Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni
2. Course : Programming in C Lab
3. Program : B.Tech- CSE
4. Target : Level- 2

Course Code: CSEG 1041
L: 0
T: 0
P: 2
C: 1

COURSE PLAN

1. Method of Evaluation

Assessment Type	Weightage (%)
Continuous Evaluation (Includes Lab report-Handwritten)	50% (Minimum of 10 Labs)
Viva-1,2,3	30% (Best of two out of three 15% each)
Lab Test-1 &2	20% (Two vivas of 10% each)

2. Passing Criteria

Scale	PG	UG
Out of 10 point scale	SGPA – "6.00" in each semester CGPA – "6.00" Min. Individual Course Grade – "C" Course Grade Point – "4.0"	SGPA – "5.0" in each semester CGPA – "5.0" Min. Individual Course Grade – "C" Course Grade Point – "4.0"

*for PG, passing marks are 40/100 in a paper
*for UG, passing marks are 35/100 in a paper

3. **Pre-requisites:** Elementary Knowledge of Computers

4. Course Objectives:

- Introduce students to the basic principles and concepts of programming.
- Develop students' ability to solve programming problems by applying the fundamental concepts of C programming.
- Demonstrate students how to design and develop structured programs using modular programming techniques.
- Enable students to apply their C programming skills to develop small-scale applications.

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2
   C: 1

5. **Pedagogy**

• Software **Installation** – Students will acquire the ability to independently install, configure, and troubleshoot required software tools and development environments.

• Algorithm **Design** – Students will develop the capability to design efficient algorithms by applying structured problem-solving techniques and logical reasoning.

• Viva – Students will demonstrate conceptual clarity, technical proficiency, and problem-solving aptitude through oral examinations.

- Concept diary (needs to be maintained by students-short and concise notes that include course concepts that he/she has understood).

6. References:

Text Books	Kernighan, B.W. and Ritchie, D.M. (1988). The C programming language. Prentice Hall (2nd ed.).
Web resources	
Journals	
Reference books	1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill. 2. H. M. Deitel, P. J. Deitel, C: How to program, 7th edition, Pearson Education.

GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' uploaded on the My UPES- LMS platform in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. Check your LMS student portal regularly.
5. Go through study material.
6. Check mails and announcements on LMS student portal.
7. Keep updated with the posts, assignments and examinations which shall be conducted on the LMS student portal.
8. Be regular, so that you do not suffer in any way.

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2
   C: 1

9. All the submissions should be on **LMS and code should be pushed to Github**.
10. **Cell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices are not permitted in classes during the Tests. Such devices MUST be turned off in the class room.
11. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
12. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail pbadoni@ddn.upes.ac.in to your concerned faculty(Put your email ID here). Please use an appropriate subject line to indicate your message details.

RELATED OUTCOMES

1. The expected outcomes of the Program:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2
   C: 1

PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team-work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at-large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. The expected outcomes of the Specific Program:

PSO1	Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques.
PSO2	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	

3. The expected outcomes of the Course:

On completion of this course, the students will be able to,

CO 1	Demonstrate a high level of proficiency in writing correct and efficient C code.
CO 2	Acquire the skills to debug and troubleshoot C programs efficiently.
CO 3	Expertise in designing structured programs using modular programming techniques.
CO 4	Understanding of file and memory management techniques.
CO 5	Acquire the ability to apply their C programming skills to develop practical applications.

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni
2. Course : Programming in C Lab
3. Program : B.Tech- CSE
4. Target : Level- 2

Course Code: CSEG 1041
L: 0
T: 0
P: 2
C: 1

4. Co-Relationship Matrix

Indicate the relationships by1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1					3				1				1	2
CO 2					2								1	2
CO 3					1								1	2
CO 4					2								1	2
CO 5			2		2				2			2	1	2
Average			.4		2				.6			.4	1	2

5. Course outcomes assessment plan:

components / Course Outcomes	Continuous Evaluation	Class Test	Viva		Any other
CO 1	☑	☑	☑	☐	☐
CO 2	☑	☑	☑	☐	☐
CO 3	☑	☑	☑	☐	☐
CO 4	☑	☑	☑	☐	☐
CO 5	☑	☑	☑	☐	☐

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni
2. Course : Programming in C Lab
3. Program : B.Tech- CSE
4. Target : Level- 2

Course Code: CSEG 1041
L: 0
T: 0
P: 2
C: 1

BROAD PLAN OF LAB

Programming in C Lab

List of Experiments

Experiment 1: Installation, Environment Setup and starting with C language

1. Write a C program to print " Hello World"
2. Write a C Program to print the address in multiple lines (new line).
3. Write a program that prompts the user to enter their name and age.
4. Write a C program to add two numbers, take number from user.

Experiment 2: Operators

1. WAP a C program to calculate the area and perimeter of a rectangle based on its length and width.
2. WAP a C program to Convert temperature from Celsius to Fahrenheit using the formula: F = (C * 9/5) + 32.

Experiment 3.1: Conditional Statements

1. WAP to take check if the triangle is valid or not. If the validity is established, do check if the triangle is isosceles, equilateral, right angle, or scalene. Take sides of the triangle as input from a user.
2. WAP to compute the BMI Index of the person and print the BMI values as per the following ranges. You can use the following formula to compute BMI= weight(kgs)/Height(Mts)*Height(Mts).

1. Name of the Faculty : Pankaj Badoni
2. Course : Programming in C Lab
3. Program : B.Tech- CSE
4. Target : Level- 2

Course Code: CSEG 1041
L: 0
T: 0
P: 2
C: 1

	BMI
Starvation	<15
Anorexic	15.1 to 17.5
Underweight	17.6 to 18.5
Ideal	18.6 to 24.9
Overweight	25 to 25.9
Obese	30 to 39.9
Morbidity Obese	40.0 above

3. WAP to check if three points (x1,y1), (x2,y2) and (x3,y3) are collinear or not.
4. According to the gregorian calendar, it was Monday on the date 01/01/01. If Any year is input through the keyboard write a program to find out what is the day on 1st January of this year.
5. WAP using ternary operator, the user should input the length and breadth of a rectangle, one has to find out which rectangle has the highest perimeter. The minimum number of rectangles should be three.

Experiment 3.2: Loops

1. WAP to enter numbers till the user wants. At the end, it should display the count of positive, negative, and Zeroes entered.
2. WAP to print the multiplication table of the number entered by the user. It should be in the correct formatting. Num * 1 = Num
3. WAP to generate the following set of output.

a.

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2
   C: 1

2 3

4 5 6

b.

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

4. The population of a town is 100000. The population has increased steadily at the rate of 10% per year for the last 10 years. Write a program to determine the population at the end of each year in the last decade.
5. Ramanujan Number is the smallest number that can be expressed as the sum of two cubes in two different ways. WAP to print all such numbers up to a reasonable limit.

   Example of Ramanujan number: 1729

   12^3 + 1^3 and 10^3 + 9^3. for a number L=20(that is limit)

Experiment 4: Variable and Scope of Variable

1. Declare a global variable outside all functions and use it inside various functions to understand its accessibility.

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2
   C: 1

2. Declare a local variable inside a function and try to access it outside the function. Compare this with accessing the global variable from within the function.
3. Declare variables within different code blocks (enclosed by curly braces) and test their accessibility within and outside those blocks.
4. Declare a static local variable inside a function. Observe how its value persists across function calls.

Experiment 5: Array

1. WAP to read a list of integers and store it in a single dimensional array. Write a C program to print the second largest integer in a list of integers.
2. WAP to read a list of integers and store it in a single dimensional array. Write a C program to count and display positive, negative, odd, and even numbers in an array.
3. WAP to read a list of integers and store it in a single dimensional array. Write a C program to find the frequency of a particular number in a list of integers.
4. WAP that reads two matrices A (m x n) and B (p x q) and computes the product A and B. Read matrix A and matrix B in row major order respectively. Print both the input matrices and resultant matrix with suitable headings and output should be in matrix format only. Program must check the compatibility of orders of the matrices for multiplication. Report appropriate message in case of incompatibility.

Experiment 6: Functions

1. Develop a recursive and non-recursive function FACT(num) to find the factorial of a number, n!, defined by FACT(n) = 1, if n = 0. Otherwise, FACT(n) = n * FACT(n-1). Using this function, write a C program to compute the binomial coefficient. Tabulate the results for different values of n and r with suitable messages.
2. Develop a recursive function GCD (num1, num2) that accepts two integer arguments. Write a C program that invokes this function to find the greatest common divisor of two given integers.

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2

C: 1

3. Develop a recursive function FIBO (num) that accepts an integer argument. Write a C program that invokes this function to generate the Fibonacci sequence up to num.
4. Develop a C function ISPRIME (num) that accepts an integer argument and returns 1 if the argument is prime, a 0 otherwise. Write a C program that invokes this function to generate prime numbers between the given ranges.
5. Develop a function REVERSE (str) that accepts a string argument. Write a C program that invokes this function to find the reverse of a given string.

Experiment 7: Structures and Union

1. Write a C program that uses functions to perform the following operations:
    a. Reading a complex number.
    b. Writing a complex number.
    c. Addition and subtraction of two complex numbers

Note: represent complex number using a structure.

2. Write a C program to compute the monthly pay of 100 employees using each employee_s name, basic pay. The DA is computed as 52% of the basic pay. Gross-salary (basic pay + DA). Print the employees name and gross salary.
3. Create a Book structure containing book_id, title, author name and price. Write a C program to pass a structure as a function argument and print the book details.
4. Create a union containing 6 strings: name, home_address, hostel_address, city, state and zip. Write a C program to display your present address.

Experiment 8: Pointers

1. Name of the Faculty : Pankaj Badoni — Course Code: CSEG 1041
2. Course : Programming in C Lab — L: 0
3. Program : B.Tech- CSE — T: 0
4. Target : Level- 2 — P: 2
   C: 1

1. Declare different types of pointers (int, float, char) and initialize them with the addresses of variables. Print the values of both the pointers and the variables they point to.
2. Perform pointer arithmetic (increment and decrement) on pointers of different data types. Observe how the memory addresses change and the effects on data access.
3. Write a function that accepts pointers as parameters. Pass variables by reference using pointers and modify their values within the function.

Experiment 9: File Handling in C

1. Write a program to create a new file and write text into it.
2. Open an existing file and read its content character by character, and then close the file.
3. Open a file, read its content line by line, and display each line on the console.

Experiment 10: Dynamic Memory Allocation

1. Write a program to create a simple linked list in C using pointer and structure.
2. Write a program to insert item in middle of the linked list.

Experiment 11: Bitwise Operator

1. Write a program to apply bitwise OR, AND and NOT operators on bit level.
2. Write a program to apply left shift and right shift operator.

Experiment 12: Preprocessor and Directives in C

1. Write a program to define some constant variable in preprocessor.
2. Write a program to define a function in directives.

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni
2. Course : Programming in C Lab
3. Program : B.Tech- CSE
4. Target : Level- 2

Course Code: CSEG 1041
L: 0
T: 0
P: 2
C: 1

Experiment 13: Macros in C

1. Write a program to define multiple macro to perform arithmetic functions.

Experiment 14: Static Library in C

1. Write a program to create a static library for performing arithmetic functions.
2. Write a program to use static library in other program.

Experiment 15: Shared Library in C

1. Write a program to create a shared library for performing arithmetic functions.
2. Write a program to use shared library in other program.

Total Lab hours 60

References*

Textbooks	1. B. W. Kernighan, and D. M. Ritchie, "The C programming language", 2nd Edition, Prentice Hall, 1988. 2. P. J. Deitel, and H. M. Deitel, "C: How to program", 8th Edition, Pearson Education, 2015.
Reference books	1. B. S. S. Gottfried, "Schaum's Outline of Programming with C", 2nd Edition, McGraw-Hill, 1996. 2. P. V. D. Linden, "Expert C Programming-Deep C Secrets", Pearson Education, 1994.
Web Resources	
Journals	
MOOCs, online courses	

Year: 2025 - 26

Semester: 1

1. Name of the Faculty : Pankaj Badoni
2. Course : Programming in C Lab
3. Program : B.Tech- CSE
4. Target : Level- 2

Course Code: CSEG 1041
L: 0
T: 0
P: 2
C: 1

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination etc.

Examination Scheme: Continuous Assessment

Components	Test & Viva	Performance & Lab Report
Weightage (%)	50	50