

Prerequisites: NIL

History and overview, logic circuits, switching, memory, registers, digital systems, Boolean logic, sequential logic, gates, circuits, combinational circuits, Switching theory, number systems, binary arithmetic, switching algebra, minimization of switching functions, design of medium scale combinational logic module, multiplexers, demultiplexers, encoders, decoders, comparators, multipliers, dividers, ALUs, Hierarchical design, Memory elements: clocked and unclocked memory devices, master-slave devices, basic flip flops, timing constraints and propagation delays, data registers, RAM, Sequential logic : FSM, Mealy and Moore models, Synchronous sequential circuits, functional units, Digital System Design: Hierarchical, Modular, synthesis, design principles and techniques, functional units, controlling concepts, timing concepts, PLDs, FPGA, PLA, ROM, PAL, PLD. Modeling and simulation: schematic capture, schematic modeling, hardware description languages (VHDL, verilog), Functional simulation, simulation test bench design.

Essential Reading:

1. S. Brown and Z. Vranesic, *Fundamentals of Digital Logic with VHDL Design*, Tata McGraw Hill, 2005
2. A.B. Marcovitz, *Introduction to Logic Design*, Tata McGraw Hill, 2nd Ed, 2005.

Supplementary Reading:

1. R. P. Jain, *Modern Digital Electronics*, Tata McGraw Hill, 3rd ed, 2003.
2. S. C. Lee, *Digital Circuits & Logic Design*, Prentice Hall of India, 2001.