

Digital Systems Design - Video course

1. Introduction to Digital Design (4hr.)

- What is Digital ?
- Specification and Implementation of digital design
- Structured and Trial-Error methods in design
- Digital Computer Aided Design (CAD) tools

2. Digital Logic (8hr.)

- Binary Number System
- Octal, Hexa-decimal and BCD Codes
- Number System Conversion
- Use of different number systems in digital design
- Logic gates – AND, OR, NOT, NAND, NOR etc.
- NAND and NOR implementation of real life digital circuits
- Digital Circuit Characterization – Fan-in/Fan-out, Switching functions, Switching times, Noise margin etc.

3. Boolean Algebra (8hr.)

- AND, OR and other relations
- DeMorgan's law
- Karnaugh Maps
- Minimization of Sum of Products and Product of Sums
- Design of minimal two-level gate networks
- Design of multiple output two level gate networks

4. Combinational Circuit Design (5hr.)

- Design Procedure
- Design of Multiplexer, Decoder, Encoder, Comparator
- Design of Seven-segment display, Parity generator
- Design of large circuits using the above modules

5. Synchronous Sequential Circuit Design (5hr.)

- Design of sequential modules – SR, D, T and J-K Flip-flops
- Flip-flop applications – Clock generation, Counters, Registers
- Basic State machine concepts

6. Design of Programmable Logic (4hr.)

- Introduction to Programmable circuits
- Design of Read-Only Memory (ROM), Programmable Logic Arrays (PLA), Programmable Array Logic (PAL)

7. Digital Computing (6hr.)

- Introduction to digital computer
- Design of Arithmetic circuits – Adders, Multipliers
- Design of Memory – ROM/RAM
- Design of a simple CPU



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