



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Physics

PHY 417 – Advance Electronic Practical

Course Code: PHY 417
Course Title: Advance Electronics Practical
No. of Units: 2
Course Duration: Six hours per week for 15 weeks.
Status: Compulsory
Course Email Address: tewetumo@futa.edu.ng
Course Webpage: <http://www.fwt.futa.edu.ng/courseschedule.php?coursecode = PHY417>
Prerequisite: PHY210, PHY315, PHY318

COURSE INSTRUCTORS

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COURSE DESCRIPTION

This course is go into proper detail in electronics designed primarily for students in Physics disciplines. It also meets the need of students in analysis circuit with proper examine it both in practically and theoretically. The practical aspect of the course deals with topics such as the use of electronics laboratory and precautions to take for safety from electrocution, identification of various electronics components, electronics circuit boards, understanding soldering techniques, circuit layouts, design and construction of complex electronic circuits etc. The focus is to impart useful skills on the students in order to enhance their appreciation of electronics and technological advancements and prepare them for other specialised applications to be encountered at higher levels. This laboratory course consists of a group of experiments drawn from various topics in electronic such as design and construction of amplifier using BJT and FET for both single stage and multi-stage, construction and measurement characteristics phase shift, wien bridge, colpitts, Hartley and tuned collector oscillators. Regulated power supplies using discrete components and op-amp as control element. Characteristic and uses of op-amps as an

inverter, summer, differentiator and integrator. Characteristics and uses of logic gates as counters and registers. Construction of weighted resistor and R-2R digital to analogue converters. Flash, dual slope, counter type and ramp analogue to digital converters.

COURSE OBJECTIVES

The objectives of this course are to:

- i. Construct a transistor amplifier from discrete components;
- ii. Construct an inverting, non-inverting and determine the gain;
- iii. Construct integrator and differentiator and determine the graph of output signal;
- iv. Construct oscillators to determine wave nature at output and other parameter;
- v. Construct power amplifier to look at basic characteristic and how to eliminate crossover distortion;
- vi. Construct regulator power supply using discrete components to determine ripple;
- vii. Construction a weighted resistor and R-2R ladder DAC; and
- viii. Construction of ADC using ADC0804 and explain how it can be interface computer and microcontroller.

COURSE LEARNING OUTCOMES / COMPETENCIES

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

(Knowledge based)

- design small amplifier to meet specific need such bandwidth, amplification level, and impedance require for both input and output.
- design power amplifier and it require power supply,
- understand the noise and distortion in a circuit and how to minimised in a circuit design;

(Skills)

The student will

- applied in communication design, instrument design, automobile electronic design and other area of electronic application.

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

i.	Assignment	10%
ii.	Class work	50%
iii.	Attendance	05%
iv.	Final Examination	<u>35%</u>
v.	Total	<u>100%</u>

GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with any of the instructors, indicating the reason for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

Assignments and Group Work: Students are expected to submit assignments as scheduled. Failure to submit an assignment, as at when due, will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the lecturers in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures. Food and drinks are not permitted in the lecture room.

READING LIST

^{1,2,3}Paul Horowitz and Winfield Hill (1995). *The Art of Electronics*. Published by Cambridge, Second edition. United Kingdom 1125p.

³ Gupta B. R. (2003). *Electronics and Instrumentation*. Published by S. Chand and Company Ltd, New Delhi, India 520p.

^{1,3}B. L. Theraja and R. S. Sedha (2003): *Principle of Electronic Devices and Circuits (Analog and Digital)*, S. Chand & Company LTD, New Delhi.

Legend

- 1- Available in the University Library
- 2- Available in Departmental/School Libraries
- 3- Available as Personal Collection

COURSE OUTLINE

TIME	TOPIC	LECTURER	Assignment submission/Time for test
1 ST WEEK	Construction of single amplifier using BJT and determine the following characteristics: input impedance, output impedance, the gain (current and voltage), frequency response and power gain.	Dr. Ewetumo and Dr. Adedayo	All assignment should be submitted by 12 noon on every Friday.
2 nd Week	Construction of single amplifier using FET and determine the following characteristics: input impedance, output impedance, the gain (current and voltage), frequency response and power gain.		
3 rd /4 th Week	Construction of single amplifier using BJT multi-stage and determine the following characteristics: input impedance, output impedance, the gain (current and voltage), frequency response and power gain.		
4 th /5 th Week	Construction of Power Supply		
6 th /7 th Week	Construction class B and AB audio amplifier		
8 th /9 th Week	Construction of Oscillator (RC oscillator: phase oscillator, wein bridge oscillator. LC oscillator: colpitts oscillator, and Hartley oscillator) and their applications		
10 th Week	Construction of inverting amp., non-inverting amp., summer, differentiator, integrator,		
11 th /12 th Week	Construction of DAC: i. Weight resistor and R-2R ladder		
13 th Week	Construction ADC using ADC0804		
14 th Week	Interfacing ADC above computer using VB 6.0 via parallel port		
15 th Week	General Discussion on the practical so far.		