

**SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrician Construction Program
Revision Date: ~~January 11, 2024~~ November 21, 2024**

I. CATALOG DESCRIPTION

Course Number: ELET1717
Course Title: AC Theory II, Test Inst. and Blueprint Reading II
Prerequisite(s): ELET1716 ~~and ELET1718~~
Corequisite(s): ~~ELET1724~~ None
Catalog Description: The theory of Alternating Current (AC) circuits are studied further and multiple exercises are completed to reinforce the concepts. Learn how to properly use test instruments for AC circuits through lab exercises. The fundamentals of Specifications and Blueprint Reading is discussed further. Several job application exercises are completed included but not limited to: conductor splicing, installing different types of luminaires in ceilings, installing different raceway systems both exposed and concealed, installing boxes in existing walls and terminating CAT 5 & 6 wall jacks.
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 ELET1716 as well as introduce new concepts and work processes.
- B. Continue to learn about Blueprint Reading and specifications.
- C. Illustrate the concepts of AC circuits both series and parallel.
- D. Demonstrate how to properly use a digital multimeter to read voltage, current and resistance in an AC circuit.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Demonstrate the basic fundamentals of blueprints and specifications.
 - 2. Interpret the fundamentals of blueprint drawing and how to make proper sketches.
 - 3. Demonstrate the ability to read and locate electrical devices on a blueprint with 100% accuracy.
 - 4. Demonstrate the ability to locate information from a blueprint specification with 100% accuracy.
 - 5. Discuss three-phase systems.
 - 6. Describe AC resistive circuits.
 - 7. Identify inductance and how it affects a circuit.
 - 8. Discuss inductive reactance.
 - 9. Analyze inductors that are in series and/or parallel.
 - 10. Examine vectors and how to use them effectively.
 - 11. Interpret the parameters of series RL circuits.
 - 12. Express the basic characteristics of AC circuits.
 - 13. Demonstrate several job application tasks 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. Reviewing the basic fundamentals of blueprints and how they are drawn.
 - 2. Analyzing and laying out residential circuits.
 - 3. Understanding job cost and how to do an actual takeoff.
 - 4. Understanding, interpreting, and evaluating blueprint specifications.
 - 5. Interpreting blueprint schedules and locating components on the print.
 - 6. Becoming familiar with blueprint system integration.
 - 7. Learning how to effectively use blueprints.
- B. SECTION 2
 - 1. Understanding inductance and how it affects the circuit.
 - 2. Working with inductors that are in series and/or parallel.
 - 3. Becoming familiar with inductive reactance.
 - 4. Understanding capacitance and how it affects the circuit.
 - 5. Understanding and working safely with capacitors.
 - 6. Working with capacitors that are in series and/or parallel.
 - 7. Becoming familiar with capacitive reactance.
- C. SECTION 3
 - 1. Comprehending the parameters of the series RL circuit.
 - 2. Comprehending the parameters of the series RC circuit.
 - 3. Comprehending and analyzing series RLC circuits.
 - 4. Understanding and working with parallel RL circuits.
 - 5. Understanding and working with parallel RC circuits.
 - 6. Comprehending and analyzing parallel RLC circuits.
 - 7. Identifying and working with LC circuits.
 - 8. Comparing series and parallel RLC circuits.
 - 9. Analyzing and working with combination RLC circuits.
- D. SECTION 4
 - 1. Power factor.
 - 2. Power factor correction.
 - 3. General use test instruments.
 - 4. Electronic circuit test instruments.
 - 5. Introduction to generators.
 - 6. Understanding how the DC generator works.
 - 7. Understanding the design and function of AC generators.
 - 8. Introduction to three-phase systems.
- E. SECTION 5
 - 1. Series resonance.
 - 2. Parallel resonance.
 - 3. Series- parallel resonant circuit comparisons.
 - 4. Filters.
- F. SECTION 6
 - 1. Electrical industry applications labs that include:
 - a. Splicing conductors
 - b. Installing a luminaire (recessed “can” fixture).
 - c. Installing a luminaire (2’ x 4’ florescent)
 - d. Installing a retrofit “old work” electrical box.
 - e. Installing flexible metal conduit.

- f. Installing armor clad and metalclad cables.
- g. Terminating a cat five he or cat 6/6 a work area outlet.

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s):
 - 1. *AC Theory Textbook – NJATC*
 - 2. *Applied Codeology Textbook -~~2020~~2023 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~~2023 Edition
 - 2. References available at the Lincoln Electrical Joint Apprenticeship and Training ~~3.~~ Committee Training Center.

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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~~80% (~~CB~~) or more on the quizzes, tests and exams or the IBEW ~~will can~~ drop them from the program.
- B. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.