

HANDS-ON LAB PRACTICAL WITH AVR AND 8051

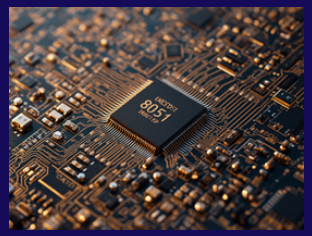
Why 8051?
The 8051 is the industry-standard architecture for learning embedded fundamentals — simple, powerful, and widely used in real-world applications.

Ideal for beginners and engineers seeking to build a strong foundation in embedded systems, bare-metal programming, and MCU architecture.

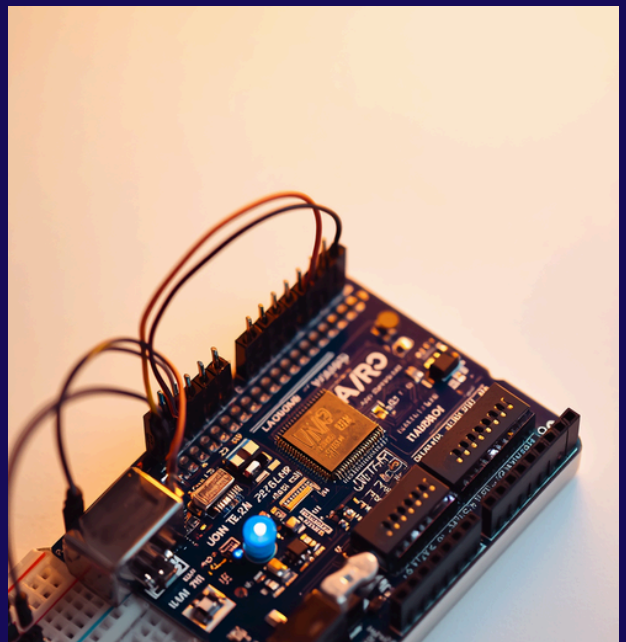
ABOUT COURSE

This course covers Embedded C programming with 8-bit MCUs, starting from C basics and progressing to hands-on microcontroller interfacing and debugging.

Gain practical skills with AVR-based lab exercises, real hardware interfacing, interrupt handling, timers, and embedded mini-projects.



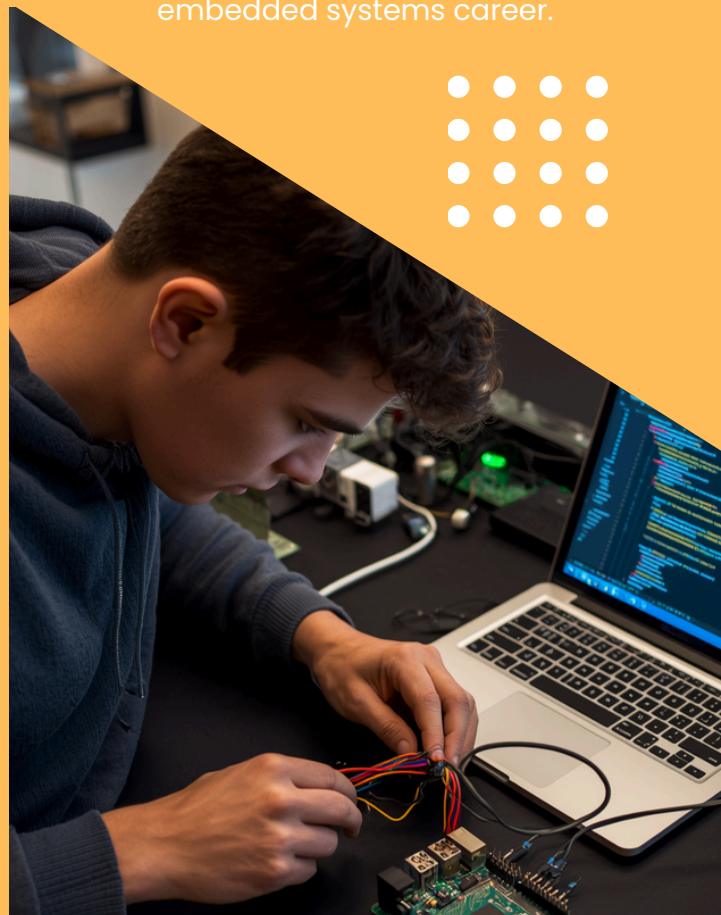




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EMBEDDED C WITH 8-BIT MCU

Master embedded programming from the ground up. Learn C fundamentals, 8051 architecture, and hands-on AVR lab practicals to launch your embedded systems career.





PROGRAMMING FUNDAMENTALS

Programming Skills Overview
Keywords & Identifiers
Operators — arithmetic, bitwise, logical, and relational operators for embedded use

COURSE INFO

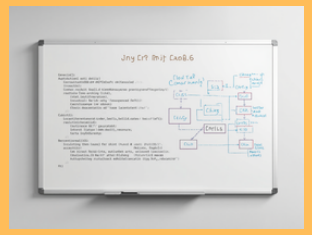
Module 1 of 4

Embedded C with 8-bit MCU

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Beginner to Intermediate Level







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CORE CONCEPTS

Preprocessor Concepts — macros, #define, #include, conditional compilation
Flow Control — if/else, loops, switch-case in embedded context

Integer, Floating & Double-Point Numbers in C — data types sized for 8-bit MCU registers and memory constraints

ADVANCED TOPICS

Storage Class in C
Pointer Basics — memory addressing, pointer arithmetic, and dereferencing
Strings — character arrays, string functions, and manipulation

Embedkari C References for data structure practice and hands-on pointer exercises with real MCU memory models





8051 ARCHITECTURE & INTRO

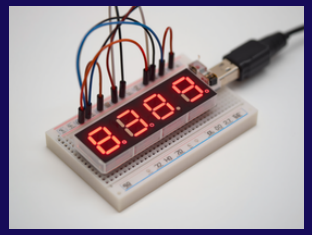
- Current 8051 Derivatives & Applications
- Introduction to AT89C52
- Memory Map of 8051
- Understanding 8051 Architecture

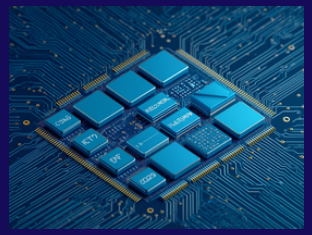
- Embedded C with 8051 Core Hands-on
- AT89C52 Timer Configuration
- 89C52 Interrupt Handling
- 8051 Mini Project Lab

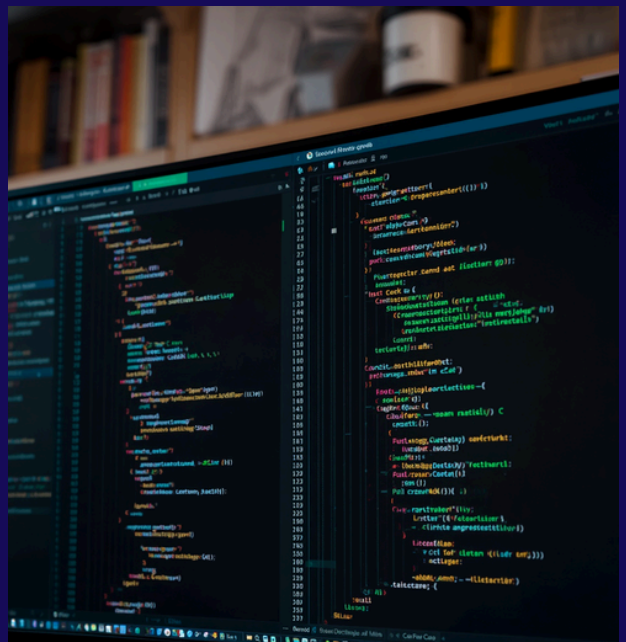
DEV SETUP

- M51 Simulator Installation
- M51 Assembly Instructions
- M51 Hands-on Debugging using DAC
- Embedded C 8051 Mini Project

- M51 Handson Debugging
- Understanding Memory Model
- Stack Operations in 8051
- Embedded C 51 - Exercise 1



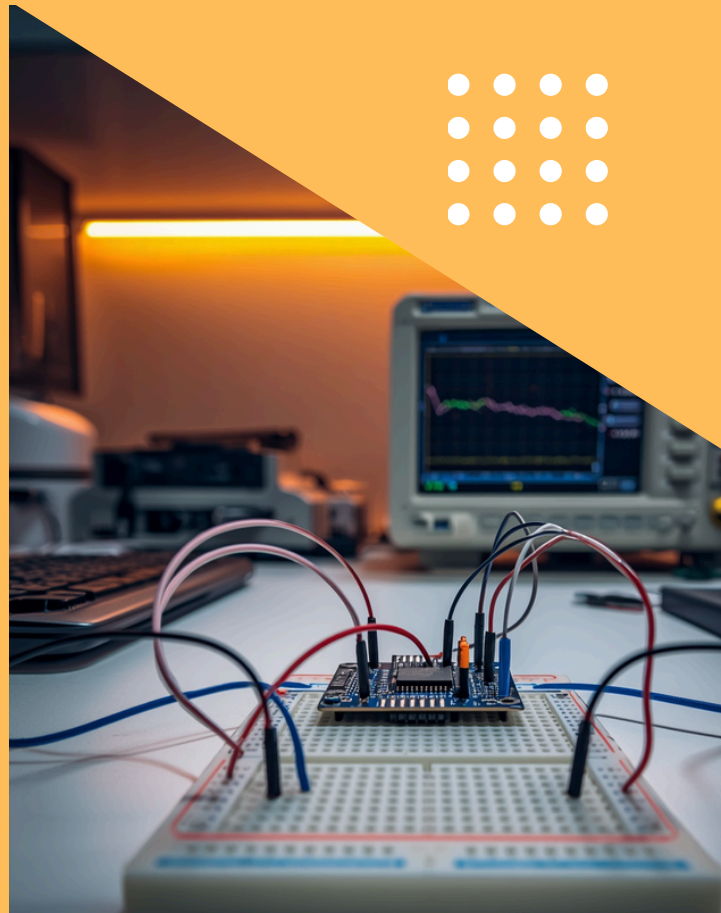




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8051 CORE LESSONS

- Memory Model & Stack
- Embedded C with 8051 Core
- Interfacing 7-Segment Display
- Interrupt Handling in AT89C52





EMBEDDED C WITH 8051

- Understanding Memory Model & Stack
- Embedded C with 8051 Core Hands-On
- Working with Registers & I/O Ports
- Data Types in Embedded C

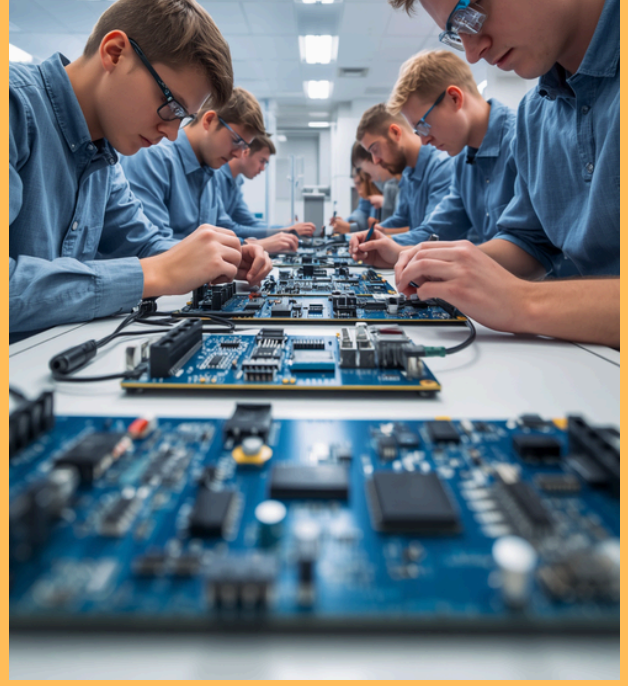
GET STARTED

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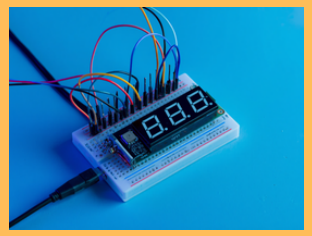
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Embedded Systems Lab, AVR & 8051







8051 PROJECTS

- Embedded C 8051 - Exercise 1
- 8051 Mini Project: LED Matrix
- Timer-Based PWM Generation
- Real-World Sensor Integration
- Interrupt-Driven System Design
- 7-Segment Counter Project
- Serial Data Logger Project
- Final Capstone: Smart Controller

HARDWARE INTERFACING

- Interfacing 8051 with 7-Segment Display
- Interrupt Handling in AT89C52
- Timer & Counter Configuration
- DAC Hands-On Debugging
- M51 Simulator Setup & Usage
- Assembly to Embedded C Migration
- Port Programming & GPIO Control
- Serial Communication Basics

