Week 1: Introduction to C Programming

- Overview of C programming language

- Setting up a C programming environment

- Basic program structure and syntax

Week 2: Data Types and Variables

- Understanding data types in C

- Declaring and initializing variables

- Basic arithmetic and logical operators

Week 3: Conditional Statements

- Using if-else statements in C

- Switch statements and conditional operators

Week 4: Loops and Iteration

- Introduction to loops in C (for, while, do-while)

- Loop control statements (break, continue)

- Nested loops and iteration

Week 5: Functions and Modular Programming

- Creating and calling functions in C

- Passing arguments to functions

- Understanding function return values

Week 6: Pointers and Memory Management

- Pointers and memory addresses in C

- Dynamic memory allocation and deallocation

- Pointers to functions and structures

Week 7: File Input and Output

- Reading from and writing to files in C

- Understanding file I/O streams

- Error handling and file management

Week 8: Introduction to C++ Programming

- Overview of C++ programming language

- Setting up a C++ programming environment

- Basic program structure and syntax

Week 9: Object-Oriented Programming (OOP) Concepts in C++

- Introduction to OOP

- Understanding classes and objects in C++

- Encapsulation, inheritance, and polymorphism

Week 10: Advanced C++ Programming

- Templates and generic programming

- Exception handling in C++

- Standard Template Library (STL) containers and algorithms

Week 11: Advanced Topics in C Programming

- Using C preprocessor directives

- Bitwise operators and bitwise manipulation

- Understanding the volatile keyword and memory barriers

Week 12: Advanced Topics in C++ Programming

- Overloading operators in C++

- Virtual functions and dynamic polymorphism

- Using namespaces in C++

Week 13: Debugging and Troubleshooting

- Common errors and debugging techniques

- Using a debugger to find and fix errors

- Debugging tips and best practices

Week 14: Performance Optimization

- Profiling and performance analysis

- Optimizing code for speed and memory usage

- Avoiding common performance pitfalls

Week 15: Real-World Applications and Projects

- Applying C and C++ programming skills to real-world projects

- Building applications and libraries in C and C++

- Collaboration and teamwork in software development projects.