

Contents

1. Fundamentals of Digital Systems

- Number systems (Binary, Octal, Decimal, Hexadecimal)
- Binary arithmetic
- Digital codes (BCD, Gray Code, ASCII)
- Logic levels and digital signals

2. Boolean Algebra and Logic Gates

- Boolean laws and theorems
- Logic functions and simplification
- Karnaugh Maps (K-Maps)
- Logic gates: AND, OR, NOT, NAND, NOR, XOR, XNOR

3. Combinational Logic Circuits

- Adders and subtractors
- Comparators
- Encoders and decoders
- Multiplexers and demultiplexers
- Arithmetic Logic Units (ALUs)

4. Sequential Logic Circuits

- Latches and flip-flops (SR, JK, D, T)
- Registers and shift registers
- Synchronous and asynchronous counters
- State machines

5. Memory and Programmable Logic Devices

- RAM and ROM
- Programmable Logic Arrays (PLA)
- Programmable Array Logic (PAL)
- FPGA fundamentals

6. Applications of Digital Circuits

- Digital system design methodology
- Interface circuits
- Introduction to microprocessors and microcontrollers
- Practical design examples and case studies