

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electronic Systems Technology Program
Revision Date: August 22, 2022

I. CATALOG DESCRIPTION

Course Number: ELEC2400
Course Title: Power Supplies and Troubleshooting
Prerequisite(s): ELEC2150
Catalog Description: Operational theory of voltage regulating supplies and related system components. Troubleshooting techniques and test specifications will be covered and reinforced through lab applications.

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

II. COURSE OBJECTIVES: *Course will:*

- A. Describe concepts of voltage regulation.
- B. Discuss principles of linear and switching voltage regulation methods.
- C. Explain troubleshooting approaches for regulated power supplies.
- D. Define line and load regulation.
- E. Identify various linear regulator confirmations and be able to describe the method used for regulation.
- F. Construct, analyze and troubleshoot basic linear regulators.
- G. Describe the principles of Switch Mode power regulation.
- H. State advantages of Switching regulation over Linear regulation.
- I. Build and troubleshoot Switch mode power supplies.
- J. Troubleshoot PC's and other systems.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Demonstrate a working knowledge of power supply systems.
 - 2. Explain, demonstrate and build switching power supply.
 - 3. Analyze and troubleshoot various power supplies, and other electronic equipment.
 - 4. Develop troubleshooting skills.
- B. General Learning Outcomes (GELOs)
 - 1. GELO #3: Critical Thinking & Problem Solving
Outcome 2: Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE

- A. Power Supply Review
 - 1. AC line voltage
 - a. Values (RMS,P and PP)
 - b. Isolation
 - 2. Rectification circuits
 - 3. Filters
 - 4. Voltage multipliers
- B. Linear Regulators

1. Zener diode type
2. Zener diode with a pass transistor
3. Shunt voltage regulator
4. Series pass with feedback
5. Current limiting circuits
6. Three terminal regulators
- C. Switch Mode Regulators
 1. Pulse width modulator
 2. Variable frequency
 3. Constant drive transformers
- D. Troubleshooting
 1. Assemble and repair of PC
 2. Repair of circuit boards
 3. ISCET exam
- E. Hands on project
 1. Build power supply

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): None
- B. Supplies: Proto-Board

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Technology enhanced lecture
 2. Classroom discussion
 3. Interactive group activities
 4. Audio visual materials
 5. Presentation by experts from the Electronics and Networking industry

VII. METHODS OF EVALUATION

- A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 1. Participation
 2. Daily assignments
 3. Written exams and/or quizzes
 4. Performance and observational assessment

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.