I/II Semester B. E

18UECC100/200	Basic Electronics	(3-0-0) 3 40 Hrs.

Course Learning Objectives(CLOs):

Basic Electronics is a core theory course at undergraduate I/ II semester level common for all the branches of engineering. The course focuses on characteristics of widely employed electronic devices, certain applications of analog and digital circuits and design of simple analog and digital circuits.

Course Outcomes(Cos):

ID	Description of the Outcome	Mapping to POs (1,12)		
		Level 3 Substantial	Level 2 Moderate	Level 1 Slight
CO-1	Discuss semiconductor devices and apply the knowledge to build regulated power supply units	3	1,2	
CO-2	Understanding the working principle of BJT as an amplifier, feedback amplifiers and oscillators.	3	1,2	
CO-3	Explain the working principles, configurations of Operational Amplifiers and implement various arithmetic circuits.	3	1,2	
CO-4	Review of Number systems and Apply the principles of Boolean algebra to design combinational Digital circuits	3	2	1
CO-5	Describe basic building blocks of communication system and compare different modulation techniques	3	2	1
CO-6	Apply the concepts of analog and digital techniques to build simple electronics circuits.			1

POs→	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
Mapping Level	2	2.5	3	-	-	-	-	-	-	-	-	-

1- Introductory (Slight) 2 - Reinforce (Moderate) 3- Mastering (Substantial)

Pre Requisites:

Introduction to Semiconductor theory.

Course Contents:

Chapter No.	Chapter contents	No of Hrs.
1.	**Semiconductor Diodes and Applications:** p-n junction diode, diode characteristics, Equivalent circuit of diode, Rectification-Half wave rectifier, Full wave rectifier, Bridge rectifier, Effect of capacitor filter on rectifiers. Zener Diode, Zener diode as a voltage regulator, Photo diode, LED, Photocoupler.	**6**
2.	**BJT and Applications:** BJT: construction and working, CB,CE,CC configurations, biasing methods, BJT as an amplifier, BJT as a switch, Transistor switch circuit to switch ON/OFF an LED and a lamp in a power circuit using a relay. Feedback Amplifiers – Principle, Properties and advantages of Negative Feedback, Voltage series feedback. Oscillators – Barkhausen's criteria for oscillation, RC Phase Shift oscillator, Wien Bridge oscillator.	**10**
3.	**Operational Amplifiers and Applications:** Introduction to Op-Amp, Differential Amplifier Configurations, Ideal Characteristics, Op-Amp parameters-CMRR, PSRR, Slew Rate, Input offset voltage, Bias current, frequency response, Pin Configuration of 741 Op-Amp, Applications-Inverting amplifier, Adder, Voltage follower, Integrator, Differentiator, Comparator.	**8**
4.	**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.	**6**

5.	**Basics of Communication Systems:** Block Diagram of Communication System, Modulation and need for Modulation, Amplitude and Frequency Modulation.	**4**
6	**Introduction to Embedded Systems:** An Embedded system, Processor in the system, Other Hardware Units, Software Embedded into a system, Exemplary Embedded Systems.	**6**

Beyond the Syllabus Coverage(Suggestive):

Demonstration of some Analog & Digital devices and circuits.

Text Book:

1. D.P.Kothari, I.J.Nagarath, “Basic Electronics”, 2nd edn, Mc Graw Hill, 2018.

Reference Books:

1. Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuits”, 10/e,PHI.
2. Thomas L. Floyd ,” Electronic Devices”, Pearson Education, 9th edition, 2012.
3. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 5th Edition, 2008.
4. George Kennedy and Bernard Davis, “Electronic Communication Systems” , 4th edition, TMH.
5. Raj Kamal, “ Embedded Systems, Architecture, Programming and design”, TMH,2003.