Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE306	**COMPUTER PROGRAMMING AND COMPUTATIONAL TECHNIQUES**	3-0-0-3	2016

Pre-requisites : Nil

Course Objectives:

- To provide adequate knowledge for coding in C++ language
- To give awareness about the different computational methods and their implementation to analyze basic Engineering problems

Syllabus

Computer programming - Elements of C++ programming language - control statements - Basic concepts of object oriented programming

Computational Techniques – Roots of transcendental equation- Interpolation -Functional approximation- Numerical Integration, Solution of simultaneous linear equations.

Expected Outcome:

- The students will be able to develop computer programs and implement numerical techniques for solving basic engineering problems using C++ language.

Text Books:

1. Balaguruswamy, Object Oriented programming with C++. Tata Mcgraw Hill., 2008
2. Gerald C. F. and P. O. Wheatley, Applied Numerical Analysis, Pearson Edu., 2004
3. Robert Lafore ., C++ Programming., Sams publishers.,4th Edition, 2001

Reference Books:

1. Barkakati N., Object Oriented Programming in C++, SAMS, 1991.
2. Kamthane A. M., Object Oriented Programming with ANSI & Turbo C++, Pearson Education, 2009.
3. Lippman S. B. and J. Lajoie, C++ Primer, Pearson Education, 2005.
4. Maria Litvin.and Gary Litvin, C++ for You++, Skylight Publishing, 1998.
5. Ravichandran D., Programming with C++, Tata McGraw Hill, 2007.

COURSE PLAN			
Modules	**Contents**	**Hours**	**Sem. Exam Marks %**
I	Introduction to C++: Structure of C++ program; Character set; Keywords; Identifiers; Data types – integer, real, character, string, Boolean, Enumerated data types, Constants and Variables; Operators – assignment, arithmetic, relational, logical, increment, decrement and conditional operators; Statements – simple & compound, declaration statements. Input and output streams. Selection statements: if, if-else, switch statements	7	15
II	Looping statements - for, while, do-while statements, Jump statements – break, continue, goto, exit (). Arrays - single and multi-dimensional arrays, initializing array elements, pointers & arrays, Character arrays, string functions, Unformatted console I/O functions, Unformatted Stream I/O	6	15

	functions. Preparation of programs for evaluation of factorial of a number, Infinite series, Sorting, Searching and Matrix manipulations.		
FIRST INTERNAL TEST			
III	User defined functions – Arguments, return values, call by value, call by reference, functions calling functions, functions and arrays - Global variables, automatic, static and register variables, recursive functions.	6	15
IV	Structures - functions and structures - Arrays of structures - structures within structures, Structures containing arrays. Files - Input & Output, sequential & random access. Basic concepts of object oriented programming - class, objects, constructors and destructors, inheritance (Programs not required)	7	15
SECOND INTERNAL TEST			
V	Roots of Transcendental equations - Successive approximations, Regula - Falsi, Newton Raphson Methods, Interpolation-Lagrange interpolation method.	8	20
VI	Functional approximation - Fitting straight line & parabola, Numerical Integration - Trapezoidal, Simpson's rule & Gauss quadrature Method. Solution of simultaneous linear algebraic equations – Gauss elimination method. Solution of Partial differential Equation - Finite Difference Method	8	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester examination)
Maximum Marks :100   **Exam Duration: 3 Hrs**

Part A -Module I & II   : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI :   2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a,b,c,d)