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: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

I. COURSE OVERVIEW:

This course provides the preliminary knowledge on electronics for civil engineering students. The course gives insights into the construction, operation and of the diodes and transistors. It provides the understanding about the integrated circuits applications, focusing on generic applications through operational amplifiers, timers. The course also includes digital electronics.

II. 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

III. COURSE OUTCOMES (COs):

COs	Course Outcome
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.

IV. SYLLABUS:

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 circuits;

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; 49 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, A stable 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;

V. 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

VI. 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.

VII. Web References:

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

VIII. 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