DIGITAL ELECTRONICS

IV Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AECC16	**Core**	3	-	-	3	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

Prerequisite: There are no prerequisites to take this course

I. COURSE OVERVIEW:

This course intended to logic gates, various logic families. Design of digital circuits using logic gates, combinational circuits and sequential circuits. Apply op-amp characteristics to design analog to digital converters and digital to analog converters. Classification and characteristics of memories such as Read-only memory, Random access memory and programmable logic devices such as programmable logic array and programmable array logic

II. COURSE OBJECTIVES:
The students will try to learn:
I.   Demonstrate the concept of electrostatic field intensity and electric potential.
II. Illustrate polarization of dielectrics and the behavior of conductors and dielectrics in electric field.
III. Understand the concept of magnetic field intensity and flux density.
IV. Discuss forces in magnetic fields and law of electromagnetic induction.
V. Analyze propagation of electro-magnetic waves.

III. COURSE SYLLABUS:
MODULE-I: FUNDAMENTALS OF DIGITAL SYSTEMS AND LOGIC FAMILIES (09)
Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital lCs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

MODULE-II: COMBINATIONAL DIGITAL CIRCUITS (09)

Standard representation for logic functions, K-map representation, and simplification of logic functions using Kmap, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer, Decoders, Adders, Sub tractors, BCD arithmetic, carry look ahead adder, serial ladder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders, drivers for display devices, Q-M method of function realization.

MODULE-III: SEQUENTIAL CIRCUITS AND SYSTEMS (09)

1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J- K-T and D types flip flops, applications of flip flops, shift registers, applications of shift registers.

Serial to parallel converter: Parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

MODULE-IV: A/D AND D/A CONVERTERS (09)

Digital to analog converters: weighted resistor, converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter lCs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

MODULE-V: SEMICONDUCTOR MEMORIES AND PROGRAMMABLE LOGIC DEVICES (09)

Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

IV. TEXT BOOKS:
1. P Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M M Mano, "Digital logic and Computer design", Pearson Education India, 2016.

V. REFERENCE BOOKS:
1. A Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

VI. WEB REFERENCES:
1. https://www.calvin.edu/~pribeiro/courses/engr315/EMFT_Book.pdf
2. https://www.web.mit.edu/viz/EM/visualizations/coursenotes/modules/guide02.pdf
3. https://www.nptel.ac.in/courses/108106073/
4. https://www.iare.ac.in

VII. E-TEXT BOOKS:
1. https://www.*bookboon.com/en/electromagnetism-for-electronic-engineers*
2. https://www.books.google.co.in/books/.../Fundamentals of Electromagnetic Fields
3. https://www.aliexpress.com/item/EBOOK...Electromagnetic-Fields-2