Switching Theory and Logic Design

Course Code	**23EC3302**	**Year**	II	**Semester**	I
Course Category	Program Core	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal 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	Perform Binary arithmetic operations using Complements and identify Binary Codes.	L3
CO2	Implement Switching Functions using Logic Gates.	L3
CO3	Apply Boolean theorems & K-Map to simplify the Switching Functions.	L3
CO4	Analyse various Combinational and Sequential circuits.	L4
CO5	Design Combinational and Sequential circuits for the given specifications.	L5

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

COs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**
CO1	2								1	1		1		
CO2	2								1	1		1		
CO3	2								1	1		1		
CO4		3							1	1		1	2	
CO5			3						1	1		1	2	1
Avg.	2	3	3						1	1		1	2	1

Syllabus		
Unit No.	**Contents**	**Mapped CO**
1	**Binary Codes**: Signed Binary Numbers, Complements, 84-2-1 code, 642-3 code, 2421 code etc., BCD code, Gray code, Excee-3 code, Error detection and correction codes: Parity code & Hamming code. **Boolean Algebra**: Basic theorems and Properties of Boolean algebra, Algebraic simplification of Switching Functions, Digital Logic Gates	CO1, CO3
2	**Switching Functions**: Canonical and Standard forms, Simplification of switching functions using K-map method, Four-variable map, Five-variable map, Don't-care conditions, NAND-NAND and NOR-NOR realizations of switching functions.	CO2, CO3
3	**Combinational Logic Circuits**: Introduction, Design procedure, Half adder, Full Adder, Half Subtractor, Full Subtractor, Parallel Binary Adder, Binary Adder/Subtractor, Decoders, Encoders, Multiplexers, De-Multiplexers, Realization of Boolean functions using Decoders and	CO2, CO4, CO5

	Multiplexers, Code Converters.	
4	**Sequential Logic Circuits**: Latches, Flip-Flops, Excitation tables of Flip-flops, Conversion from one flip-flop to another, Registers, Shift registers, Ripple counters, Design of Synchronous Counters, Ring counter.	CO2, CO4, CO5
5	**Synchronous Sequential Machines**: Analysis of Clocked Sequential Circuits, State diagrams, State tables, Mealy and Moore models, State reduction, Design procedure, Design and realization of circuits using various Flip-flops.	CO2, CO4, CO5

Learning Resources
Text Books
1. Michael D. Ciletti, M. Morris Mano, Digital Design, Pearson Education, 4th Ed., 2007.
Reference Books
1. Zvi Kohavi, Switching and Finite Automata Theory, 2nd Ed, Tata McGraw-Hill Education, 2008. 2. John F. Wakerly, Digital Design Principles and Practices, Pearson Education, 4th Ed., 2008. 3. Charles Roth, Jr., Larry Kinney, Fundamentals of Logic Design, Cengage Learning, India, 7th Ed., 2013.
e- Resources & other digital material
1. http://www.ece.ubc.ca/~saifz/eece256.html 2. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Guwahati/digital_circuit /frame/index.html