Course Code	Course Name	Credits
26PH012	BASIC ELECTRONICS	04

Course Objectives

- To understand the various techniques and concepts in Electronics.
- To apply these techniques in practical circuits.
- To develop the skill in handling instruments.

Learning Outcomes

Upon successful completion, students will have the knowledge and skills to:

- Understand the characteristics and applications of diodes, rectifiers, filters, Zener diodes, LEDs, and photodiodes.
- Explain the structure, characteristics, and biasing techniques of transistors and FETs used in electronic circuits.
- Analyze the operation and performance of single-stage, multistage, and power amplifiers.
- Describe the principles and working of feedback amplifiers and oscillators.
- Apply concepts of switching circuits and operational amplifiers to design basic electronic circuits.

Unit 1 - Diode Characteristics And Applications (12 Hrs.)

Constant voltage source - constant current source - Maximum power transfer theorem - Thevenine's theorem - procedure for finding Thevenin Equivalent circuit - PN junction theory - V-I characteristics of a PN junction diode - Half wave rectifier - Bridge rectifier - Efficiency - filters - Shunt capacitor filter - p filter - Zener diode - equivalent circuit - voltage regulator - LED - V-I characteristics - advantages - applications - photo diode - characteristics – applications.

Unit 2 – Transistor Characteristics And Biasing Techniques (12 Hrs.)

Junction transistor structure - working of a transistor - transistor amplifying action - transistor characteristics - CB, CE, CC - comparison between the three configurations - basic CE amplifier circuit -selection of operating point - need for bias stabilization - requirements of a biasing circuit - fixed bias - voltage divider biasing circuit - h parameter equivalent circuits - Types of FET - JFET - working principle - symbol - comparison with bipolar transistor - output characteristics - shorted gate drain current, pinch off voltage and gate source cut off voltage - JFET parameters.

Unit 3 - Single Stage, Multistage And Power Amplifiers (12 Hrs.)

Single stage transistor amplifier - BJT, FET - analyzing an amplifier - graphical method - equivalent circuit method - gain of a multistage amplifier - RC and transformer coupling - frequency response curve of an RC coupled amplifier - analysis of two stage RC coupled amplifier - classification of amplifiers - single ended and power amplifier - push pull amplifier.

Unit 4 – Feedback Amplifiers And Oscillators (12 Hrs.)

Concept of feedback in amplifiers - types of feedback - voltage gain of feedback amplifier - advantages of negative feedback - amplifier circuits with negative feedback - classification of oscillators - positive feedback amplifier as an oscillator - LC oscillators - Hartley, Colpitts and RC oscillators - Phase shift and Wien's bridge - Crystal oscillators – Astable multivibrator.

Unit 5 - Switching Circuits & Integrated Circuits (12 Hrs.)

Clipping and clamping circuits - SCR: working - equivalent circuit - important terms - V-I characteristics - Integrated circuits - advantages and disadvantages - Operational amplifier - differential amplifier - basic circuit - operation - common mode and differential mode signals - voltage gains - CMRR- Schematic symbol of OP AMP - output voltage - OP-AMP with negative feedback - inverting amplifier - Non inverting amplifier - Voltage follower - summing amplifiers - Integrator and differentiator.

Reference Books:

1. Bhargava N.N, Kulshreshtha D.C and S.C Gupta - Basic electronics and linear circuits, Tata McGraw Hill Publishing Company Limited, 2007.
2. V.K. Mehta and Rohit Mehta, Principles of Electronics, S. Chand & Co. Ltd, New Delhi, 2013.

Websites and eLearning Sources:

1. https://onlinecourses.nptel.ac.in/noc21_ee55/preview
2. https://youtu.be/USrY0JspDEg?si=pko-wg7aip59RHUn
3. https://youtu.be/_vKeaPHXF9U?si=W9uMuceAvnGBOeUt

COs and Bloom's Taxonomy Mapping – 26PH012		
Course Outcomes	**On successful completion of this course, students will be able to**	**BTL**
CO1	Recall and explain characteristics and applications of diodes and electronic components.	K1, K2
CO2	Apply transistor and FET concepts to analyze electronic circuits and biasing techniques.	K3
CO3	Analyze amplifier circuits and their performance characteristics.	K4
CO4	Evaluate feedback mechanisms and oscillator circuits in practical applications.	K5
CO5	Design and implement basic electronic circuits using operational amplifiers and switching devices.	K6

BTL (Bloom's Taxonomy Level) - K1 – Remembering, K2 – Understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6 - Create

Relationship Matrix – 26PH012													
Course Outcomes	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**						**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	
CO1	3	2	1	1	1	1	3	2	1	1	1	1	1.50
CO2	3	3	2	1	1	1	2	3	3	2	2	1	2.08
CO3	3	3	2	2	1	1	2	2	3	2	2	1	2.00
CO4	2	2	3	2	2	1	2	2	3	3	3	2	2.25
CO5	2	2	3	2	2	2	2	2	3	3	3	3	2.42
												Total	2.05

Mean Score: 3- High, 2- Medium/Moderate, 1-Low