Digital Electronics

CourseCode	23EC2701A	**Year**	IV	**Semester**	I
Course Category	OE–III	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	---
ContinuousInternal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		BL
CO1	Understand different number systems and generate various codes.	L2
CO2	Simplify and implement the Switching Functions using logic gates.	L3
CO3	Design different types of combinational logic circuits.	L4
CO4	Analyse the behaviour of different sequential circuits.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes &Strength of correlations (3-High, 2: Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2							2	2			1	
CO2	3	3	2		1			2	2			3	
CO3	3	2	3	1	2			2	2			3	2
CO4	3	3	3	1	2			2	2			3	2
Avg.	3	3	3	1	2			2	2			3	2

Syllabus		
UnitNo.	**Contents**	**Mapped CO**
1	**Review of Number Systems & Codes:** Representation of numbers of different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed members. Gray code ,4 bit codes; BCD, Excess-3, 2421, 84-2-1 code etc., Error detection & correction codes: parity checking, even parity, odd parity, Hamming code **Boolean theorems and logic operations:** Boolean theorems, principle of complementation & duality, De-morgan theorems. Basic logic operations - NOT, OR, AND, Universal Logic operations, EX-OR, EXNOR operations. Standard SOP and POS Forms, NAND-NAND and NOR-NOR realizations.	CO1,CO2
2	**Minimization Techniques:** Minimization and realization of switching functions using Boolean theorems, K-Map (up to 5 variables). **Combinational Logic Circuits Design:** Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders; 4-bit adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit and carry look-a-head adder circuit	CO2,CO3
3	**Combinational Logic Circuits Design Using MSI &LSI:** Design of encoder, decoder, multiplexer and demultiplexers, Implementation of higher order circuits using lower order circuits, Realization of Boolean functions using decoders and multiplexers. Design of Priority encoder, 4-bit digital comparator and seven segment decoder	CO3
4	**Introduction Of PLD's:** PROM, PAL, PLA -Basics structures, realization of Boolean functions.	CO3

5	**Sequential Circuits:** Classification of sequential circuits (synchronous and asynchronous) operation of NAND & NOR Latches and flip-flops; truth tables and excitation tables of RS flip-flop, JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals. Conversion from one flip-flop to another flip-flop, Design of ripple counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register, bi-directional shift register, universal shift register	CO4

Learning Resources
Text Books
1. Michael D. Ciletti, M. Morris Mano, Digital Design, Pearson Education, 4th Ed., 2007. 2. Zvi. Kohavi , Switching and finite automata theory, Cambridge, 3rd Ed., 3. Charles Roth, Jr., Larry Kinney, Fundamentals of Logic Design, Cengage Learning, India, 7th Ed., 2013.
Reference Books
1. Anand Kumar, Switching Theory and Logic Design, PHI, 3rd Ed., 2. Fredriac J. Hill, Gerald R. Peterson, Introduction to Switching Theory and Logic Design, John Wiley & Sons Inc. , 3rd Ed.,
e- Resources & other digital material
1. https://nptel.ac.in/courses/108105132