types LFMC & LFNC.

V. INSTRUCTIONAL MATERIALS

A. Required Text(s):
1. *AC Theory Textbook – NJATC*
2. *Applied Codeology textbook- 2020 Edition – NJATC*
3. *Blueprint Reading for Electricians – NJATC*
4. *Code Calculations Textbook – NJATC*
5. *Electrical Safety Related Work Practices Textbook- 2018 Edition –NJATC*
6. *Residential Blueprint – NJATC*
7. *Transformer Principles and Applications Textbook– ATP*
8. *Test Instruments Applications Manual- NJATC*
9. *Electrical Industry Applications Manual - NJATC*

B. Other Resources: Instructor handouts
1. National Electric Code NFPA 70E Textbook -2020 Edition
2. References available at the Lincoln Electrical Joint Apprenticeship and Training
3. 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 75% (C) or more on the quizzes, tests and exams or the IBEW will drop them from the program.
B. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.