

Contents

Part 1: Introduction to Microcontrollers

1. Introduction to Microcontrollers
2. Microprocessor vs Microcontroller
3. MCS-51 / 8051 Family
4. Embedded System Applications

Part 2: 8051 Hardware Architecture

5. Internal Architecture of 8051
6. Memory Organization (RAM, ROM, SFR)
7. Registers and I/O Ports
8. Clock, Reset, and Machine Cycles
9. Timers and Counters
10. Interrupt Handling
11. Serial Communication (UART)

Part 3: Instruction Set and Programming

12. 8051 Instruction Set
13. Addressing Modes
14. Arithmetic and Logical Instructions
15. Branching and Control Instructions
16. Assembly Language Programming
17. Stack and Subroutines

Part 4: Advanced Programming

18. Peripheral Programming
19. Serial Port Programming
20. Interrupt and Timer Programming
21. C Programming for 8051

Part 5: Interfacing and Applications

22. Microcontroller System Design
23. LCD and LED Interfacing
24. Keyboard and Sensor Interfacing
25. Stepper/DC Motor Control
26. Real-Time Embedded Applications

Part 6: Development Tools

27. Keil Compiler and IDE
28. Debugging and Simulation
29. Embedded Project Development

