

**Course Learning Objectives (CLOs):**

The course focuses on characteristics of widely employed electronic devices, their applications and design of simple analog and digital circuits.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12)/ PSOs (13,14)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	<b>Discuss</b> semiconductor diodes and apply the knowledge to build regulated power supply units.	3	1,2	--
CO-2	<b>Describe</b> the operation of BJT and its applications.	--	1	2,3
CO-3	<b>Explain</b> the working principle and configuration of operational amplifier and discuss its applications.	--	1,2	3
CO-4	<b>Apply</b> the concepts of analog and digital techniques to build simple electronics circuits.	--	2,12	1,3
CO-5	<b>Explain</b> various processors and hardware, software units embedded into a system.	--	--	1

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mapping Level	2.66	1.75	1.67	--	--	--	--	--	--	--	--	2	--	--

**Pre-requisites:** Semiconductor theory

**Contents:****Unit-I**

**Semiconductor Diode and Characteristics:** P-N junction diode, Diode characteristics, Photo diode, LED and Zener diode.

**Applications of Diodes:** Rectification-Half wave rectifier, Full wave rectifier, Bridge rectifier, Effect of capacitor filter on rectifiers, Zener diode as a voltage regulator, 78XX fixed IC voltage regulator, Regulated power supply. **07 Hrs**

## Unit-II

**Bipolar Junction Transistor:** Construction and working, CB,CE,CC configurations, Transistor voltage and currents, DC operating point, Selection of operating point, Fixed biasing, Voltage divider biasing.

**Applications of BJT:** BJT as a switch, BJT as an amplifier, Feedback Amplifiers – Principle, Properties, Advantages of negative feedback, Voltage series feedback, Oscillators – Barkhausen's criteria for oscillation, RC phase shift oscillator, Hartley oscillator. **09 Hrs**

## Unit-III

**Introduction to Operational Amplifier:** Introduction to op-amp, Pin Configuration of 741, Op-amp differential amplifier configurations, Ideal characteristics, CMRR, PSRR, Slew Rate, Input offset voltage, Bias current, Frequency response.

**Applications of Operational Amplifiers:** Inverting amplifier, Adder, Voltage follower, Integrator, Differentiator, Comparator. **07 Hrs**

## Unit-IV

**Digital Electronics Fundamentals:** Difference between analog and digital signals, Boolean algebra, Basic and Universal gates, Realization of expression using universal gates, Half adder, Full adder.

**Basics of Communication Systems:** Block diagram of communication system, Modulation and need for modulation, Amplitude modulation, Frequency modulation. **09 Hrs**

## Unit-V

**Introduction to Embedded Systems:** An embedded system, Hardware units, Software embedded into a system, Exemplary embedded systems.

**Processors in the System:** Introduction, Microprocessor, Microcontroller, Digital signal processor. **07 Hrs**

## Reference Books:

- 1) D.P.Kothari, I.J.Nagarath, "Basic Electronics", 2/e, Mc Graw Hill, 2018.
- 2) Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", 10/e, PHI, 2008.
- 3) Thomas L. Floyd, "Electronic Devices", 9/e, Pearson Education, 2012.
- 4) David A. Bell, "Electronic Devices and Circuits", 5/e, Oxford University Press, 2008.
- 5) George Kennedy and Bernard Davis, "Electronic Communication Systems", 5/e, TMH, 2011.
- 6) Raj Kamal, "Embedded Systems, Architecture, Programming and Design", 1/e, TMH, 2008.