BASIC ELECTRONICS ENGINEERING

III SEMESTER: CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AECB01	Foundation	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES:

The course should enable the students to:

I. Introduce components such as diodes, BJTs and FETs.
II. Know the applications of components.
III. Understand common forms of number representation in logic circuits
IV. Be acquainted to principles and characteristics of op-amp and apply the techniques for the design of comparators, instrumentation amplifier, integrator, differentiator

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COURSE OUTCOMES:

CO 1: Describe the concept of diode and its applications.
CO 2: Describe the operation of various transistors, FETs and their biasing methods.
CO 3: Understand the concept of operational amplifier with analysis of applications.
CO 4: Analysis of 555 timer IC for multivibrators and op-amp data converters.
CO 5: Explore the digital number systems and various digital logic circuits.

COURSE LEARNING OUTCOMES:

1. Understand the basic concept of PN junction diode.
2. Analyze the characteristics of diode for ideal and practical conditions.
3. Understand the applications of diode in rectifiers with and without filters.
4. Understand the concept of breakdown mechanism in diodes with applications of Zener breakdown diodes.
5. Describe the classification family table of various transistors.
6. Describe the concept of Bipolar Junction transistor with various modes of operation.
7. Understand the concept of transistor biasing with voltage divider bias.
8. Understand the construction and working of Field Effect Transistor(FET).
9. Understand the concept of Metal Oxide Semiconductor FET.
10. Illustrate the basic CMOS circuits.
11. Understand the basic concepts of operational amplifiers.
12. Analyze the parameters of practical and ideal op-amps.
13. Understand the concept of virtual ground in op-amps.
14. Perform basic arithmetic operations on voltages using opamps.
15. Examine the working of op-amp as differentiator, integrator, comparator and buffer.
16. Understand the internal block diagram of 555 timer IC.
17. Examine the working of 555 timer as astable and monostable multivibrator.
18. Understand the principle of data conversions with terminology.

19. Analyze the A/D converters.
20. Analyze the resistor ladder D/A converters.
21. Perform calculations in different number systems.
22. Understand the basic concepts of Boolean algebra and combinational logic circuits.
23. Understand the basic sequential logic circuits.
24. Understand counters, shift registers.

MODULE – I	DIODE AND APPLICATIONS	Classes: 08

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: 10

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: 08

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: 10

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: 09

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