

ELN 275 TROUBLESHOOTING

COURSE DESCRIPTION:

Prerequisites: ELN 232 and ELN 234

Corequisites: ELN 133

This course covers techniques for analyzing and repairing failures in electronic equipment. Topics include safety, signal tracing, use of service manuals, and specific troubleshooting methods for analog, digital, and other electronics-based circuits and systems. Upon completion, students should be able to diagnose and isolate faults logically and perform necessary repairs to meet manufacturers' specifications. Course Hours Per Week: Class, 1. Lab, 3. Semester Hours Credit, 2.

COURSE OBJECTIVES:

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

- a. Inspect electrical connections.
- b. Interpret schematics and assembly drawings to locate components.
- c. Identify, select and handle replacement components.
- d. Replace components and circuit modules.
- e. Conduct ohmmeter tests on circuit components.
- f. Conduct in-circuit tests on components.
- g. Analyze voltage and current measurements to isolate faults.
- h. Isolate faults to module, circuit, and component level.
- i. Trace circuit connections to identify and isolate faults.
- j. Select and apply multimeters.
- k. Select and apply oscilloscopes.
- l. Maintain a technical logbook.

OUTLINE OF INSTRUCTION:

- I. Voltage Measurements
 - A. DC and AC measurements using the digital multimeter
 - B. DC and AC measurements using the digital storage oscilloscope
- II. Printed Circuit Boards
 - A. Types
 - B. Assembly and manufacturing process
 - C. Identifying PCB and PCA markings
 - D. Testing to locate PCB faults
- III. Resistors
 - A. Types
 - B. Operation

- C. Component markings and ratings
 - D. Testing to identify resistor failures
- IV. Capacitors, Inductors, and transformers
- A. Types
 - B. Operation and circuit models
 - C. Testing to identify device failures
- V. Diodes
- A. Types
 - B. Operation and circuit models
 - C. Component markings and ratings
 - D. Testing to identify diode failures
- VI. Transistors
- A. Types
 - B. Operation and circuit models
 - C. Component identification
 - D. Testing to identify transistor characteristics
 - E. Testing to identify transistor failures
- VII. Integrated Circuits
- A. Types
 - B. Component identification and markings
 - C. Testing to identify integrated circuit failures in circuit
- VIII. Schematics
- A. Rules for schematics diagrams
 - B. Creating schematics from a circuit

REQUIRED TEXTBOOKS AND MATERIALS:

Perrazo. The Complete Guide to Electronics Troubleshooting. Delmar.

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.