SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrician Construction Program
Revision Date: August 26, 2019
Syllabus Statements

I. CATALOG DESCRIPTION

Course Number:	ELET1728
Course Title:	Motors, Lightning Protection, Lighting Fundamentals
Prerequisite(s):	ELET1723 & ELET1727
Corequisite(s):	ELET1732
Catalog Description:	An in-depth study of the general principles of AC and DC motors. The concepts and multiple devices of Motor Controls and the applications they are used. Lightning protection systems, design and installation requirements. The science of lighting, the various types of lighting, their applications and how they are controlled are covered. The concept of Programmable Logic Controllers, how they function and how to program a PLC using ladder logic. A study of building automation concepts are covered.
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 ELET1727 as well as introduce new concepts and work processes.
B. Discuss magnetism and induction and how they apply to electric motors.
C. Examine motor circuits, which would include starting, overload and overcurrent protection, and disconnecting means.
D. Explain motor starters, automatic and manual pilot devices along with control drawings.
E. Investigate the principles of a lightning protection system.
F. Describe the science and concepts of lighting.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES;

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

1. Discuss the concepts and parts of a complete lightning protection system.
2. Demonstrate how to design and install a lightning protection system with 100% accuracy.
3. Recognize the construction and nameplate information of the different types of AC & DC motors.
4. Demonstrate how to install and connect a motor with 100% accuracy.
5. Identify the components of a motor starter.
6. Explain overload relays, pushbuttons, selector switches and mechanical pilot devices.
7. Demonstrate how to connect overload relays, pushbuttons, selector switches and mechanical pilot devices with 100% accuracy.
8. Demonstrate how to read motor control drawings with 100% accuracy.
9. Analyze the difference between 2 and 3-wire control circuits.
10. Demonstrate how to draw schematic and wiring diagrams with 100% accuracy.
11. Discuss the concepts of a lightning protection system.

12. Demonstrate how to properly size and install and lightning protection system.
13. Examine the science and types of lighting available in today's market.
14. Demonstrate the knowledge of how to troubleshoot a lighting system 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. Magnetism and induction
2. Motor nameplates
3. AC alternators
4. Three-phase motors
5. Squirrel cage motors

B. SECTION 2

1. Wound rotor motors
2. Single phase motors
3. Motor protection
4. DC motors and generators
5. Motor starting
6. Motor branch circuits
7. Motor branch circuit protection
8. Motor overload protection
9. Sizing motor disconnect

C. SECTION 3

1. Introduction to magnetic motor control
2. Manual pilot devices
3. Automatic pilot devices
4. Magnetic control relays
5. Control transformers
6. Magnetic contactors
7. Basic motor starters
8. Basic timers
9. Control diagrams and drawings

D. SECTION 4

1. Lightning protection systems introduction
2. Lightning protection system's groundwork
3. Down conductors and bonding
4. Rooftops
5. Concealed and structural steel systems
6. Bonding requirements and potential equalization
7. Surge protection devices

E. SECTION 5

1. Basic concepts in lighting
2. The science of light
3. Qualities of light sources
4. Daylighting
5. Lamps
6. Luminaires

7. Lighting controls
8. Quantity and quality of light
9. Basic lighting retrofit and energy codes
10. Understanding florescent and HID lighting terminology
11. The ABCs of electronic florescent ballasts
12. The ABCs of high intensity discharge ballast 1
13. The ABCs of high intensity discharge ballast 2
14. Introduction to LED lighting and technology
15. LED lighting in detail
16. LED lighting applications

V. INSTRUCTIONAL MATERIALS

A. Required Text(s): *IBEW Apprentice Guide*

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 75% (C) or more on the quizzes, tests and exams or the IBEW will drop them from the program.