COURSE OUTLINE

Analog Circuits and Applications
Course Title

GE 124
Dep't. & Course No.

1. COURSE DESCRIPTION

This course is designed to familiarize students with the different electronic devices, analog circuits, techniques and their respective functions and applications. Such circuits are: Power supply circuits, Amplifiers, Oscillators, and Signal processing circuits. It includes testing and troubleshooting.

11. SEMESTER CREDITS: 3 Credits

111. CONTACT HOURS PER WEEK: 2 Lecture | 3 Lab | 5 Total

1V. PREREQUISITE: GE 114, GE 115, & ET103

V. STUDENT LEARNING OUTCOMES:

At the end of the semester the student with a combination of accuracy of 65% will be able to

1. Discuss the different types DC powers supply circuits.
2. Explain the operation of each section of the DC power supply circuit.
3. Discuss techniques in repairing the DC power supply circuit.

V1. COURSE CONTENT

A. Sectional Diagram of Powers Supply
1. Types of step down transformer
2. Types of rectifier circuit.
3. Types of filter circuit
4. Types of regulator circuit

B. Parts and Operations
1. Powers step down
2. Rectification
3. Filtering
4. Regulating

C. Linear power supply
1. Safety procedures
2. Tips and technique
3. Test instruments

D. Switch mode power supply
1. Safety procedures
2. Tips and technique
3. Test instruments

4. List the different types of transistor amplifier circuit.

5. Explain the characteristics of each type of transistor amplifier circuit.

6. Explain the operation of Operational Amplifier.

7. Discuss the characteristics of different classes of amplifier.

8. Discuss tips and technique in troubleshooting small signal amplifier circuit.

9. Discuss tips and technique in troubleshooting audio amplifier circuit.

E. Types of Amplifier Circuit and Operation

1. Bipolar Transistor Circuit and Biasing
   a. Common Emitter
   b. Common Collector
   c. Common Base
   d. Parameters

2. JFET Circuit and Biasing
   a. Introduction to Field-Effect Transistors
   b. MOS Field-Effect Transistor
   c. FET handling Precautions
   d. Power FET

3. 0p-Amp Circuit and Biasing
   a. Background Information
   b. An Inverting Amplifier
   c. A Non Inverting Amplifier
   d. OP-Amp Input Modes
   e. Math Using Op-Amp Circuits

F. Classes of Amplifier

1. According to operation
   a. Class A
   b. Class B
   c. Class C
   d. Class AB

2. According to the design
   a. Push-Pull Amplifier
   b. Complementary- Symmetry Amplifier

G. Small Signal Amplifier

1. Safety procedures
2. Tips and technique
3. Test instruments

H. Audio Power Amplifier

1. Safety procedures
2. Tips and technique
3. Test instruments

10. List the different type of oscillator circuit.

11. Explain the operation of each type of oscillator circuit.

12. Discuss the tips and technique in diagnosing the problem of oscillator circuit.

13. Explain the operation modulator and demodulator circuit.

14. Discuss the tips and technique in diagnosing the problem of modulator and demodulator circuit.

15. List the different types of filter circuit.

16. Explain the operation of each type of filter circuit.

I. Oscillator

1. Introduction to oscillator circuit
2. Tuned Circuit
3. Hartley and Culprits
4. Piezo Electric Crystal
5. Voltage Controlled Oscillators

J. Modulator and Demodulator Circuit

1. Operation
2. Tips and technique
3. Test instruments

K. Active and Passive Filter Circuil

2. Low Pass Filter
3. High Pass Filter
4. Band Pass Filter
5. Notch Filter

V11. MATERIALS REQUIRED

A. Power Supply Kit
B. Audio Amplifier Kit
C. FM Radio Receiver Kit
D. Multi-meters
E. Oscilloscope
F. Assorted Transistor and IC

V11. TEXTS AND REFERENCES

A. Required Text: Instructor's made handouts.

1X. METHODS OF INSTRUCTION

A. Lecture for the presentation of theory
B. Discussion and questioning for test of understanding
C. Demonstration for the presentation of skills
E. Supervised practical laboratory exercises for emphasis of known principles
F. Computer aided learning

X. METHODS OF EVALUATION

A. Lecture presentation will be tested using the written test.
Laboratory evaluation will be rated based on the following criteria.

1. Accuracy
2. Speed
3. Completion
4. Techniques

B. The components with corresponding weight in percent included in the Computation of Midterm and Final grades are:

Participation	10%
Portfolio	10%
Quizzes/Homework	10%
Midterm/Final Examination	20%
Laboratory Performance/Project....	50%
TOTAL =	100%

The transmutation of percentage letter grades is as follows

90%	- 100 %	=	A
80%	- 89%	=	B
70%	- 79%	=	C
65%	- 69%	=	D
0	- 64%	=	F

TASK LISTING SHEET

ANALOG CIRCUITS AND APPLICATIONS
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Credits: 2 Lec 1 Lab 48 Total Lab Hrs.

Laboratory Objectives	Time Allotment
1. Design and Construct Power supply circuit	9
1. Construct DC regulated power supply circuit 2. Assemble DC regulated power supply equipment	
2. Troubleshoot and Repair Power Supply Circuit	9
1. Test and replace defective parts of power step down circuit. 2. Test and replace defective parts of rectifier and filter circuit. 3. Test and replace defective parts of regulator circuit.	
3. Design and Construct an amplifier Circuit	9
1. Construct an audio amplifier circuit 2. Assemble a small transistorized stereo amplifier circuit (1w to 5wt) 3. Measure the bias voltage of the different parts of the amplifier	
4. Troubleshoot and Repair Amplifier Circuit	9
1. Perform modification of the circuit to repair the system 2. Test and replace defective parts of the amplifier circuit	
5. Troubleshoot and Repair Frequency Generator Circuit	6
1. Perform modification of the circuit to repair the system 2. Test and replace defective parts of the frequency generator	
6. Troubleshoot and Repair Signal Processing Circuit	6
1. Perform modification of the circuit to repair the system 2. Test and replace defective parts of the frequency generator	

Palau Community College
GE 124 – ANALOG CIRCUITS AND APPLICATIONS
Course Learning Outcomes

During the course experience, the course learning outcomes (CLO) will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical rating of 4,3,2 and 1 are not intended to represent the traditional school grading system of A, B, C, D and F. The descriptions associated with each of the numbers focus on the level of student performance for each of the course learning outcome listed below.

Rating Scale: 5 Excellent
4 Above-Average
3 Average
2 Below Average
1. Unacceptable

CLO 1: Design and construct a power supply circuit.

5	Design and construct a power supply circuit with excellent wirings, PCB design, mounting of components, and soldering with no instruction or supervision.
4	Design and construct a power supply circuit with very satisfactory wirings, PCB design, mounting of components, and soldering with no instruction but limited supervision.
3	Design and construct a power supply circuit with satisfactory wirings, PCB design, mounting of components, and soldering with some instruction and more than limited supervision.
2	Design and construct a power supply circuit with unsatisfactory wirings, PCB design, mounting of components, and soldering with considerable instruction and close supervision.
1	Unable to design and construct a power supply circuit even with close instruction and supervision. Little to no experience and knowledge in the area.

CLO 2: Troubleshoot and repair a power supply circuit.

5	Diagnose and fix the problem of a power supply with no instruction or supervision.
4	Diagnose and fix the problem of a power supply circuit with no instruction and limited supervision.
3	Diagnose and fix the problem of a power supply circuit with some instruction and more than limited supervision.
2	Diagnose and fix the problem of a power supply circuit with considerable instruction and close supervision.
1	Unable to fix the problem of a power supply circuit even with close instruction and supervision. Little to no experience and knowledge in the area.

CLO 3: Design and construct an amplifier circuit.

5	Design and construct an amplifier circuit with excellent wirings, PCB design, mounting of components, and soldering with no instruction or supervision.
4	Design and construct an amplifier circuit with very satisfactory wirings, PCB design, mounting of components, and soldering with no instruction and limited supervision.
3	Design and construct an amplifier circuit with satisfactory wirings, PCB design, mounting of components, and soldering with some instruction and more than limited

	supervision.
2	Design and an amplifier construct power supply circuit with unsatisfactory wirings, PCB design, mounting of components, and soldering with considerable instruction and close supervision.
1	Unable to design and construct an amplifier circuit even with close instruction and supervision. Little to no experience and knowledge in the area.

CLO 4: Troubleshoot and repair an amplifier circuit.

5	Diagnose and fix the problem of an amplifier circuit with no instruction or supervision.
4	Diagnose and fix the problem of an amplifier circuit with no instruction and limited supervision.
3	Diagnose and fix the problem of an amplifier supply circuit with some instruction and more than limited supervision.
2	Diagnose and fix the problem of an amplifier supply circuit with considerable instruction and close supervision.
1	Unable to fix the problem of an amplifier circuit even with close instruction and supervision. Little to no experience and knowledge in the area.

CLO 5: Troubleshoot and repair a frequency generator circuit.

5	Diagnose and fix the problem of a frequency generator circuit with no instruction or supervision
4	Diagnose and fix the problem of a frequency generator circuit with no instruction and limited supervision
3	Diagnose and fix the problem of a frequency Generator circuit with some instruction and more than limited supervision.
2	Diagnose and fix the problem of a frequency generator circuit with considerable instruction and close supervision
1	Unable to fix the problem of a frequency generator circuit even with close instruction and supervision. Little to no experience and knowledge in the area.

CLO 6: Troubleshoot and repair a signal processing circuit .

5	Diagnose and fix the problem of a signal processing circuit with no instruction or supervision.
4	Diagnose and fix the problem of a signal processing circuit with no instruction and limited supervision.
3	Diagnose and fix the problem of a signal processing circuit with some instruction and more than limited supervision.
2	Diagnose and fix the problem of a signal processing circuit with considerable instruction and close supervision.
1	Unable to fix the problem of a signal processing circuit even with close instruction and supervision. Little to no experience and knowledge in the area.