

Proposed common syllabus for B. Tech. 1st year for the paper Programming for Problem Solving LAB (ESC-XX)

Programming for Problem Solving LAB			
Course Code	ESC-XX	CA Marks	40
Teaching Hours/Week(L:T:P)	0:0:4	End Semester Exam (ESE) Marks	60
Total Hours of Pedagogy	48	Total Marks	100
Credits	02	Exam Hours	03
Course Objectives: <ol style="list-style-type: none"> 1. Students will learn to implement fundamental programming constructs, such as loops, conditionals, and functions, to solve real-world problems. 2. The lab will also focus on developing skills in managing data using arrays, structures, and pointers. 3. By the end of the course, students will be proficient in writing modular, efficient, and maintainable C code. 			
Teaching-Learning Process(General Instructions) These are sample strategies that faculty can use to accelerate the attainment of various course outcomes: <ol style="list-style-type: none"> 1. Instructor-led demonstrations: The faculty explains key concepts and coding techniques, often using live coding sessions to illustrate practical applications. 2. Hands-on exercises: Students work on coding tasks individually, applying what they've learned in a practical, hands-on manner. 3. Interactive discussions: The faculty and students engage in discussions to clarify doubts, explore different approaches to problem-solving, and share insights. 4. Feedback and debugging sessions: The faculty provides regular feedback on students' code, helping them identify errors and improve their coding practices. 5. Project-based learning: Students work on real-world projects that require the application of various programming constructs and concepts, enhancing their practical skills and understanding. 			
Students should perform the following C programs but not limited to			
Unit : 1: Basic C programming using Flow Control			
1. W.A.P to print HELLO WORLD 2. W.A.P to print your biodata. 3. W.A.P to addition, subtraction, multiplication, division of two numbers. 4. W.A.P. to find the big among two and three numbers. 5. W.A.P. to check whether a number is even or odd. 6. W.A.P. to check whether a year is leap year or not. 7.W.A.P. which will take input 3 numbers as marks of 3 subjects and then check the grade as per MAKAUT 8.W.A.P. to convert a centigrade temperature into Fahrenheit & vice versa. 9. W.A menu driven Program which will act as calculator (using +,-,*,/ as case constant value). 10 W.A menu driven Program to convert a centigrade temperature into Fahrenheit & vice versa. 11. W.A.P. to print the following series SUM=1/1! +2/2! + 3/3!..... 12.W.A.P. to find whether a number prime or not. 13.W.A.P. to find the factorial of a number(use long int).			

Proposed common syllabus for B. Tech. 1st year for the paper **Programming for Problem Solving LAB (ESC-XX)**

- 14.W.A.P. to print the Fibonacci series.
15. W.A.P. to print different triangle pattern using * and numbers.
16. W.A.P to print all prime numbers within a given range.
- 17) W.A.P to check whether a number is palindrome or not.
- 18) W.A.P to print reverse of a number & print the difference between original & reverse number.
- 19) W.A.P to check whether a number is a Armstrong number or not.
- 20) W.A.P to check whether a number is a perfect number or not.
- 21) W.A.P to sum all the digits of number.
- 22) W.A.P to print the convergence of a number.
- 23) Write a menu driven program using do-while to iterate the menu.

Teaching-Learning Process:	ICT, board, Active Learning
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Unit 2: C programming using Function, Recursion and Strings

1. W.A.P. to print the factorial of a number using function.
2. W.A.P. to print the factorial of a number using recursion.
3. W.A.P. to print the G.C.D. of two numbers using function.
4. W.A.P. to print the G.C.D. of two numbers using recursion
5. W.A.P. to print the Fibonacci series using recursion.
6. W.A.P. to calculate string length using both user define function and library functions.
- 7) W.A.P. to copy a string using both user define function and library functions.
- 8) W.A.P. to copy a substring user define function
- 9) W.A.P. to compare two string without case sensitive manner
- 10) W.A.P. to compare two string with case sensitive manner.
11. W.A.P. to reverse a string using both user define function and library functions.
12. W.A.P. to concat a two string using both user define function and library functions.
13. W.A.P. to print the abbreviation of a name.(Ex. Netaji Subhas Chandra Bose=N.S.C.Bose)
14. W.A.P. to check whether a string is palindrome or not.
15. Write a program which will take a number as input & print the corresponding word representation. (e.g 1635=one thousand six hundred thirty five)

Teaching-Learning Process:	ICT, board, Active Learning ,Problem based learning
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Unit 3: C programming using Array and pointers

1. W.A.P. to display 1D array elements
2. W.A.P. to add all the 1D array elements.
3. W.A.P. to display 2D array elements in both row-major and column major order.
4. W.A.P. to display 1D and 2D array elements using pointers
- 5.W.A.P. to ADD two matrices.
6. W.A.P. to MULTIPLY two matrices.
- 7.W.A.P. to sort a list of elements using bubble sort.
- 8.W.A.P. to sort a list of elements using selection sort.
- 9.W.A.P. to sort a list of elements using insertion sort.
10. W.A.P. to sort a list of names stored in a 2D array of character.
11. W.A.P. to print the difference the difference between array of pointers & pointer to an array.
12. W.A.P. to explain the use of void pointer.

Proposed common syllabus for B. Tech. 1st year for the paper Programming for Problem Solving LAB (ESC-XX)

13.W.A.P. to explain the use of function pointer.	
14.W.A.P. to explain the difference between far, near & huge pointer.	
Teaching-Learning Process:	ICT, board, Active Learning ,Problem based learning

Unit 4: C programming using Structure, Union and File Handling

1. Write a menu driven program to sort students according to their name or marks or roll depend upon user choice. Where student is a structure consist of

i) name(char array)

ii) roll(integer)

iii) marks(float).

Use do-while to iterate the menu & also use typedef to makes sorter the structure name.

2. W.A.P. to take input to an array using dynamic memory allocation.

3. W.A.P. to explain the difference between malloc() & calloc().also show the use of free() function.

4. W.A.P. to print the content of file.

5. W.A.P. to copy the content of a file into another file.

6. W.A.P. to count the frequency of a character from a file.

7. W.A.P. to print the content of file, takes the name of the file using command line argument.

8. W.A.P. to copy the content of a file into another file, takes the name of the files using command line argument.

9. W.A.P. to count the frequency of a character from a file, takes the name of the file using command line argument.

10. W.A.P to print the difference between structure & union.

Teaching-Learning Process:	ICT, board, Active Learning ,Problem based learning
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Course Outcomes (COs)

CO #	CO statement	Action verb	Knowled ge level
CO1	Debug and troubleshoot C programs to identify and resolve errors effectively.	identify	K2
CO2	Demonstrate proficiency in writing, compiling, and executing C programs.	Demonstrate	K3
CO3	Apply fundamental programming constructs such as loops, conditionals, and functions to solve problems.	Apply	K3
CO4	Implement and manipulate data structures such as arrays, structures, and pointers in C.	Implement	K3
CO5	Develop modular and maintainable programs using functions and procedures.	Develop	K6
CO6	Implement file input/output operations and manage memory efficiently in C programs.	Implement	K3

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Assessment Details (both CA & ESE)

Will be added after finalization in academic council

Suggested Learning Resources:
Books <ol style="list-style-type: none">1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill2. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, Prentice Hall of India. Reference: <ol style="list-style-type: none">1. Reema Thereja ,Programming in C, Cengage publication,