

COURSE PACK

Scheme

The scheme is an overview of work-integrated learning opportunities and gets students out into the real world. This will give what a course entails.

Course Title	Problem Solving and Computer Programming			Course Type		Integrated			
Course Code	E1PA103B			Class		MCA 1 st SEM			
Instruction delivery	Activity	Credits	Credit Hours	Total Number of Class Semester				Assessment Weightage	
	Lecture	3	3						
	Tutorial	0	0	Theory	Tutorials	Practicals	Self-Study	CIE	SEE
	Practical	1	2						
	Self-study	0	0						
	Total	4	5	45	0	15	0	50%	50%

Course Outcomes(COs)

After the completion of the course, the student will be able to:

CO No.	Course Outcomes
E1PA103B.1.1	Apply various problem-solving strategies and algorithm design approaches.
E1PA103B.1.2	Analyze arrays, functions, and pointer concepts.
E1PA103B.1.3	Evaluate new data types for abstract data structure and write programs using files.
E1PA103B.1.4	Implement the concept of problem-solving and computer programming

Course Assessment

The course assessment patterns are the assessment tools used both in formative and summative examinations.

Type of Course (B)	CIE			Total Marks		Final Marks CIE*0.5+SEE*0.5
	LAB Work@ + Record	MTE	LAB EXAM	CIE	SEE	
Blended	25		25	100	100	100

@Lab Work-15 marks + Lab Record-10 marks

*Passing Criteria-30% of marks to be secured in the lab Exam conducted by two examiners (one internal and one external)

Course Content (Theory)

Introduction
Algorithms, Flow charts, Pseudo code Problem solving techniques ,Identifiers – Keywords– Data Types – Data Type Conversions , Operators – Conditional Controls – Loop Controls– Input/Output operations,
Problem solving strategies
Algorithmic approaches: Sequential , Selection (if, elif, if.. else, nested if else) ,Iteration (while and for) , problem solving strategies: brainstorming, divide and conquer, reduction, trial and error, heuristic, exhaustive search, backtracking, greedy
Arrays
Arrays – Accessing Array Elements Pointers and Arrays – Arrays as Function Arguments, – Function Returning Addresses – Dynamic Memory Allocation – Storage Classes.
Functions
Function Prototyping – Function Arguments – Actual vs. Formal Parameters – Pointers – Pointer . Variables – Pointers Concepts in Functions – Multiple Indirection
Structure, Union and File Handling
Structures – Unions – typedef – enum – Array of Structures – Pointers to Structures – Macros and Pre-processor, Character I/O – String I/O – Formatting input/output – File I/O

Bibliography

Text Book (s)

1. E. Balagurusamy – Programming in ANSIC – Tata McGraw Hill 3rd Edition– 2004.

Reference Book (s)

1. B.S. Gottfried – Programming with C – Schaum's Outline Series – Tata McGraw Hill 2nd Edition– 1998.
2. K.R. Venugopal, Sudeep R. Prasad – Programming with C – Tata McGraw Hill - 2002.
3. Yashavant Kanetkar – Let us C – BPB Publications- 5th Edition - 2004.

Web Reference

1. Swayam/NPTEL/MOOCs

- https://onlinecourses.nptel.ac.in/noc22_cs40/preview
- <https://archive.nptel.ac.in/courses/106/104/106104128/>
- https://onlinecourses.nptel.ac.in/noc19_cs42/preview

2. Official C Website

- <https://www.w3schools.com/c/>

3. Optional certifications and online platforms

- <https://www.shiksha.com/online-courses/free-online-courses-certificates>
- <https://www.codechef.com/practice/c>

Course Content Lab

Lab1: General Programs

1. Write a C program to sum two numbers.
2. Write a C program to calculate simple interest.
3. Write a C program to calculate average and percentage of your high school result.
4. *Write a program to swap the values of two variables.*
5. *Write a program to convert temperature from degree centigrade to Fahrenheit. $^{\circ}F = ^{\circ}C * 9/5 + 32$*
6. *Write a program to compute the addition, subtraction, product, quotient and remainder of two given numbers.*

Lab 2: Programs based on Branching statements-1

7. Write a C program to check whether a given number is even or odd.
8. *Write a C program to check whether a given year is Leap year or not.*
9. Write a C program to check equality of two numbers.
10. Write a C program to compare three numbers and print the greatest number.

Lab 3: Programs based on Branching statements-2

11. *Write a program to compute net amount from the given quantity purchased and rate per quantity. Discount of 10 is allowed if quantity purchased exceeds 100.*
12. Write a C program to design calculator using case switch construct.
13. *Write a program to read three integer values from the keyboard and display the output stating that they are the sides of right-angled triangle.*

Lab-4: Programs Based on Control statements-1

14. Write a C program to print table of given number.
15. *Write a program to print the sum of digit of a given number.*
16. *Write program to print the Fibonacci series up to a given number.*
17. *Write a program to print the prime numbers within a given number.*
18. *Write a program to check a given number is prime or not.*

Lab-5: Programs Based on Control statements-2

19. *Write a program to check whether a no is an Armstrong number.*
20. *Write a program to determine and print the sum of the following harmonic series for a given value of $n = 1$
 $+1/2 + 1/3 + 1/4 + \dots + 1/n$*
21. *Write a program to print the Floyds triangle*
$$\begin{array}{c} 1 \\ 2 \ 3 \\ 3 \ 5 \ 6 \end{array}$$
22. *Write a program to print binary equivalent of an integer number.*
23. *Write a program to print the following pattern (take number of lines as input from the user).*

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Lab-6: Programs Based on Array-1

24. *Write a program to find out the length of a given string without using the library function strlen().*
25. *Write a program to print the reverse of a given string.*
26. *Write a program to check if a given string is palindrome or not. A string is said to be palindrome if the reverse of the string is equal to the string.*
27. *Write a program to count the number of vowels in a given string.*
28. *Write a program for addition of two nxm matrices.*
29. *Write a program for multiplication of two nxm matrices*

Lab-7: Programs Based on Function

30. *Write a program to compute factorial of a given number using function.*
31. *Write a function for swapping of two numbers.*
32. *Write a program for finding factorial of a number using recursion.*
33. *Write a program to sort an array using Bubble Sort (using function).*
34. *Write a program to search a key number in an array using Sequential Search Method.(use function)*

Lab-8: Programs Based on Structure/Union/Enum

35. *Write C program to accept the details of employee and display them using structure. Details consist of Employee ID, Name, Designation, Department, and Salary.*
36. *Write a C program to store the details of 3 students in terms of their name ,age, and their high school percentage.(Use array of structure.)*
37. *Write C program to accept batting information of cricket team using structure. It contains player name and runs scored by player. Calculate total runs scored by cricket team.*

Lab-9: Programs Based on File Handling

38. *Write a program in C to create and store information in a text file.*
39. *Write a program in C to read an existing file and write the content on monitor.*
40. *Write a program in C to read numbers from a file and print their square on monitor.*
41. *Write a program in C to Find the Number of Lines in a Text File.*
42. *Write a program in C to count number of words and characters in a file.*
43. *Write a program to accept student details (name, Enroll No, address, phone no, Email)and store them in a file and perform the following operations on it.*
 - a. *Search* b. *Add* c. *Delete* d. *Modify* e. *Display*.

Note:

1. **We will do some project-based learning in labs.**
2. **In every lab you all are required to carry A4 sheets to record your work.**
3. **In every lab you will be assessed on your performance in lab, record and viva.**