EC/ChE-111	PROBLEM SOLVING WITH C	L	T	P	C
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COURSE OBJECTIVES:

1. To understand the basic problem solving process using algorithm, Flow Charts and pseudo-code development.
2. To understand the basic concepts of control structures in C.
3. To understand the concepts of arrays, functions and pointers in C and can effectively use pointers for Dynamic memory allocation.
4. To understand the concepts of structures, unions, files and command line arguments in C.

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Develop algorithms and flow charts for simple problems.
2. Use suitable control structures for developing code in C.
3. Design modular programs using the concepts of functions and arrays.
4. Design well-structured programs using the concepts of structures and pointers.
5. Develop code for complex applications using file handling features.

UNIT I **(13)**

Introduction : Computer & it's Components, Hardware , Software, programming languages, Algorithm, Characteristics of algorithm, Flowchart, Symbols used in flowchart, history of C, structure of C program, C language features.

C Tokens: Character set, Identifiers, Keywords, constants, Data types, type qualifiers, Declaration and Initialization of variables.

Operators & Expressions: C operators and expressions, Type-conversion methods, Operators Precedence and Associativity, Input/ Output functions and other library functions.

Programming Exercises: C-Expressions for algebraic expressions, Evaluation of arithmetic and boolean expressions. Values of variables at the end of execution of a program fragment, Computation of values using scientific and engineering formulae.

UNIT II **(13)**

Control Statements : If-Else statement, Else-If statement, Switch statement and goto statement, Looping- While, Do-While and for statements, Break and continue statements.

Programming Exercises: Finding the largest of three given numbers, Computation of discount on different types of products with different ranges of discount, finding the type of triangle formed by the given sides, Computation of income-tax, Computation of Electricity bill, finding roots of a quadratic equation. Finding the factorial of a given number, test whether a given number is-prime, perfect, palindrome or not, Generation of prime and Fibonacci numbers.

UNIT III **(14)**

Arrays : One - dimensional, Two-dimensional numeric and character arrays.**Functions:** Function Definition, Function prototype, types of User Defined Functions, Function calling mechanisms, Built-in string handling and character handling functions, recursion, Storage Classes, mult-file compilation, Function with Arrays.

Programming Exercises: Computation of statistical parameters of a list of numbers, sorting and searching a given list of numbers, Operations on Matrices such as addition, multiplication, Transpose of a matrix. Finding whether a given string is palindrome or not, sorting of names, operations on strings

with and without using library functions, recursive functions to find the factorial value, Fibonacci series, GCD, swapping of two variables, calling the function by passing arrays.

UNIT IV **(13)**

Pointers : Pointer, Accessing a variable through pointer, pointer Arithmetic, pointer and Arrays, Dynamic memory allocation, pointer to pointer, Array of pointers.

Structures: Structures, Nested structures, Array of structures, Pointer to structures, passing structures to functions, self referential structure, Unions.

Programming Exercises: Sort and search the given list using functions and pointers, operations on arrays using functions and pointers. Operations on complex numbers, maintaining the books details by passing array of structures to functions, sorting the list of records.

UNIT V **(12)**

Files : Defining and opening a file, closing a file, input/output operations on files using file handling functions, random access to files. Command line arguments, C-preprocessor directives.

Programming Exercises: Create and display the contents of text file, copy the contents of one file into another, merging the contents of two files, writing, reading and updation of student records in a file, programs to display the contents of a file and copy the contents of one file into another using command line arguments.

LEARNING RESOURCES:

TEXT BOOK(s):

Byron Gottfried - Programming with C (Schaum's Outlines), Third Edition, Tata McGraw-Hill.

REFERENCE BOOK(s):

1. Stephen G. Kochan - Programming in C, Fourth Edition, Pearson
2. Herbert Sheildt - C Complete Reference, TMH, 2000.
3. K R Venugopal & Sudeep R Prasad - Programming with C, TMH., 1997
4. Brian W. Kernighan & Dennis M. Ritchie - The C programming Language, Second Edition, Prentice Hall

WEB RESOURCES:

1. http://cprogramminglanguage.net/
2. http://lectures-c.blogspot.com/
3. http://www.coronadoenterprises.com/tutorials/c/c_intro.htm
4. http://vfu.bg/en/e-Learning/Computer-Basics--computer_basics2.pdf