

Chapter One: Introduction to Programming [3 hours] ^[4]

- Computer Program and Programming Language
 - Definition
- Types of Programming Languages
 - Machine Level, Assembly Level & High-Level Language
- Generations of programming language
 - First (machine level) to fifth 'AI & more'
- Problem-solving using a Computer
 - Analysis
 - Design 'algorithm and flowchart'
 - Programming*
 - Compilation Linking and Execution
 - Debugging & Testing
 - Types of Testing
 - Documentations

Chapter Two: Overview of C [3 hours] ^[4]

- Introduction & History of C Programming
 - ALGOL {1969s} ► B ► BPCL ► K&R C ► ANSI C ► C99
- C Headers and Library Functions
 - Headers files: stdlib.h, stdio.h, string.h, math.h and library functions defined under these headers file.
- Preprocessor Directives
 - Definitions and examples (#include, #define)
- Basic Structure of a C Program
 - 6 sections [Documentation, link, definition, global declaration, main, sub-program section]
- C Tokens
 - Character Set [letters, digits, special characters, whitespace characters]
 - Keywords [32 reserved words]
 - Identifiers [definition, Naming rules & guidelines]
- Type Casting
 - Implicit, Explicit
- Data Types, Variables and Constants
 - Data types [fundamental, derived & user-defined]
 - Variables [declaration, types, scope]
- Compilers and IDE for C

Chapter Three: Operators and Expressions [4 hours] ^[4]

- Operators
 - Arithmetic
 - Logical
 - Relational
 - Assignment

- Increment & Decrement [pre & post]
- Bitwise
- special [sizeof, comma]
- Expressions
 - Arithmetic expressions
 - Shorthand Assignment Operator
 - Evaluation of expressions
 - precedence of arithmetic operators [high, low]
 - Associativity [left to right, right to left]

Chapter Four: Input-output in C [3 hours] ^[3]

- Unformatted I/O
 - getchar()
 - getch()
 - getche()
 - gets()
 - putchar()
 - puts()
- Formatted I/O
 - printf()
 - scanf()
- Control String
 - Flags
 - Field width
 - Precision and
 - Specifier

Chapter Five: Control Structures [8 hours] ^[12]

- Sequential
- Branching
 - simple if
 - if-else
 - nested if-else
 - else-if ladder
 - Switch
 - goto
- Looping
 - Types
 - while, do & for
 - Categories
 - entry-controlled & exit controlled
 - counter-controlled & sentinel controlled
 - Nesting
 - Loop interruption
 - break, continue

Chapter Six: Array and Pointer [7 hours] ^[11]

- ▶ Array
 - One Dimensional Array
 - Two-Dimensional Array
 - Multi-Dimensional Array
 - String
 - String handling functions
 - strlen(), strcpy(), strcat(), strrev(), strcmp(), strlwr(),strupr()
 - Array of strings
- ▶ Pointer
 - Definition, Declaration & Types [null, void, etc.]
 - Pointer Arithmetic
 - Relationship between Pointer and Array

Chapter Seven: User-defined Functions [6 hours] ^[8]

- ▶ Introduction & Advantages
- ▶ Elements of User-defined Function
 - Declaration/Prototype, Definition, Function Parameters, function call
- ▶ Storage Class
 - auto, register, extern, and static
- ▶ Scope Rules
- ▶ Category of Functions
 - Functions with no arguments and no return values
 - Functions with arguments and no return values
 - Functions with arguments and return values
 - Functions with no arguments and return values
- ▶ Recursive functions
- ▶ Function Call by Values and Reference
- ▶ Passing Array and String to Function

Chapter Eight: Structure [5 hours] ^[6]

- ▶ Defining, Declaring, Accessing & Initializing Structure Elements
- ▶ Array of Structure
- ▶ Array within structure
- ▶ Structure within structure/ nested structure
- ▶ Structure & pointer [This operator (->) concept]
- ▶ Passing and Returning Structures to/from Function

Chapter Nine: File Management [4 hours] ^[5]

- ▶ Binary and Text File in C
- ▶ File Opening Modes
 - ▶ w, r, a, wb, rb, ab, w+, a+, r+ & more

- ▶ Defining, Opening & Closing File
- ▶ Input-output operations on files
 - ▶ Character I/O [fputc(), fgetc()]
 - ▶ String I/O [fgets(), fputs()]
 - ▶ Formatted I/O [fscanf(), fprintf()]
 - ▶ Record I/O [fwrite(), fread()]
- ▶ Overview of Random File Access
 - ▶ fseek, ftell, and rewind
- ▶ Error handling

Chapter Ten: Recent Trends in Programming [2 hours] ^[3]

- ▶ Introduction to OOP
- ▶ Definitions of Class, Method and Object in OOP
- ▶ Difference between POP and OOP
- ▶ Overview of other High-Level Programming Languages
 - C++, Python, JavaScript, Java, C#, R, Kotlin, Ruby & more

^[50]

Lab Activities

- ▶ Lab 1: Introduction and Demonstrations of projects written in C
 - ▶ Lab 2: Formatted and Unformatted Input/output in C
 - ▶ Lab 3: Branching in Control Structure in C
 - ▶ Lab 4: Looping in Control Structure in C
 - ▶ Lab 5: Array in C
 - ▶ Lab 6: String in C
 - ▶ Lab 7: Pointers in C
 - ▶ Lab 8: User-Defined functions in C
 - ▶ Lab 9: Structure in C
 - ▶ Lab 10: File handling in C
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- ▶ Group project on C: Maximum 4 students in a group at the end of the course.
(20 marks out of 50 marks)

^[60]

Board Question

- ▶ 40% theory & 60% Example code.
- ▶ Follow 40/40/20 rule for question complexity
 - 40 % questions complexity should be easy
 - 40 % questions complexity should be moderately hard
 - 20 % questions complexity should be hard