

FACULTY OF ENGINEERING & TECHNOLOGY

First Year Bachelor of Engineering

Course Code: 102000110

Course Title: INTRODUCTION TO COMPUTER PROGRAMMING WITH C

Type of Course: Engineering Science Course

Course Objectives: Students will gain understanding of basics of computer, hardware, software, and programming language Students will learn problem solving skills through C programming language.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	40 / 14	20 / 7	60 / 21	30 / 10	150 / 52

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to Computers and Programming: Introduction to computer: Basic block diagram, Functions of various components of computer, Concepts of Hardware and software, Types of software Computer languages and programming: Concepts of Machine level, Assembly level and high-level languages, Compiler and interpreter, Flowcharts and Algorithms	5
2	Fundamentals of C: Features of C language, structure of C Program, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions	6
3	Control structure in C: Decision making and Branching: Simple if, if-Else, Nesting of if-else, Else If ladder, Switch statement, The ? operator, goto statement Decision making and Looping: while statement, do statement, for statement, Jumps in loop, break and continue, Nesting of control structures	8
4	Array and String: Concepts of array: One- and two-dimensional arrays, declaration and initialization, operation on array, multidimensional arrays Character array and string: declaration and initialization, operations on string, Built-in string functions, table of strings	7
5	Functions and Recursion: Concepts of user defined functions: function declaration, function definition, function call, passing parameters, nesting of functions Introduction to Recursion as a way of solving problems and examples	6

6	Structures and Unions: Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, Introduction to Unions	4
7	Pointers and File Management: Basics of pointers, pointer to pointer, pointer and array, pointer to array, array to pointer, function returning pointer, structures and pointers Introduction to file management and its functions	4

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
20%	30%	30%	20%	0%	0%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	Programming in ANSI C, Eighth Edition, by E. Balagurusamy, McGraw Hill Education
2	Let Us C, by Yashavant Kanetkar, BPB Publications
3	Fundamentals of Computing and Programming in C, by Pradip Dey, Manas Ghosh, Oxford University Press
4	How to Solve it by Computer, by R.G. Dromey, Pearson Education

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Formulate algorithm and/or flowchart for a given problem.	10
CO-2	Translate algorithm and/or flowchart into C program using correct syntax and execute it.	10
CO-3	Write programs using control structures, arrays, functions, structures .	40
CO-4	Decompose a problem and formulate solutions using functions.	20
CO-5	Apply concepts of array, pointer, structure, functions, recursion and file management to solve engineering and/or scientific problems.	20

List of Practicals / Tutorials:

1	<p>Write a C program to understand concepts of structure of C Program, scanf and printf.</p> <p>Write a C Program to declare, assign, read and print values of variables of different datatypes.</p> <p>Write a program to that performs as calculator (addition, multiplication, division, subtraction).</p>										
2	<p>Write a program to understand concepts of other operators (bitwise, increment/decrement, conditional, etc.).</p> <p>Write a program to find area of square, rectangle, triangle and circle.</p> <p>Write a program to calculate simple interest ($i = (p*r*n)/100$). Where i = Simple interest p = Principal amount r = Rate of interest n = Number of years</p>										
3	<p>Write a C program to enter a distance in to kilometre and convert it in to meter, feet, inches and centimeter.</p> <p>Write a program to compute Fahrenheit from centigrade ($f=1.8*c +32$)</p> <p>Write a C program to read a number and check it is even or odd.</p>										
4	<p>Write a C program to find that the accepted number is Negative, or Positive or Zero.</p> <p>Write a program to read three numbers from keyboard and find out maximum out of these three. (nested if else)</p> <p>Write a C program to check whether the entered character is capital, small letter, digit or any special character.</p>										
5	<p>Write a program to read marks from keyboard and your program should display equivalent grade according to following table (if else ladder)</p> <table border="1"> <thead> <tr> <th>Marks</th> <th>Grade</th> </tr> </thead> <tbody> <tr> <td>100 - 80</td> <td>Distinction</td> </tr> <tr> <td>79 - 60</td> <td>First Class</td> </tr> <tr> <td>59 - 40</td> <td>Second Class</td> </tr> <tr> <td>< 40</td> <td>Fail</td> </tr> </tbody> </table> <p>Write a C program demonstrate functionality of calculator using switch-case.</p> <p>Write a C program to find factorial of a given number.</p>	Marks	Grade	100 - 80	Distinction	79 - 60	First Class	59 - 40	Second Class	< 40	Fail
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6	<p>Write a program to reverse a number.</p> <p>Write a program to generate first n number of Fibonacci series.</p> <p>Write a C program to find the sum and average of different numbers which are accepted by user as many as user wants.</p> <p>Write a program to check whether the given number is prime or not.</p>										



7	<p>Write a program to evaluate the series $1^2+2^2+3^2+\dots+n^2$</p> <p>Write a C program to find $1+1/2!+1/3!+1/4!+\dots+1/n!$.</p> <p>Write a C program to display following patterns using asterisk (*).</p> <pre>* * *** **** * ** *** **** * ** *** ****</pre> <p>Write a C program to display following patterns.</p> <pre>1 2 3 4 5 AAAAA 1 2 3 4 5 BBBB 0 1 3 4 5 CCC 1 0 1 4 5 DD 0 1 0 1 5 E 1 0 1 0 1</pre>
8	<p>Write a program to read array of integers and print it in reverse order.</p> <p>Write a program that adds two 1-dimensional array & store into third array.</p> <p>Write a program to insert and delete an element to/from desired position in an array.</p> <p>Write a program to sort a given array in ascending order. (use Bubble Sort algorithm)</p>
9	<p>Write a program for multiplication of two matrices.</p> <p>Write a program to find length of string without using library function.</p> <p>Write a program to concatenate two strings without using library function.</p>
10	<p>Write a program that reads a string and counts occurrences of a given character.</p> <p>Write a program convert character into Toggle character.</p> <p>Write a program that checks whether the string is palindrome or not using string library function.</p>
11	<p>Write a C Program to demonstrate the use of inbuilt string functions.</p> <p>Write a function power that computes x raised to the power y for integer x and y and returns double type value.</p> <p>Write a calculator program (add, subtract, multiply, divide). Prepare user defined function for each functionality.</p>
12	<p>Write a program to find sum of elements of 1-D Array using Function.</p> <p>Write a program that use user defined function swap() to interchange the value of two variable.</p> <p>Write a program to find factorial of a number using recursion.</p> <p>Write a program to generate Fibonacci series using recursion.</p>
13	<p>Write a function which takes a two integer array as argument and give sum of these arrays.</p> <p>Define a structure to enter enrolment number, name of student and marks of the student in three subjects. Enter data for 5 students. Display grade cards of all students. Display student who has top rank in the class.</p> <p>Define a structure called cricket that will describe the following information: Player name, Team name, Batting average</p> <p>Declare an array player. Write a program to print name & team of those players whose batting average is greater than given value.</p>



14	Write a program to demonstrate the concept of union. Write a program using pointer and function to determine the length of string. Write a program to demonstrate the concept of pointer. Write a program to add elements of array using pointer.
15	Write a program to copy the content one file into another file. Write a program to demonstrate ftell() and fseek() for file handling. Write a program that compares two files and returns 0 if they are equal and 1 if they are not.

Supplementary learning Material:

1	NPTEL course / tutorials
2	Vlabs.iitb.ac.in
3	Open online courses from www.coursera.org , www.udacity.com , etc.

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22