

ELEC 66 Course Outline as of Fall 2004

CATALOG INFORMATION

Dept and Nbr: ELEC 66            Title: TESTS & MEASUREMENTS  
Full Title: Tests & Measurements/Troubleshooting  
Last Reviewed: 10/13/2003

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	2.00	17	Lab Scheduled	35.00
		Contact DHR	1.00		Contact DHR	17.50
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable  
Grading:            Grade Only  
Repeatability:    00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:

**Catalog Description:**  
Operation, applications and limitations of analog voltmeters, digital voltmeters, signal generators, and oscilloscopes. Construction of a transistor AM (amplitude modulated) receiver to be used as a vehicle for troubleshooting. Troubleshooting techniques and procedures are covered in general and then applied to the AM radio using standard test equipment.

**Prerequisites/Corequisites:**  
ELEC 62.

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: Operation, applications & limitations of analog voltmeters, digital voltmeters, signal generators & oscilloscopes. Troubleshooting techniques and procedures will also be covered. (Grade Only)  
Prerequisites/Corequisites: ELEC 62.  
Recommended:

Limits on Enrollment:  
Transfer Credit: CSU;  
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>			Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>			Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>			Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:	Fall 2009
<b>UC Transfer:</b>		Effective:		Inactive:	

### **CID:**

**Certificate/Major Applicable:**  
Certificate Applicable Course

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Upon completion of this course the students will be able to:

1. Demonstrate correct operation of standard test equipment.
2. Identify applications and limitations of standard test equipment.
3. Construct a functioning amplitude modulated (AM) transistor receiver.
4. Evaluate the functions of each stage in a block diagram of an AM receiver.
5. Analyze the schematic diagram of an AM receiver to the component level.
6. Identify proper and accepted troubleshooting techniques and procedures.
7. Demonstrate success in troubleshooting using a transistor AM receiver.

### **Topics and Scope:**

- I. Standard Test Equipment
  - A. Oscilloscopes
    1. Types
    2. Use
    3. Operation
    4. Applications and limitations of measurements
  - B. Voltmeters
    1. Comparisons of analog and digital
    2. Correct operational characteristics
    3. Applications and limitations
  - C. Signal Generators
    1. Audio versus radio frequency
    2. Function generators
    3. Operation

4. Applications and limitations
- II. Amplitude Modulated (AM) Radio Construction
  - A. Schematic diagram and layout
  - B. Components
    1. identification
    2. orientation
    3. fabrication techniques
  - C. Alignment
- III. AM Radio Operation.
  - A. Block diagram - function of each stage
  - B. Stage analysis - function of each component
- IV. Troubleshooting Theory
  - A. "Divide by two" process
  - B. Signal tracing and fault recognition
  - C. Troubleshooting techniques
- V. Troubleshooting Applications (lab)
  - A. Electrical faults
  - B. Troubleshooting techniques

### Assignment:

Assignments may include:

1. Problem solving: Construct an AM radio; analyze AM radio operation.
2. Homework: Create a schematic diagram and layout for a radio circuit; develop a block diagram and determine the operational function of each stage; demonstrate the "divide by two" process.
3. Class performance and performance exams: Analyze each stage and the function of each component in each stage; Demonstrate troubleshooting techniques (skills) on a radio with electrical faults.
4. Write lab reports evaluating troubleshooting techniques.
5. Textbook reading, 30 pages per week.
6. Quizzes (2-3); midterm; final exam.

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems

Problem solving  
20 - 50%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, Performance exams, Troubleshooting w/instructor evaluation.

Skill Demonstrations  
10 - 40%

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice, Short answer to simulated problems.

Exams  
20 - 50%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

None

Other Category  
0 - 0%

### **Representative Textbooks and Materials:**

Electronic Test Instruments: Analog and Digital Measurements (2nd edition). Prentice Hall, 2002.

Carr, Joseph J. Practical Radio Frequency Test and Measurement: A Technician's Handbook. Newnes, 1999.