BASIC ELECTRONICS ENGINEERING

III Semester: CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AECB01	Foundation	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 70		

OBJECTIVES:

The will try to learn:

I. The Fundamental knowledge of the operational principle and characteristics of semiconductor devices and their applications
II. The working principle of Op-Amp and its linear and non linear applications such as amplifiers, data converters.
III. The binary numbers systems, Boolean algebra principles and basic logic gates to implement combinational and sequential circuits

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

1 Demonstrate the properties of semiconductor materials which forms the basis for the formation of pn junction diode and zener diode.
2 Extend the pn junction characteristics for the diode applications such as switch and rectifiers.
3 Compare the half and full wave rectifier circuits with and without filters for attenuating ripples in rectifier output.
4 Explain the constructional features and principle of operation of bipolar and unipolar devices for operating in active, saturation and cutoff regions.
5 Make use of the V-I characteristics of BJT, JFET and MOSFET for determining the input, output resistance and current, voltage gain.
6 Extend the different modes of op-amp configurations for finding parameters of slew rate, CMRR and PSRR.
7 Utilize the inverting and non-inverting amplifiers as arithmetic operations, waveform generator and in IC related real time applications.
8 Illustrate monostable and astable multivibrator using the IC 555 timer
9 Classify the various data converters for converting analog data to digital data and digital data to analog data.
10 Identify the different performance characteristics and specifications of data converters.
11 Examine the need of binary number systems, Boolean algebra and logic gates for implementing digital circuits.
12 Interpret the need of sequential logic design principles for designing flip-flops, counters and shift registers.

MODULE-I	DIODE AND APPLICATIONS	Classes: 09
Semiconductor Diode - Ideal versus Practical, Resistance Levels, Diode Equivalent Circuits, Load Line Analysis; Diode as a Switch, Diode as a Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Breakdown Mechanisms, Zener Diode – Operation and Applications.		
MODULE-II	**BIPOLAR JUNCTION TRANSISTOR (BJT)**	**Classes: 09**
Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Voltage Divider Bias Configuration; Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Depletion and Enhancement type Metal Oxide Semiconductor (MOS) FETs, Introduction to CMOS.		
MODULE-III	**OPERATIONAL AMPLIFIERS AND APPLICATIONS**	**Classes: 10**
Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram,Pin Configuration of 741 Op-Amp, Characteristics of Ideal OpAmp, Concept of Virtual Ground; Op-Amp Applications- Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.		
MODULE-IV	**TIMERS AND DATA CONVERTERS**	**Classes: 09**
IC 555 Timer – Block Diagram, Astable and Mono stable Multi vibrator Configurations; Data Converters – Basic Principle of Analogue–to-Digital (ADC) and Digital-to-Analogue (DAC) Conversion, Flash type, Counter-ramp type and Successive Approximation type ADCs, Resistor Ladder Type DAC, Specifications of ADC and DAC.		
MODULE -V	**BASIC DIGITAL ELECTRONICS**	**Classes: 08**
Binary Number Systems and Codes; Basic Logic Gates and Truth Tables, Boolean Algebra, De Morgan's Theorems, Logic Circuits, Flip-Flops – SR, JK, D type, Clocked and Master-Slave Configurations; Counters –Asynchronous, Synchronous, Ripple, Non-Binary, BCD Decade types; Shift Registers – Right-Shift, Left-Shift, Serial-In-Serial-Out and Serial-In-Parallel-Out Shift Registers; Applications.		

Text Books:

1. R. L. Boylestad & Louis Nashlesky, "Electronic Devices &Circuit Theory", Pearson Education, 2007.
2. Santiram Kal, "Basic Electronics- Devices, Circuits and IT Fundamentals", Prentice Hall, India, 2002.

Reference Books:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 2008.
2. Thomas L. Floyd and R. P. Jain, "Digital Fundamentals", Pearson Education, 2009.
3. R. S. Sedha , "A Text Book of Electronic Devices and Circuits", S. Chand & Co., 2010.
4. R. T. Paynter, "Introductory Electronic Devices & Circuits – Conventional Flow Version", Pearson Education, 2009.

Web References:

1. mcsbzu.blogspot.com
2. https://archive.org/details/ElectronicDevicesCircuits
3. https://www.smartzworld.com
4. https://www.crectirupati.com

E-Text Books:

1. https://books.google.co.in/books/about/Switching_Theory_and_Logic_Design
2. http://services.eng.uts.edu.au/pmcl/ec/Downloads/LectureNotes.pdf
3. http://nptel.ac.in/courses/122106025/
4. https://books.google.co.in/books?isbn=8122414702
5. https://books.google.co.in/books?isbn=013186389