




Embedded System Design

C Programming	Microcontroller
<p>Fundamentals of C</p> <ul style="list-style-type: none"> Data types, Variables and Constants Use of Memory Arithmetic & Logical Operators and Expressions Conditional Statements and Loops <p>Functions</p> <ul style="list-style-type: none"> Introduction and Importance Passing Value/Reference Recursive Functions Getting values back from Functions Affects on Stack Library and User defined function Passing Variable number of parameters <p>Arrays</p> <ul style="list-style-type: none"> Definition, initialization and usage Multi Dimensional Arrays Strings Pointer based arrays Passing arrays to functions String handling – with function/without function <p>Storage Class and Scope of Variables</p> <ul style="list-style-type: none"> Scope and Life Automatic, Static, External, Register Memory(CPU / RAM) <p>Pointers</p> <ul style="list-style-type: none"> Introduction to pointers Defining pointers Importance of & and * operators Pointer Assignment Pointer Arithmetic Generic and Null Pointer Function Pointers Pointers to Arrays and Strings Array of Pointers <p>Structures & Unions</p> <ul style="list-style-type: none"> Introduction to structures Declaration, initialization Access to members of structure Array of Structures Passing structures to functions Memory Allocation Structure Comparison Structure bit operation Unions 	<p>Introduction</p> <ul style="list-style-type: none"> Microprocessor Vs Microcontroller The Instruction Set Architectures CISC Vs RISC The Memory Architectures Harvard Vs Von Neumann Architecture <p>Introduction to 8051 Core</p> <ul style="list-style-type: none"> Architecture and Features CPU Specifications Operating Parameters Peripherals and IO components Memory Organization – CPU Registers and SFRs <p>Assembly Programming Concepts</p> <ul style="list-style-type: none"> Addressing Modes Instruction Set Arithmetic and Logic Instructions Data Transfer Instructions Flow Control Instructions Miscellaneous Instructions Simple Assembly Programming Exercise <p>Peripheral Programming</p> <ul style="list-style-type: none"> Ports: Input/output Timers & Counters Interrupts, UART <p>Concept of Programming</p> <ul style="list-style-type: none"> Cross Compiler Embedded C Implementation, Programming and Debugging Memory Models Library reference Use of #pragma directive Functions, Parameter passing and return types <p>External Interfaces</p> <ul style="list-style-type: none"> LEDS Switches LCD (4bit, 8bit modes) Keypad Matrix <p>Mini Project</p> <p>ARM</p> <ul style="list-style-type: none"> Architecture Instruction Set Advantages of RISC Operating modes <p>Peripheral Programming</p> <ul style="list-style-type: none"> Ports: Input/output Timers & Counters

<ul style="list-style-type: none"> • Structure Vs Union • Pointers to Structure and Union <p>Dynamic Memory Allocation</p> <ul style="list-style-type: none"> • Malloc(), Calloc(), Realloc(), Free() • Pointers to Dynamic memory <p>Enumerated data types</p> <ul style="list-style-type: none"> • Enum, Indexing • Enum Vs #define <p>Bit wise Operations</p> <ul style="list-style-type: none"> • Bit wise AND (&), OR (), XOR (^) Logic • Compliment (~) operator • Left-Shift (<<), Right Shift (>>) • Masking, Setting, Clearing and Testing of Bit / Bits <p>File Handling Concepts</p> <ul style="list-style-type: none"> • Introduction to File Data • Inode, FILE structure • Pointer to File • File Accessing Concepts <p>Command line Arguments</p> <ul style="list-style-type: none"> • Argc, argv • Variable Inputs to the main <p>Compiler in Practical</p> <ul style="list-style-type: none"> • Preprocessor Directives • Compiler, Assembler, Linker <p>Data Structures</p> <ul style="list-style-type: none"> • Introduction to Data Structure • Types – Linear & non-linear • Concept of Linked List • Single, and Double Linked Lists • Stacks & Queues • Binary Trees • Sorting and Searching Techniques <p>Simple Programming Practice Complex Logic Development</p>	<ul style="list-style-type: none"> • UART Communication <p>Interrupts</p> <ul style="list-style-type: none"> • Interrupt Handling registers • Enabling and Disabling Interrupts • Interrupt Handling Mechanism • Global and Local Interrupts • Fast Interrupt Requests <p>Programming</p> <ul style="list-style-type: none"> • Assembly level concepts • Porting from assembly to C programming • Understanding C to assembly instructions • Program Efficiency <p>External Interfaces</p> <ul style="list-style-type: none"> • LEDS • Switches • LCD (4bit, 8bit modes) • Keypad Matrix <p>Mini Project</p> 
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1. Minor and Major Project Guidance to Engineering students.
2. Vocational Training Certification for enrolled students.