Fundamentals of Computer Programming

Course Code	Credit Hours
CS-114	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 Book:

1. Peter Norton, Introduction to Computers, McGraw-Hill, 7th Edition, 2013.
2. Paul J. Deitel and Harvey M. Deitel, C++: How to Program, Prentice Hall, 8^{th}/9^{th} Ed.
3. Turbo C Programming for the PC Robert Lafore
4. Object-Oriented Programming in C++, Robert Lafore, Fourth Edition, Sams Publishers, 2001

Reference Book:

1. Tariq, Object-Oriented Programming using C++
2. Herbert Schildt, C++: The Complete Reference, 4^{th} Ed.
3. Robert W. Sebesta, Concepts of Programming Languages, Pearson Education India, 1993.
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

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 Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1.	Introduction to Course, Introduction to Computers: System components
2.	Introduction to Computers: Networks and Operating Systems
3.	What is programming? Computer configuration, algorithms, flowcharts, computer languages, generations and levels of programming languages, data and results, a typical IDE (Microsoft Visual C++ 6.0)
4.	Data: Data types, data representation, identifiers, reserved words, variables, constants
5.	Input and Output: Standard Library, Output, Address operator, Input, String I/O, character I/O, escape sequences, assignment statement, type casting.
6.	Operators: Arithmetic operators, operator precedence, associativity
7.	Selection: Relational and logical operators, if, if/else, nested if's, conditional operator, conditional expressions, switch
8.	Repetition: While, do/while, for(;;), break and continue statements.
9.	Functions: Programmer defined functions, library functions, storage classes, scope, parameter passing, and recursion.
10.	Arrays: Input and output of data, searching, sorting, array of characters, arrays as parameters
11.	Structures: Structure declaration, accessing structure members, arrays of structures, passing structures as function arguments.
12.	Pointers: Address and indirection operators, pointer arithmetic, pointers and arrays, call by value and call by reference, dynamic memory allocation.
13.	Files: Opening and closing files, reading and writing text files.

14.	Introduction to Object Oriented Programming: Classes, instantiation, member function, data members, constructors, destructors, function overloading, default arguments.
15.	Introduction to Data Structures
16.	Project demos, Revision
17.	Project demos, Revision
18.	**End Semester Exam**

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.
9	Functions: Programmer defined functions, library functions, storage classes, scope, parameter passing, and recursion.
10	Arrays: Input and output of data, searching, sorting, array of characters, arrays as parameters
11	Classes, instantiation, member function, data members, constructors, destructors, function overloading, default arguments.
12	Files: Opening and closing files, reading and writing text files.
13	Structures: Structure declaration, accessing structure members, arrays of structures, passing structures as function arguments.