II B.Tech I Sem

15AEC06-SWITCHING THEORY AND LOGIC DESIGN

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Course Objectives:

To provide fundamental concepts used in the design of digital systems and learn the methods for the design of digital circuits.

Course Outcomes:

a. To introduce basic postulates of Boolean algebra and the methods for simplifying Boolean expressions
b. To illustrate the concepts and study the procedures for the analysis and design of combinational circuits and sequential circuits
c. To introduce the concepts of programmable logic devices.

UNIT I

Number System & Boolean Algebra: Digital Systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes. Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, Other logic operations & Logic gates.

UNIT I

Gate Level Minimization: The map method, four variable, K-map, Five variable map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Ex-or Function, Tabular Method- Simplification of Boolean function using tabulation Method.

UNIT III

Analysis And Synthesis Of Combinational Circuits: Combinational circuits, Analysis & Design procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT IV

Analysis And Synthesis Of Sequntial Circuits: Sequential Circuits, Latches Flips-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters – Registers, Shift Registers, Ripple Counters, Synchronous counters, other counters.

UNIT V

Asynchronous sequential Logic & Programmable Memories: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of State flow tables, Race-free

State Assignment, Hazards. Random Access Memory, Memory Decoding Errordetection and correction, ROM, PLA, PAL.

Text Books:

1. Digital Design, M.Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, Zvi Kohavi and Nirah K.Jha, 2nd Edition, Tata McGraw Hill, 2005.

References

1. Fundamentals of Logic Design, Charles H Roth,Jr., 5th Edition, Brooks/cole Cengage Learning, 2004.
2. Digital & State Machine Design, Comer, 3rd Edition, OXFORD.
3. Fundamentals Digital Circuits, A.Anand Kumar, 3rd Edition, PHI, 2014.