

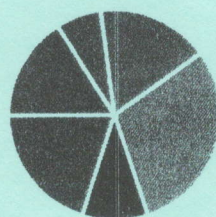
	ARKA JAIN University Jharkhand	NAAC A GRADE ACCREDITED UNIVERSITY	[21-06-2025] END SEM EXAMINATION School of Engineering & IT
Program	Bachelor of Computer Application (General & Cyber Security)		
Subject Name	Data Structure through C	Session	Even, 2024-2025
Semester	II	Year	June, 2025
Time: 3 Hour Max. Marks : 70	- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>.		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)					
Q.N	QUESTIONS	Marks	COs	KL	
1					
i	What do you linear data structure? Give example.	02	CO1	K1	
ii	What is the advantage of an ADT?	02	CO2	K1	
iii	List the various operations that can be performed on data structure.	02	CO2	K1	
iv	How Do You Search for a Particular Element in a Data Structure (Array)?	02	CO4	K2	
v	Explain the difference between an array and a linked list.	02	CO2	K1	
vi	What is a postfix expression, and how can a stack be used to evaluate it?	02	CO3	K1	
vii	What is a dequeue and how is it different from a queue?	02	CO3	K3	
viii	What is the difference between balanced binary tree and complete binary tree?	02	CO1	K1	
ix	What is a stack underflow?	02	CO2	K1	
x	What is a multidimensional array?	02	CO2	K1	

CO1	Different operation can be implemented in data structure.
CO2	Prefix to postfix stack can be done on any given expression
CO3	Insertion or deletion of data using link list
CO4	Any expression can be converted into tree structure.
CO5	Minimize the over use of traversing.

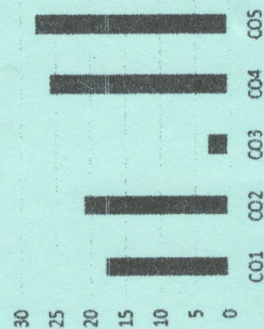
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution



Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	What is Stack? Explain all the operations in Detail.	05	CO5	K2
3	What is the importance of Searching in Data Structure Algorithm? Give an example with proper algorithm.	05	CO4	K3
4	Write the algorithm and code for insertion sort.	05	CO3	K4
5	How do you implement a stack using an array?	05	CO2	K4
6	Create an expression tree from the given expression : $(A+B)*A-C$	05	CO3	K4
7	What do you mean by Dynamic memory allocation? Explain Malloc(), Calloc() functions.	05	CO4	K4

Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	What are the different operations on queue? Write code for all the operations.	10	CO1	K5
9	Convert the following Infix Expression: $(AX + (B * C))$ to Postfix Expression and Prefix Expression:	10	CO4	K6
10	Write a Program to find Minimum and Maximum elements of an array using recursion.	10	CO5	K4
11	Explain Quick sort and sort the given array using quick sort 10 15 1 2 9 16 11	10	CO5	K3
12	Write a program to Find all the roots of a quadratic equation in C.	10	CO3	K6

 ARKA JAIN University Jharkhand				[24-06-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Bachelor of Computer Application				
Subject Name	Operating System		Session	Even, 2024-2025	
Semester	II		Year	June, 2025	
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; <u>don't Write on the 1st Page Backside</u> • Answer all Questions of Section A (Compulsory) • Answer Any <u>Four</u> out of Six of Section B • Answer Any <u>Three</u> out of Five of Section C • Possession of <u>Mobile Phone</u> or any kind of <u>Written Material</u>, <u>Arguments with the Invigilator</u> or <u>Discussion with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Paper(s)</u>.				
	Knowledge Level (KL)	K1 : Remembering		K3 : Applying	
		K2 : Understanding		K4 : Analysing	
			K5 : Evaluating		
			K6 : Creating		

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)				
Q.N	QUESTIONS	Marks	COs	KL
1				
i	Define an Operating System.	02	CO1	K1
ii	List two services provided by the OS.	02	CO1	K1
iii	Which scheduling algorithm allocates the CPU first to the process that requests the CPU first?	02	CO4	K2
iv	What is the role of OS in managing Software resources?	02	CO2	K2
v	What are the benefits of using a graphical user interface (GUI) over a command-line interface (CLI)?	02	CO1	K2
vi	What is a process in an operating system?	02	CO1	K2
vii	Define the kernel and shell	02	CO2	K2
viii	What is user management in Operating System?	02	CO4	K2
ix	Define multithreading.	02	CO4	K1
x	What is Semaphore?	02	CO5	K1

Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)																						
Q. No.	QUESTIONS	Marks	COs	KL																		
2	Explain the key components of an OS: Kernel, Shell, and User Interface.	05	CO1	K3																		
3	Discuss the essential services provided by an operating system.	05	CO2	K4																		
4	What do you mean by Scheduling? Compare pre-emptive and non pre-emptive scheduling.	05	CO4	K4																		
5	What is critical section? What are the requirements to its solution? Explain in details.	05	CO5	K3																		
6	What do you mean by Thread? Explain the advantages of threads over processes.	05	CO4	K4																		
7	What do you mean by Multiprocessor? Write down the applications of Multiprocessor?	05	CO5	K4																		
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)																						
Q. No.	QUESTIONS	Marks	COs	KL																		
8	Explain Paging Technique with example.	10	CO6	K3																		
9	Define the process of creating, deleting, and managing files and directories in Linux using basic command-line tools such as touch, rm, mv, and cp. Provide examples of each command. Label any 3 Security Features in Linux.	10	CO6	K5																		
10	What do you mean by Real Time Operating System? What are the various Real Time Operating System? Explain features and special technique of different types of Real Time Operating System.	10	CO3	K4																		
11	Analyze the benefits and limitations of multithreading and multiprocessing in modern systems.	10	CO3	K3																		
12	Explain First Come First Serve scheduling policy using following set of processes.	10	CO4	K5																		
<table><tr><td>Proceses</td><td>P1</td><td>P2</td><td>P3</td><td>P4</td><td>P5</td></tr><tr><td>Admission Time</td><td>0</td><td>2</td><td>3</td><td>4</td><td>8</td></tr><tr><td>Service Time</td><td>3</td><td>3</td><td>5</td><td>2</td><td>3</td></tr></table>					Proceses	P1	P2	P3	P4	P5	Admission Time	0	2	3	4	8	Service Time	3	3	5	2	3
Proceses	P1	P2	P3	P4	P5																	
Admission Time	0	2	3	4	8																	
Service Time	3	3	5	2	3																	

CO- Course Outcomes,	KL- Knowledge Level,	PO – Program Outcome
CO1	To acquire the fundamental knowledge of the operating system architecture and components	
CO2	To know the various operations performed by the operating system	
CO3	To Know about the Types of operating systems and differences * among them	
CO4	To Know about the Processes, threads, and the differences between the two processes	
CO5	To Know about the Interrupts, synchronization, waiting, and atomic behaviour.	
CO6	To Know about the Virtual memory, paging, and memory allocation Caching principles and quantitative estimation of cache behaviour.	
GRAPHICAL REPRESENTATION		
Bloom's Taxonomy 		Course Outcomewise Marks Distribution

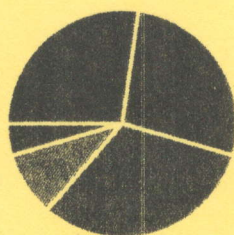
JGI	ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	[26-06-2025] END SEM EXAMINATION School of Engineering & IT
Program	Bachelor of Computer Application (General/AIDL/Cyber Security)		
Subject Name	Object Oriented Programming with C++	Session	Even, 2024-2025
Semester	II	Year	June, 2025
Time: 3 Hour Max. Marks : 70	- Start writing from 2nd page onwards; don't Write on the 1st Page <u>Backside</u> - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)				
Q.N	QUESTIONS	Marks	COs	KL
1				
i	Define Object Oriented Programming	02	CO1	K1
ii	What is the difference between data abstraction and data encapsulation?	02	CO2	K2
iii	List any two advantages of Object-Oriented Programming.	02	CO2	K1
iv	Mention any two disadvantages of procedure-oriented programming languages.	02	CO2	K1
v	What do you mean by a class in C++?	02	CO1	K1
vi	Explain the term constructor in brief.	02	CO2	K2
vii	What is function overloading?	02	CO3	K1
viii	What is the use of the <i>this</i> pointer?	02	CO2	K2
ix	Define friend class with a simple example.	02	CO3	K2
x	What is a pure virtual function?	02	CO3	K2

Course Outcomes	CO1	Analyze the logic of a given problem.
	CO2	Use branching control statements and iterative control statements using C++.
	CO3	Demonstrate the concepts of Reusability through the use of functions, Inheritance & Polymorphism.
	CO4	Analyze the problem statement and decide the logic to solve the problem using C++ Programming.

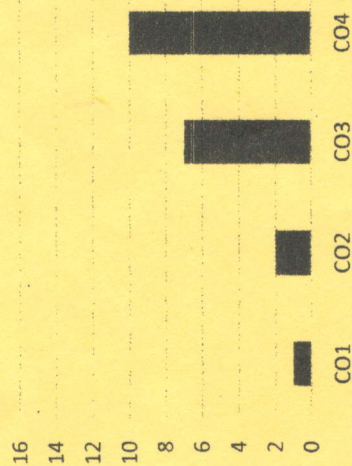
GRAPHICAL REPRESENTATION

Blooms Level Wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution



Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain inheritance and describe any two types with examples.	05	CO3	K2
3	Write a program in C++ to demonstrate function overloading.	05	CO3	K3
4	Explain the concept of constructor overloading with an example.	05	CO2	K3
5	What are the differences between static and dynamic binding?	05	CO4	K4
6	How is exception handling done in C++ using try, catch, and throw?	05	CO2	K3
7	Describe the advantages of OOP paradigm over procedural programming.	05	CO1	K4

Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)

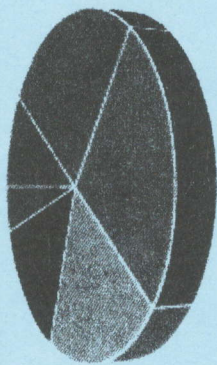
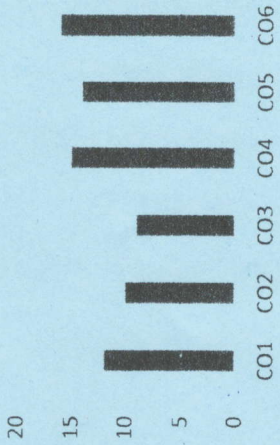
Q. No.	QUESTIONS	Marks	COs	KL
8	Write a C++ program to demonstrate multiple inheritance. Explain constructor execution order.	10	CO3	K3
9	Explain operator overloading. Write a C++ program to overload + and == operators.	10	CO3	K3
10	Define virtual functions. Write a program to show runtime polymorphism using base class pointers.	10	CO3	K3
11	What are templates in C++? Write a program using function and class templates.	10	CO3	K6
12	Explain file handling in C++. Write a program to read and write student records using file streams.	10	CO4	K3

	ARKA JAIN University Jharkhand		[30-06-2025] END SEM EXAMINATION School of Engineering & IT
Program	Bachelor Of Computer Application		
Subject Name	System Analysis and Design	Session	Even, 2024-2025
Semester	II	Year	June, 2025
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Q. N1		Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)		
	QUESTIONS	Marks	COs	KL
i	What is the primary objective of Systems Analysis and Design (SAD)?	2	CO4	K1
ii	What is an open system?	2	CO1	K2
iii	What is the main responsibility of a system analyst?	2	CO4	K3
iv	Which SDLC model is most suitable for projects with well-defined requirements?	2	CO6	K2
v	What type of feasibility assesses whether the system will be accepted by users?	2	CO2	K4
vi	Which technique is commonly used to gather detailed requirements from stakeholders?	2	CO1	K2
vii	Which diagram is used to represent entities and their relationships in a database?	2	CO3	K1
viii	Which architectural model separates presentation, logic, and data layers?	2	CO5	K2
ix	What does a Data Flow Diagram (DFD) primarily represent?	2	CO3	K2
x	Which testing technique focuses on individual modules of a system?	2	CO5	K5

Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the importance of Systems Analysis and Design (SAD).	05	CO1	K2
3	What are Testing Techniques? Explain.	05	CO5	K3
4	Discuss the key responsibilities of a system analysis.	05	CO3	K3
5	Describe the different types of feasibility.	05	CO4	K3
6	Describe the SDLC (Software Development Life Cycle) and explain its various phases.	05	CO1	K2
7	Discuss Waterfall model.	05	CO6	K4
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the importance of conducting a feasibility study. Describe Iterative SDLC models.	10	CO1	K3
9	What is the difference between functional and non-functional requirements? Provide examples of each.	10	CO2	K2
10	Discuss the principles of good user interface design and its role in system usability.	10	CO5	K3
11	Draw and explain a Data Flow Diagram (DFD) with appropriate levels and components.	10	CO6	K4
12	What are the common types of software testing? Describe unit and integration testing in detail.	10	CO3	K5

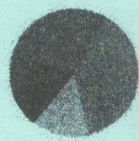
CO- Course Outcomes, KL- Knowledge Level, PO - Program Outcome

Course Outcomes	CO1	CO2	CO3	CO4	CO5	CO6
	Develop the skills to gather, analyze, and document user requirements for information systems.	Gain proficiency in designing system architectures and interfaces based on requirements.	Learn to create models such as data flow diagrams and entity-relationship diagrams to represent system components and interactions.	Develop the ability to identify and solve problems related to system design and implementation.	Improve communication skills to effectively convey technical information to stakeholders.	Acquire basic project management knowledge to effectively manage system analysis and design project.
GRAPHICAL REPRESENTATION						
Bloom's level wise Marks Distribution			Course Outcome (CO) based Marks Distribution			
 • K1 • K2 • K3 • K4 • K5 • K6			 CO1 CO2 CO3 CO4 CO5 CO6			

CO- Course Outcomes,		KL- Knowledge Level,	PO - Program Outcome
Course Outcomes	CO1	Understand and appreciate descriptive statistics	
	CO2	Understand the concepts of probability and random variable	
	CO3	Interpolation, approximation, and integration of Functions	
	CO4	Initial values problems governed by ordinary differential equations	

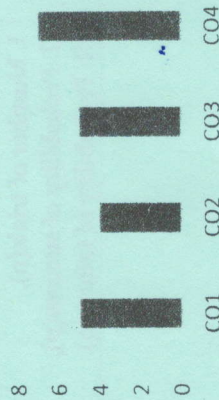
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ k1 ■ k2 ■ k3 ■ k4 ■ k5 ■ k6

Course Outcome wise Marks Distribution



JGI ARKA JAIN University Jharkhand NAAC GRADE A ACCREDITED UNIVERSITY		[02-07-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Bachelor of Computer Application		(General/ AIDL / CS)
Subject Name	Numerical & Statistical Methods		Session Even, 2024-2025
Semester	II		Year June, 2025
	• Start writing from 2nd page onwards; <u>don't Write on the 1st Page Backside</u> • Answer all Questions of Section A (Compulsory) • Answer Any <u>Four</u> out of Six of Section B • Answer Any <u>Three</u> out of Five of Section C • Possession of <u>Mobile Phone</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussion with Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>.		
Knowledge Level (KL)	K1 : Remembering		K3 : Applying
	K2 : Understanding		K4 : Analysing
			K5 : Evaluating
			K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)

Q. N1	QUESTIONS	Marks	COs	KL
i	Apply one iteration of the Newton-Raphson method for $f(x)=x^2-2$ with $x_0=1$.	2	CO4	K1
ii	Apply one iteration of the Bisection Method to find a root of $f(x)=x^3-4$ in $[1, 2]$.	2	CO1	K2
iii	Find the forward difference Δy from the data: $y(0) = 1$, $y(1) = 3$, $y(2) = 7$.	2	CO4	K3
iv	Using Lagrange interpolation, estimate the value of $f(2)$ from: $(1, 2)$, $(3, 10)$.	2	CO3	K2
v	Compute the absolute error and relative error if the exact value is 2.5 and approximate value is 2.45.	2	CO4	K4
vi	Perform one iteration of the Gauss-Seidel method to solve the system: $4x+y=9$ $x+3y=5$ (Use initial guess $x=0, y=0$)	2	CO2	K2
vii	Find the expected value $E(X)$ for a discrete random variable X with: $P(X=1)=0.2$ $P(X=2)=0.3$ $P(X=3)=0.5$	2	CO1	K3
viii	Fit a straight line $y=mx+c$ using least squares method for the data: $(1, 2)$, $(2, 3)$. (Find m and c using the formulas for two points.)	2	CO3	K2

ix	What is the primary use of the least-squares regression technique?	2	CO4	K2												
x	Write the formula for the expected value of a discrete random variable X.	2	CO2	K1												
Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)																
Q. No.	QUESTIONS	Marks	COs	K1												
2	Define truncation error and round-off error. Illustrate with suitable examples.	05	CO1	K2												
3	Explain Gauss-Seidel method for solving a system of linear equations. Apply it for two iterations to solve: $10x+y+z=12, 2x+10y+z=13, x+2y+10z=14$	05	CO4	K3												
4	Use Newton's Forward Interpolation to find the value of y at $x = 2.5$ for the following data: X : 1 2 3 4 Y: 1 4 9 16	05	CO3	K3												
5	Solve the equation $x^3 - x - 1 = 0$ using the Newton-Raphson method for one iteration.	05	CO4	K3												
6	A person measured a length as 3450 cm , where as its actual length is 3445 cm and another length as 145 cm where as its actual length is 140 cm compare their absolute and relative error	05	CO1	K5												
7	On the average, one in 400 items is defective. If the items are packed in the boxes of 100, what is the probability that any given box of items will contain: (i) Defective (ii) Less than 2 defective	05	CO2	K4												
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)																
Q. No.	QUESTIONS	Marks	COs	K1												
8	Solve the following system of equation by Gauss-Jordan method? $10x - 7y + 3z = 6$ $-6x + 8y - z = 5$ $3x + y + 4z = 2$	10	CO4	K3												
9	a) Explain Forward and Backward Differences with their formulas. b) Given the data:	10	CO3	K2												
<table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>f(x)</td><td>2</td><td>6</td><td>15</td><td>26</td><td>40</td></tr></table>					x	1	2	3	4	5	f(x)	2	6	15	26	40
x	1	2	3	4	5											
f(x)	2	6	15	26	40											

	Construct the forward difference table.			
10	Using Lagrange's formula. Find the polynomial which fits the following data $(-1, 7), (1, 5)$ and $(2, 15)$.	10	CO3	K3
11	Using graphical method solve following LP problems Max $Z = 5x_1 + 3x_2$ Subject to $3x_1 + 5x_2 \leq 15$ $5x_1 + 2x_2 \leq 10$ $x_1, x_2 \geq 0$	10	CO1	K4
12	The mean of binomial distribution is 40 and the Standard Deviation is 6. Calculate - I. Number of trials(n), II. Probability of success(p), III. Probability of failure(q).	10	CO2	K5