SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE, EEE, CSE, IT)

Course code: 13EC1105	L	T	P	C
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Course Outcomes:

At the end of the course, a student will be able to

CO 1 Convert one number system to other.

CO 2 Implement logic circuits and simplify logic expressions.

CO 3 Design Combinational logic circuits through expressions.

CO 4 Illustrate the concept of sequential logic design, analyze the operation of flip-flap and design various types of sequential circuits.

CO 5 Differentiate Mealy & Moore models and Simplify and Design Sequential machines.

UNIT-I   (10 Lectures)
NUMBER SYSTEMS & CODES:

Introduction to number systems, Complement representation of negative numbers, binary arithmetic, binary codes, Error detecting & correcting codes.

UNIT-II   (15 Lectures)
BOOLEAN ALGEBRA AND SWITCHING FUNCTION:

Fundamental postulates of Boolean algebra, Basic theorems and properties, switching functions, Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal gates - NAND/ NOR realizations. K-map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules.

UNIT-III   (13 Lectures)
COMBINATIONAL LOGIC DESIGN:

Adders, Subtractor, Multiplexer, De-Multiplexer, MUX Realization

of switching functions, Encoder, Decoder, Parity bit generator, Code-converters, Basic PLD's-ROM, PROM, PLA, PAL Realizations.

UNIT-IV   (13 Lectures)

SEQUENTIAL CIRCUITS:

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Latches and Flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters, Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector.

UNIT-V   (9 Lectures)

FINITE STATE MACHINES:

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

ALGORITHMIC STATE MACHINES:

Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1.   Morris Mano, *"Digital Design"* PHI, 3rd Edition, 2006.

2.   Anand Kumar, *"Switching Theory and Logic Design"* PHI,2008

REFERENCES:

1.   Zvi Kohavi, *"Switching & Finite Automata Theory"* TMH, 2nd Edition

2.   R.P.Jain. *"Modern Digital Electronics",* 4th Edition, TMH, 2009.

3.   John M. Yarbrough, *"Digital Logic Applications and Design"* Thomson Publications, 2006.

4.   Charles H. Roth*, "Fundamentals of Logic Design"* Thomson Publications, 5th Edition, 2004.