

## ELN 131

### COURSE DESCRIPTION:

Prerequisites: ELC 131

Corequisites: MAT 122

Course Hours Per Week: Class, 3. Lab, 3. Semester

Hours Credit, 4.

### COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:

- a. Identify and describe operation of semiconductor devices.
- b. Analyze where and how analog components are used.
- c. Locate and select analog devices using component specifications based on circuit requirements.
- d. Construct operational circuits using analog devices.
- e. Select and demonstrate the use of appropriate test equipment to analyze circuit operation.
- f. Using appropriate troubleshooting techniques evaluate circuit performance applying suitable repair methods.
- g. Identify and demonstrate safe workplace practices.

### OUTLINE OF INSTRUCTION:

- I. Introduction to Semiconductor Physics
  - A. N-type and P-type materials
  - B. Electron and hole currents
  - C. PN junction and biasing
- II. Diode Circuit Analysis
  - A. Diode model
  - B. Clipper and clamper circuits
  - C. Special diodes: Zener and LED
- III. Power Supplies
  - A. Rectifiers
  - B. Voltage regulation
  - C. Transient suppressors

- D. Power supply troubleshooting
- IV. Bipolar Junction Transistors
  - A. Transistor types: NPN and PNP
  - B. Transistor ratings and specifications
  - C. Transistor testing
- V. Transistor Amplifier Circuits
  - A. DC biasing
  - B. Practical biasing circuits
  - C. BJT transistor amplifier configurations: common-emitter, -collector, and -base
- VI. Common Emitter Amplifiers
  - A. Equivalent circuit models
  - B. Gain and Impedance
  - C. Troubleshooting common emitter amplifiers
- VII. Other BJT Amplifiers
  - A. Common collector amplifiers
  - B. Common base amplifiers
- VIII. Power Amplifiers
  - A. Classes of amplifiers: A, B, AB, C, and D
  - B. Class AB amplifier analysis

**REQUIRED TEXTBOOKS AND MATERIALS:**

Paynter, Robert. Introductory Electronic Devices and Circuits, Prentice Hall.

Paynter, Robert. Lab Manual for Introductory Electronic Devices and Circuits, Prentice Hall.

**STATEMENT FOR STUDENTS WITH DISABILITIES:**