

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B.Tech. Electronics & Communication Engineering
Course Code:	2EC101
Course Title:	Electronic Devices and Circuits
Course Type:	<input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course/ <input type="checkbox"/> Departmental Elective/ <input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/ (<input type="checkbox"/> Open Elective Any other)
Year of Introduction:	2023-24

Credit Scheme

L	T	Practical component				C
		LPW	PW	W	S	
2	-	2	-	-	-	3

Course Learning Outcomes (CLOs):

At the end of the course, students will be able to-

1. apply the concept of semiconductor physics in the working of electronic devices BL-3
2. analyse the performance of electronic circuits such as clipper, clamper and feedback amplifiers BL-4
3. comprehend the operation of FET BL-2
4. design, built and test electronic circuits for various applications BL-6

Unit No.	Syllabus	Teaching hours
I	Semiconductor Diode: Volt-Ampere characteristics, Temperature Dependence of diode characteristic, Transition capacitance, Diffusion capacitance, Diode resistance, clipper, and clamper circuits	06
II	Bipolar Junction Transistor: BJT working and construction, I-V characteristics, Transistors biasing and thermal stabilisation, Transistor as a Switch, Transistor as an amplifier, Hybrid model, Analysis of amplifier circuit using h-parameters	06
III	Feedback Amplifier: Feedback concept, Transfer gain with feedback, General characteristics of negative and positive feedback amplifiers, Oscillators	06
IV	Power amplifier: Introduction, Classification Class A Amplifier, 2nd Harmonic distortion, Higher Order Harmonic Generation, Transformer Coupled Audio Power amplifier, Push - Pull Amplifier, Efficiency, Class B Amplifier, Class AB Operation	03
V	Field Effect Transistor: Classification of FET, working and V-I Characteristics of FET, Transistor biasing techniques, small signal model, high-frequency model (pi model), FET amplifier configurations, Comparison of amplifier configurations	09

Self Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Laboratory Work:

Laboratory work will be based on the above syllabus with a minimum of 15 experiments to be incorporated.

List of Experiments:

Sr. No.	Title of the experiment	Hours
1.	Diode clipper circuits	02
2.	Bias stability Techniques for Bipolar Junction Transistor (BJT)	02
3.	Common Emitter (CE) configuration as an amplifier for Bipolar Junction Transistor (BJT).	04
4.	Common Base (CB) configuration as an amplifier for Bipolar Junction Transistor (BJT).	04
5.	To design, construct and test current series feedback amplifier for given specifications.	04
6.	To design, construct, and test voltage shunt feedback amplifiers for given specifications.	04
7.	To design, construct, and test voltage series feedback amplifiers for given specifications.	04
8.	To design, construct and test RC phase shift oscillator for a given frequency.	02
9.	To design construct and test the LC oscillator.	02
10.	To design, construct and test Class B power amplifiers for different Load Resistances.	02
11.	To design, construct and test common source amplifier using FET for given specifications.	04
12.	To Design DC voltage Regulator using Discrete Components and using voltage regulator IC and determine line and load regulation in both cases.	04
13.	To design, construct and test tuned amplifier for given specifications.	04
14.	Diode clamper circuit.	02
15.	Apply electronic circuit concepts to design and implement a hardware project.	06

Suggested Readings:

1. Boylestead & Nashelsky, Electronics Devices and Circuits Theory, PHI
2. David A. Bell, Electronic Devices and Circuits, Oxford University press
3. Millman & Halkias, Electronic Devices and Circuits, McGraw Hill