

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrical/Electromechanical Technology Program
Date: August 2025

I. CATALOG DESCRIPTION

Course Number: ELEC2565
Course Title: Industrial Electronics and Components
Prerequisite(s): ELEC1217
Catalog Description: This course focuses on electronic components used in industrial devices such as variable Frequency drives, DC motor drives and electronic sensors.
Credit Hours: 3
Class Hours: 22.5
Lab Hours: 67.5
Total Contact Hours: 90

II. COURSE OBJECTIVES: *Course will:*

- A. Illustrate applications of diodes and their uses in industry.
- B. Demonstrate testing, troubleshooting and applications of transistors used in industry.
- C. Identify uses and applications of Operational Amplifiers.
- D. Explain uses and applications of Thyristors.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Build and test single phase rectifiers.
 - 2. Build and test three phase rectifiers.
 - 3. Build and test circuits that use transistors as amplifiers.
 - 4. Build and test circuits that use transistors as switches.
 - 5. Build and test various configurations of Operational Amplifier circuits.
 - 6. Build and troubleshoot Pulse Width Modulation circuits using Operational Amplifiers.
 - 7. Build, test and troubleshoot phase control circuits that use SCRs.
 - 8. Build, test and troubleshoot phase control circuits that use TRIACs.
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO #3: Critical Thinking & Problem Solving
Outcome 1: Collect, identify, interpret and analyze data.

IV. CONTENT/TOPICAL OUTLINE

- A. SEMICONDUCTOR DEVICES
 - 1. Diode
 - a. Diode/rectifier review
 - b. Forward and reverse biasing
 - c. Light emitting diodes
 - d. Zener diodes
 - 2. Transistors
 - a. Theory of operation
 - b. NPN & PNP
 - c. Transistor parameters
 - d. Biasing

- e. Ohmmeter testing
 - f. Schematic symbols
 - g. Lead identification
 - h. Darlington pair
 - i. Field effect transistors
- 3. The Operational Amplifier
 - a. The 741 Op Amp
 - b. Theory of operation
 - c. Voltage follower
 - d. Inverting and non-inverting amps
 - e. Comparator
- 4. Silicon Controlled Rectifiers
 - a. Theory of operation
 - b. Ohmmeter testing
 - c. Schematic symbol
 - d. Lead identification
 - e. Phase control circuits
- 5. The Diac
 - a. Theory of operation
 - b. Schematic symbol
- 6. The Triac
 - a. Theory of operation
 - b. Ohmmeter testing
 - c. Schematic symbol
 - d. Lead identification
 - e. Phase Control circuits
- 7. Solid State Relays
 - a. Theory of operation
 - b. AC and DC outputs

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s) None
- B. Other Resources: None
- C. Supplies: Global Specialties Experimenter 300 Bread Board

VI. METHODS OF PRESENTATION/INSTRUCTION

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

VII. METHODS OF EVALUATION

- A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Overall course grade shall consist of Theory grade and Lab grade.

VIII. SPECIFIC COURSE REQUIREMENTS

- A. A minimum grade of 60% is required.
- B. Cheating within the Manufacturing Division: Any violation of academic integrity on assignments, quizzes, or tests will result in a grade of 0 on that assignment, quiz, or test. A second violation in any course after the initial infraction will result in a grade of F for

that course. Any additional violations while in the program will result in a suspension from the program.

- C. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.