

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrical/Electromechanical Technology Program
Revision Date: August 22, 2022

I. CATALOG DESCRIPTION

Course Number: ELEC1464
Course Title: Transformers, Three-phase System
Prerequisite(s): ELEC1217
Catalog Description: Study of transformers including three-phase use with balanced and unbalanced loads. Wiring techniques and performance characteristics of single phase motors.

Credit Hours: 3
Class Hours: 30
Lab Hours: 45
Total Contact Hours: 75

II. COURSE OBJECTIVES: *Course will:*

- A. Teach students about all types of three-phase systems.
- B. Cover motors and motor repair techniques.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Understand transformers
 - 2. Understand single phase motors
 - 3. Understand three-phase transformer hookups
 - 4. Have an understanding of three-phase transformers and perform required projects
- B. General Learning Outcomes (GELOs)
 - 1. GELO #3: Critical Thinking & Problem Solving
 - Outcome 1: Collect, identify, interpret, and analyze data
 - Outcome 2: Synthesize information to arrive at reasoned solutions

IV. CONTENT/TOPICAL OUTLINE

- A. Single Phase Motor Theory
 - 1. Theory of operation
 - 2. Induction motors
 - 3. Capacitor start motors
 - 4. Permanent split capacitor run motors
 - 5. Capacitor star – capacitor run motors
 - 6. Troubleshooting
 - 7. Meggers
 - 8. Growlers
 - 9. Lead connections
 - 10. Repair tips
- B. Transformer Construction
 - 1. Determine working voltage
 - 2. Proper polarity
 - 3. Transformer efficiency
- C. Three-phase Voltage & Currents
 - 1. Wye to Wye transformers

- a. Proper connections
 - b. Voltage and current calculations
 - c. Laboratory hook-up and measurement of calculated values
- 2. Delta to Delta transformers
 - a. Proper connections
 - b. Voltage and current calculations
 - c. Laboratory hook-up and measurement of calculated values
- 3. Delta to Wye transformers
 - a. Proper connections
 - b. Voltage and current calculations
 - c. Laboratory hook-up and measurement of calculated values
- 4. Wye to Delta transformers
 - a. Proper connections
 - b. Voltage and current calculations
 - c. Laboratory hook-up and measurement of calculated values
- 5. V-V transformers
 - a. Proper connections
 - b. Voltage and current calculations
 - c. Laboratory hook-up and measurement of calculated values
- D. Boost Buck Transformers
 - 1. Understanding the need and use of boost-buck transformers
 - 2. Calculation of voltages and currents for several different design uses
 - 3. Hook-up and test several calculated set-ups

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): None
- B. Supplies: Calculator and notebook

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Lecture
 - 2. Lab
 - 3. Homework/Quizzes
 - 4. Utilizing online shell for documentation and homework/quizzes

VII. METHODS OF EVALUATION

- A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Participation
 - 2. Exams and Quizzes
 - 3. Homework
 - 4. Lab performance

VIII. SPECIFIC COURSE REQUIREMENTS

- A. A minimum grade of D is required.
- B. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.