

Computer Programming

Course Code	Credit Hours
CS-112	2-1

Course Description

This course focuses on the development of fundamental computer concepts and its application to the real world. A systematic approach is used to teach students the basic computer components along with teaching them how to write computer programs that solve well specified problems. Emphasis is placed on the mastery of basic programming skills, with a considerable attention to the fundamental building blocks of computer programs, and the associated concepts and principles. The essentials of sequential processing and control flow are taught in a procedural programming context prior to introducing classes, objects and related object-oriented programming concepts. To ensure the development of the necessary competencies, assigned homework includes the development of program solutions to problems of adequate complexity and relevance.

Text Books:

1. C++ How to program 10th Edition, Paul Deitel & Harvey Deitel
2. Introduction to Python for Computational Science and Engineering by Hans Fangohr

Reference Books:

1. Tariq, Object-Oriented Programming using C++
2. Robert W. Sebesta, Concepts of Programming Languages, Pearson Education India, 1993.
3. Herbert Schildt, C++: The Complete Reference, 4th Ed.
4. Noel Kalicharan, C by Example, Cambridge University Press, 1994.
5. Richard P. Halpern: C for Yourself, Oxford University Press, 1996
6. B.J. Holmes: Programming with ANSI C, 1996, DP Publications
7. Paul J. Deitel and Harvey M. Deitel, C++: How to Program, Prentice Hall, 8th/9th Ed.
8. Turbo C Programming for the PC Robert Lafore
9. Object-Oriented Programming in C++, Robert Lafore, Fourth Edition, Sams Publishers, 2001

Prerequisites:

Nil

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assessment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1.	Introduction to Course, Introduction to Computers: System components, Introduction to MS/Libre Office, MS Excel
2.	Computational Thinking, Algorithms & Flowcharts
3.	Introduction to programming & C++/PYTHON/C sharp/Matlab
4.	Computer configuration, generations and levels of programming languages, data and results, a typical IDE
5.	Data: Data types, data representation, identifiers, reserved words, variables, constants, Lists
6.	Input and Output: Standard Library, Output, Address operator, Selection: Relational and logical operators, Input, String I/O, character I/O, escape sequences
7.	Operators: Arithmetic operators, operator precedence, associativity
8.	if, if/else, nested if's, conditional operator, conditional expressions, switch
9.	Loop structures: Repetition-While, do/while

10.	Loop structures: for(;;), break and continue statements.
11.	Functions: Programmer defined functions, library functions, storage classes, scope, parameter passing, and recursion.
12.	Arrays: Input and output of data, searching, sorting, array of characters, arrays as parameters
13.	Introduction to Object Oriented Programming: Classes, instantiation, member function, data members, constructors, destructors, function overloading, default arguments.
14.	Programming with PYTHON data frames, 2D plotting, 3D plotting and Advance 3D plotting
15.	Programming with PYTHON , Files: Opening and closing files, reading and writing text files.
16.	Structures: Structure declaration, accessing structure members, arrays of structures, passing structures as function arguments
17.	Pointers: Address and indirection operators, pointer arithmetic, pointers and arrays, call by value and call by reference, dynamic memory allocation.
18.	Project demos, Revision , ESE

Practical

Experiment No	Description
1	Introduction to Computers: System components, Introduction to MS/Libre Office, MS Excel, Algorithms & Flowcharts
2	Introduction to programming & C++/PYTHON/Csharp/Matlab/Octave
3	Computer configuration, a typical IDE , Data types, data representation, identifiers, reserved words, variables, constants, Lists
4	Input and Output: Standard Library, Output, Address operator, Selection: Relational and logical operators, Input, String I/O, character I/O, escape sequences
5	Operators: Arithmetic operators, operator precedence, associativity
6	if, if/else, nested if's, conditional operator, conditional expressions, switch

7	Loop structures: Repetition-While, do/while,
8	Loop structures: for(;;), break and continue statements.
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