

Information Booklet cum Syllabus

Of

Programming in C & C++

Revision-I



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National Institute of Electronics and Information Technology

An Autonomous Scientific Society under
Ministry of Electronics and Information Technology, Government of India

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1. About Course

This course is designed to provide acquire the Knowledge of C and C++ Programming Language, after the course students will be able to: Build basic programs using fundamental programming constructs like variables, conditional logic, looping, functions Pointers, Array, File handling, OOPs Concepts. Work with user input to create fun and interactive programs.

2. NIELIT

National Institute of Electronics and Information Technology, NIELIT, (Erstwhile DOEACC Society) is an autonomous scientific society of the Ministry of Electronics & Information Technology, Government of India. The Society is registered under the Societies Registration Act, 1860. NIELIT was set up to carry out Human Resource Development and related activities in the area of Information, Electronics & Communications Technology (IECT). NIELIT is engaged both in Formal & Non-Formal Education in the areas of IECT besides development of industry oriented quality education and training programmes in the state-of-the-art areas. NIELIT has endeavored to establish standards to be the country's premier institution for Examination and Certification in the field of IECT. It is also one of the National Examination Body, which accredits institutes/organizations for conducting courses in IT and Electronics in the non-formal sector.

3. Objective of Course

The objectives of this course are to make the student understand programming language, programming, concepts of Loops, reading a set of Data, stepwise refinement, Functions, Control structure, Arrays. After completion of this course the student is expected to analyze the real-life problem and write a program in 'C' language to solve the problem. The main emphasis of the course will be on problem solving aspect i.e. developing proper algorithms. And to make students familiar with the concept of Object-Oriented Programming & its implementation.

After completing the module, the learner will be able to:

- Understand the C Language and describe its features.
- Understand the concept of C Program & make program by using Control Structure.
- Able to understand the User Defined Function and create the UDF.
- Understand the Pointers and File Handling in C.
- Understand the concept of OOPs.
- Understand the concept Class & Objects
- Able to understand about the Constructor, Destructor, Encapsulation, Abstraction,
- Polymorphism, and Inheritance

2. Job Roles of Course

After successful completion of the qualification the candidates shall be employed in the industries for following occupations:

- Assistant Programmer
- Trainer/Faculty
- And also make Career in Software Development

3. Eligibility

10th Pass, Basic Knowledge of Computer.

4. Total duration of the Course

60 Hours (Theory: 30 Hrs, Practical/Tutorial: 30 Hrs)

5. Course Details

7.1. Course Outline and Objective of Each Unit

S. No.	Unit Name	Duration (Theory) in Hours	Duration (Practical) in Hours	Total Learning Hrs.	Learning Objectives
1	Introduction to C Language	2	1	3	After completion of this unit of module, Learner will be able to <ul style="list-style-type: none"> • Understand Basic of C Programming Compare it's with other programming language understand Data type. • Able to make Program by accepting user input.

2	Variable, Keyword, Datatypes & Types of Operator	2	2	4	After completion of this unit of module, Learner will be able to <ul style="list-style-type: none"> • Understand the Operators and expressions in C. • Able to make Program by using different types of operator in C.
3	Control Statement in C (Conditional statement, switch statement, Looping statement, break statement, continue statement)	4	4	8	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Able to make Program by using conditional and switch statement • Understand the concept of Loop, Nested Loop and able to make program Based on loop & nested loop.
4	Array	2	2	4	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Know very well about Array and Types of Array. • Able to make program by using Array
5	String Handling in C	1	2	3	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • String in C.
6	Pointers	2	2	4	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Know very well about Pointers in C • Types of Pointers in C
7	Structure and Union	2	1	3	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Understand the concept of Structure & Union.

8	Functions (Types of functions, return statement, Types of arguments, recursion)	3	3	6	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • User Defined Function and Lambda Function • Understand the concept of arguments. • Understand the concept of local & global variables. • Able to make program by using recursion.
9	File input/output operations	2	1	3	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Able to read/write data from a file.
10	Self Referential Structures and Linked Lists	2	2	4	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Understand the concept of Self Referential Structures. • Able to make program through linked list
11	Introduction to C++ and Programming Basics	1	1	2	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Understand the concept of C++. • Able to understand programming basics of C++
12	Pointers in C++	1	1	2	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Know very well about Pointers in C++ • Types of Pointers in C++
13	OOPs Concepts, Concepts of Class, Objects, Constructor & Destructor	2	2	4	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Concept OOPs. • Understanding Class and object. • Features of OOPs like Constructor & Destructor

14	Concepts of Inheritance, Polymorphism and Virtual Functions	2	2	4	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Understanding concepts of Virtual Functions. • Features of OOPs like Inheritance & Polymorphism.
15	Graphics Programming with Projects	3	3	6	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> • Understanding concepts of Graphics in C and C++.
		30	30	60	

7.2. Detailed Syllabus

Unit Name	Contents	Hrs.
Introduction to C Language	<ul style="list-style-type: none"> • Introduction of Programming • Execution of program 	03
Variable, Keyword, Datatypes & Types of Operator	<ul style="list-style-type: none"> • Operators, Data types, Constants, Identifiers • Managing Input and Output with examples, 	04
Control Statement in C (Conditional statement, switch statement, Looping statement, break statement, continue statement)	<ul style="list-style-type: none"> • Concept of if, if...else, elseif clause, Switch statement with examples • while loop, for loop, break and continue, return statements. • Nesting of loops 	08
Array	<ul style="list-style-type: none"> • Concepts of Array • Types of Array 	04
String Handling in C	<ul style="list-style-type: none"> • String Handling in C. 	03
Pointers	<ul style="list-style-type: none"> • Creating and Initializing of Pointer • Types of Pointers 	04
Structure and Union	<ul style="list-style-type: none"> • Concepts of Structure and Union 	03
Functions (Types of functions, return statement, Types of arguments, recursion)	<ul style="list-style-type: none"> • Concept of Functions with Examples • Types of arguments • Recursive Functions. 	06
File input/output operations	<ul style="list-style-type: none"> • Introduction to File Handling • File Operations. 	03
Self Referential Structures & Linked Lists	<ul style="list-style-type: none"> • Concepts of Self Referential Structures. • Program through linked list 	04
Introduction to C++ and Programming Basics	<ul style="list-style-type: none"> • Concepts of C++ • Basic Programming through C++ 	02
Pointers in C++	<ul style="list-style-type: none"> • Uses of Pointers in C++ • Types of Pointers in C++ 	02
OOPs Concepts, Concepts of Class, Objects, Constructor & Destructor	<ul style="list-style-type: none"> • Object Oriented Programming Concepts • Concepts of Classes, Objects, Constructor and Destructor 	04
Concepts of Inheritance, Polymorphism and Virtual Functions	<ul style="list-style-type: none"> • Concepts of Virtual Functions • Inheritance and Polymorphism 	04

Graphics Programming with Projects	<ul style="list-style-type: none">• Concepts of Graphics in C and C++.• Uses of Graphics Header File	06
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6. Reference Books/Study Material

- Let Us C by Yashwant Kanetkar
- Ansi C by Balaguru Swami
- Let Us C++ By Yashwant Kanetkar

7. Practical Assignments

Assignment 1.

- Write a program to print "Hello, This is My First C Language".
- Program to read two numbers and print their quotient and remainder.
- Program to take the temperature in Celsius and convert it to Fahrenheit.
- Program to read height in centimeters and then convert the height to feet and inches
- Program to add two numbers.
- Program to print odd numbers within a given range.
- Program for Program to find area of a circle.
- Program for Simple interest calculation.
- Program to reverse three digits number without using loop.
- Program to exchange the values of two numbers without using a temporary variable.
- Program to calculate gross salary where $\text{gross salary} = \text{Basic} + \text{HRA} + \text{DA}$
 - In this HRA is 16% of Basic, DA is 12% of Basic

Assignment 2.

- Write a program to find maximum between two numbers using if else.
- Write a program to find maximum among three number
- Program to Take in the Marks of 5 Subjects and Display the Grade.
- Program to check Armstrong Number use three digit number.
- Write a program to check whether a number is positive, negative or zero.

Assignment 3.

- Program to calculate factorial of a given number
- Program to find the sum of digits in a number.
- Program to count the number of digits in a number.
- Program for n-th Fibonacci number.

Assignment 4.

- Create a function to calculate the area of Circle.
- Create a function to find out factorial of a number.
- Create a function to find the reverse of a number.
- Create a function to calculate the arithmetic operation.

Assignment 5.

- Find Out Length of String.
- Program to Check Palindrome of string.
- Program to count No. of vowels of string.
- By using String Function Count a substring in main string

Assignment 6.

- Function to calculate remainder.
- Find the Square of a number using function.
- Program to add number from 1 to 6 by using Function recursion.
- Program to Calculate Factorial Value By Using Recursion Function.

Assignment 7.

- Program to check the file is Exist or not.
- Program to Read text from File. (File Must be created before reading) at default location.
- Write a program to save the output of program in a file.

Assignment 8.

- Create a Program to calculate sum of two numbers by Using OOPs Concept.
- Create a constructor to take input as a Function.
- Create a class that derived from base class by using derived class object access the base class method.