An ISO 9001:2015 Certified Organization

दिल्ली सरकार द्वारा मान्यता प्राप्त

PROGRAMMING LANGUAGES – 6 MONTHS

C PROGRAMMING COURSE - 2 MONTHS

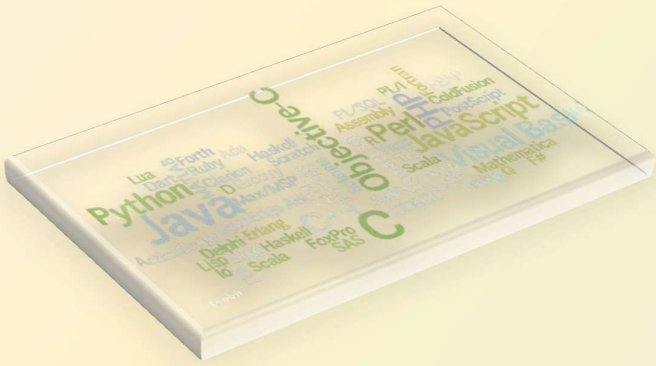
Module 1 C LANGUAGE FUNDAMENTALS

- ✓ Variables and data types
- ✓ Constants and literals
- ✓ Keywords in C
- ✓ printf() and scanf() functions
- ✓ Comments and code readability
- ✓ Escape sequences

MODULE 2 OPERATORS AND EXPRESSIONS

- ✓ Arithmetic operators
- ✓ Relational operators
- ✓ Logical operators
- ✓ Assignment operators
- ✓ Increment C decrement operators
- ✓ Conditional (ternary) operator
- ✓ Operator precedence and associativity

MODULE 3: CONTROL FLOW

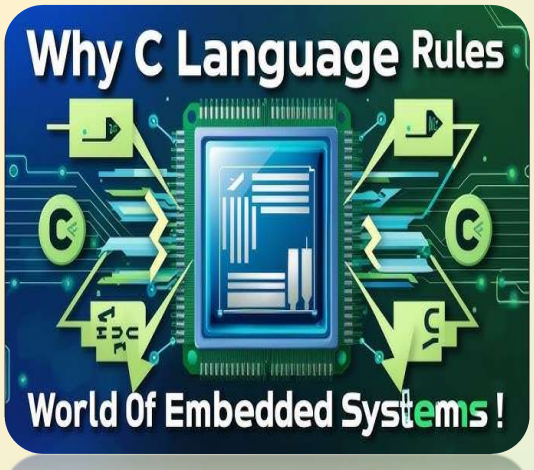


- ✓ Decision-making:
- ✓ if, if-else, nested if-else
- ✓ switch-case
- ✓ Looping:
- ✓ for loop
- ✓ while loop
- ✓ do-while loop
- ✓ break and continue statements
- ✓ goto statement (and why to avoid it)

MODULE 4: FUNCTIONS IN C

- ✓ Declaring and defining functions
- ✓ Function parameters and return values
- ✓ Scope and lifetime of variables
- ✓ Recursion in C
- ✓ Passing arguments (by value vs by reference)

MODULE 5: ARRAYS AND STRINGS



- ✓ One-dimensional arrays
- ✓ Multi-dimensional arrays
- ✓ Array initialization and traversal
- ✓ Introduction to strings
- ✓ String handling functions (strlen, strcpy, strcat, strcmp)
- ✓ Character arrays vs string literals

✓ Module 6: POINTERS

- ✓ Introduction To Pointers
- ✓ Pointer Arithmetic
- ✓ Pointers And Arrays
- ✓ Pointers And Functions
- ✓ Null Pointer
- ✓ Void Pointers

Module 7: STRUCTURES AND UNIONS

- ✓ Defining And Declaring Structures
- ✓ Accessing Members
- ✓ Nested Structures

- ✓ Arrays Of Structures
- ✓ Introduction To Unions
- ✓ Difference Between Structures And Unions

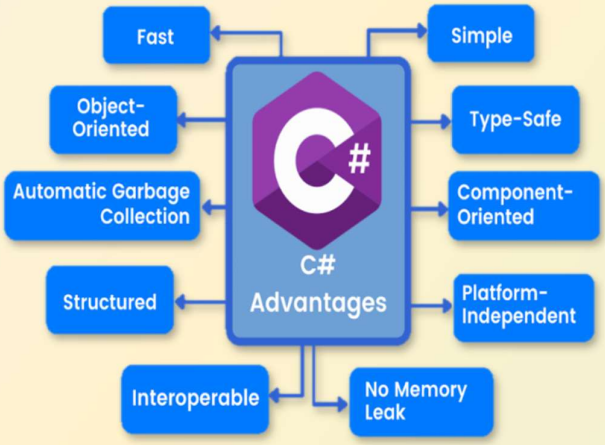
Module 8: DYNAMIC MEMORY ALLOCATION

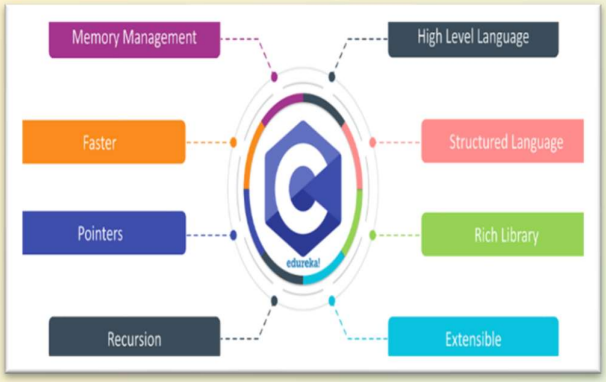
- ✓ Malloc(), Calloc(), Realloc(), And Free()
- ✓ Memory Leaks And Best Practices
- ✓ Module G: File Handling
- ✓ File Operations: Read, Write, Append
- ✓ Text Files Vs Binary Files
- ✓ File Handling Functions (Fopen, Fclose, Fgetc, Fputc, Fgets, Fputs, Fprintf, Fscanf)
- ✓ Error Handling In File Operations

Module 9: PROJECT WORK S PRACTICE

- ✓ Mini-Project Ideas:
- ✓ Student Record Management System
- ✓ Simple Calculator
- ✓ Tic-Tac-Toe Game
- ✓ Debugging And Troubleshooting
- ✓ Best Practices In Coding

PROGRAMMING





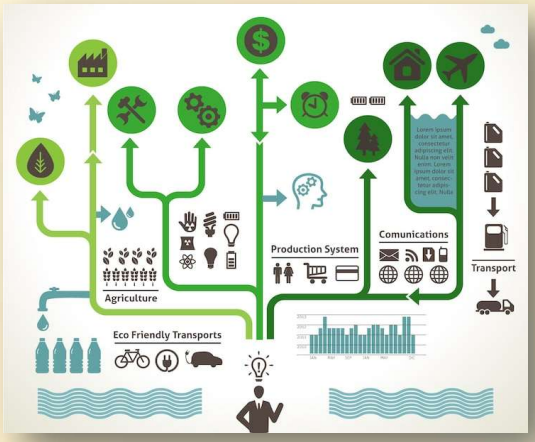
C++ PROGRAMMING COURSE

Module 1: C++ Language Basics

- ✓ Variables, constants, and literals
- ✓ Data types in C++
- ✓ Input and output using cin and cout
- ✓ Type casting
- ✓ Comments and code readability

Module 2: Operators and Expressions

- ✓ Arithmetic operators
- ✓ Relational operators
- ✓ Logical operators
- ✓ Assignment operators
- ✓ Increment C decrement operators
- ✓ Conditional (ternary) operator
- ✓ Scope resolution operator (::)
- ✓ Operator precedence and associativity

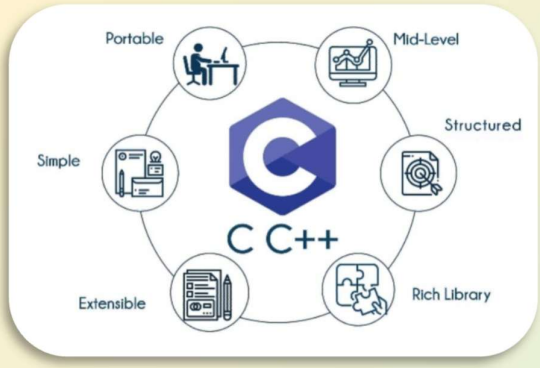


MODULE 3: CONTROL FLOW

- ✓ Decision-making:
- ✓ if, if-else, nested if-else
- ✓ switch-case
- ✓ Looping:
- ✓ for loop
- ✓ while loop
- ✓ do-while loop
- ✓ break and continue
- ✓ goto statement (and why to avoid it)

MODULE 4: FUNCTIONS IN C++

- ✓ Declaring and defining functions
- ✓ Function parameters and return types
- ✓ Default arguments
- ✓ Inline functions
- ✓ Function overloading
- ✓ Recursion
- ✓ Passing arguments by value and reference



MODULE 5: OBJECT-ORIENTED PROGRAMMING (OOP) CONCEPTS

- ✓ Introduction to OOP
- ✓ Classes and objects
- ✓ Data members and member functions
- ✓ Access specifiers (public, private, protected)
- ✓ Constructors and destructors
- ✓ this pointer

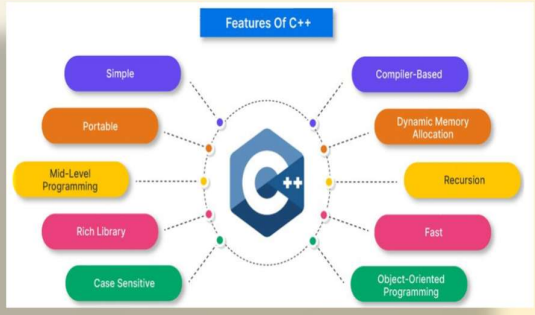
MODULE 6: ADVANCED OOP CONCEPTS

- ✓ Encapsulation
- ✓ Inheritance (single, multiple, multilevel, hybrid)
- ✓ Function overriding
- ✓ Polymorphism:
- ✓ Compile-time (function overloading, operator overloading)
- ✓ Run-time (virtual functions)

- ✓ Abstract classes
- ✓ Friend functions

Module 7: Arrays, Strings, and Pointers

- ✓ One-dimensional and multi-dimensional arrays
- ✓ Array of objects
- ✓ String handling in C++
- ✓ string class and its functions
- ✓ Introduction to pointers
- ✓ Pointers and arrays
- ✓ Pointers to objects
- ✓ nullptr and best practices



Module 8: Dynamic Memory Management

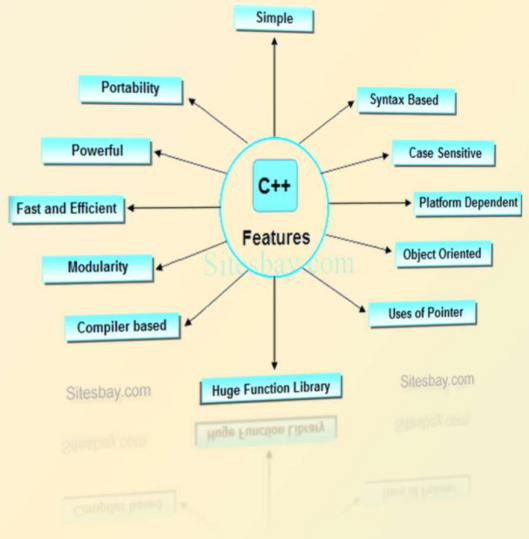
- ✓ new and delete operators
- ✓ Dynamic arrays
- ✓ Smart pointers (unique_ptr, shared_ptr, weak_ptr) (for modern C++)

Module 9: Operator Overloading

- ✓ Overloading arithmetic operators
- ✓ Overloading relational operators
- ✓ Overloading stream insertion (<<) and extraction (>>) operators

Module 10: File Handling in C++

- ✓ File input and output streams
- ✓ Reading and writing text files
- ✓ Reading and writing binary files
- ✓ File modes
- ✓ Error handling during file operations



Module 11: Templates and Exception Handling

- ✓ Function templates
- ✓ Class templates
- ✓ Template specialization
- ✓ Exception handling with try, catch, and throw
- ✓ Standard exceptions

Module 12: Standard Template Library (STL)

- ✓ Introduction to STL
- ✓ Containers: vector, list, deque, map, set
- ✓ Iterators
- ✓ Algorithms (sort, find, count)
- ✓ Lambda expressions

Module 14: Project Work s Practice

- ✓ Mini-project ideas:
- ✓ Bank account management system
- ✓ Student result processing system
- ✓ File-based inventory management
- ✓ Simple game (e.g., Snake, Tic-Tac-Toe)
- ✓ Debugging and best coding practices

PYTHON PROGRAMMING COURSE - 2 MONTHS

- ✓ **Module 1: PYTHON BASICS**
- ✓ Variables and data types
- ✓ Type casting
- ✓ Constants in Python
- ✓ Input and output (input(), print())
- ✓ Comments and docstrings
- ✓ Reserved keywords

MODULE 2: OPERATORS IN PYTHON

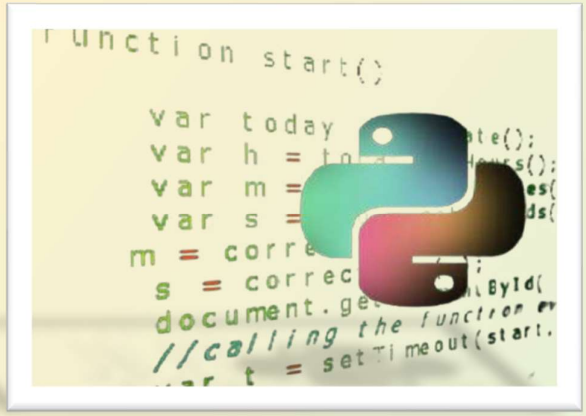
- ✓ Arithmetic operators
- ✓ Relational (comparison) operators
- ✓ Logical operators
- ✓ Assignment operators
- ✓ Identity operators (is, is not)
- ✓ Membership operators (in, not in)
- ✓ Operator precedence

MODULE 3: CONTROL FLOW STATEMENTS

- ✓ Decision-making:
- ✓ if, if-else, if-elif-else
- ✓ Nested conditions
- ✓ Looping:
- ✓ for loop
- ✓ while loop
- ✓ Loop control:
- ✓ break, continue, pass
- ✓ else with loops

MODULE 4: DATA STRUCTURES IN PYTHON

- ✓ Lists:
- ✓ Creation, indexing, slicing
- ✓ List methods
- ✓ Tuples:
- ✓ Immutable sequences
- ✓ Tuple packing and unpacking
- ✓ Sets:
- ✓ Creating sets
- ✓ Set operations (union, intersection, difference)
- ✓ Dictionaries:
- ✓ Key-value pairs
- ✓ Dictionary methods
- ✓ String operations and formatting



MODULE 5: FUNCTIONS IN PYTHON

- ✓ Defining and calling functions
- ✓ Function parameters and return values
- ✓ Default, keyword, and variable-length arguments (*args, **kwargs)
- ✓ Lambda functions
- ✓ Scope and lifetime of variables
- ✓ Recursion

MODULE 6: FILE HANDLING

- ✓ Reading and writing text files
- ✓ Reading and writing binary files
- ✓ File methods (open, read, write, close)
- ✓ File modes
- ✓ Exception handling in file operations

MODULE 7: EXCEPTION HANDLING

- ✓ Errors vs exceptions
- ✓ Try-except block
- ✓ Else and finally clauses
- ✓ Raising exceptions
- ✓ Custom exceptions

MODULE 8: OBJECT-ORIENTED PROGRAMMING IN PYTHON

- ✓ Classes and objects
- ✓ Instance and class variables
- ✓ Instance and class methods
- ✓ Constructors (init)
- ✓ Inheritance (single, multiple, multilevel)
- ✓ Method overriding
- ✓ Polymorphism
- ✓ Encapsulation and abstraction
- ✓ Magic methods (str , len , etc.)

MODULE 9: ADVANCED PYTHON CONCEPTS

- ✓ Iterators and generators
- ✓ Decorators
- ✓ Comprehensions (list, set, dictionary)
- ✓ zip(), map(), filter(), reduce()
- ✓ Regular expressions (re module)
- ✓ Date and time operations
- ✓ JSON handling

MODULE 10: PROJECT WORK S PRACTICE

- ✓ Mini-project ideas:
  - ➢ Personal expense tracker
  - ➢ Weather app using API
  - ➢ Web scraper for news headlines
  - ➢ Simple quiz game
- ✓ Debugging and best coding practices