



ARKA JAIN
University
Jharkhand

NAAC
GRADE A
ACCREDITED UNIVERSITY

[21-06-2025]

END SEM EXAMINATION
School of Engineering & IT

Program	Master of Computer Applications		
Subject Name	Data Structures	Session	Even, 2024-2025
Semester	II	Year	June, 2025 *
• 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

Time: 3 Hour
Max. Marks : 70

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

Q. N1	QUESTIONS	Marks	COs	KL
i	Define ADT (Abstract Data Type).	2	CO1	K1
ii	Compare binary search and linear search techniques.	2	CO2	K2
iii	How data structures are classified?	2	CO4	K2
iv	What are the types of linked lists?	2	CO1	K1
v	List the advantages of circular linked list.	2	CO2	K1
vi	List any four applications of stack.	2	CO3	K1
vii	What do you mean by stack overflow and stack underflow?	2	CO1	K1
viii	Explain the applications of Deques.	2	CO3	K2
ix	Define Asymptotic notation.	2	CO2	K1
x	Define Graph.	2	CO2	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Discuss the applications of queues in breadth first search.	05	CO4	K2
3	Explain Recursion. Differentiate recursive method and iterative method with suitable example.	05	CO3	K2
4	Create an algorithm for Push and Pop operations on Stack using Linked list.	05	CO3	K3
5	What is the draw backs of single linked list? Explain how to implement insert and traverse operations in circular linked list.	05	CO2	K3
6	Convert the following Infix into Postfix expression: $A+(B*C)/D$.	05	CO4	K3
7	Give any Two Applications of Graph.	05	CO3	K1

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

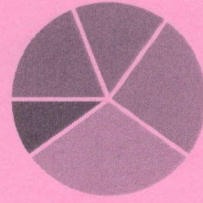
Q. No.	QUESTIONS	Marks	COs	KL
8	Create a Binary search Tree for the following values 45, 15, 79, 90, 10, 55, 12, 20, 50. Write the deletion operation of Binary search tree and delete the node 55 in the above created Tree.	10	CO3	K4
9	Describe how stacks can be made using arrays and linked lists. Explain how to add (push) and remove (pop) items from each type of stack. Discuss the benefits and drawbacks of using arrays versus linked lists for implementing stacks.	10	CO2	K4
10	Draw a recursion tree of Tower of Hanoi for $N=4$. Examine how to solve GCD of a number using recursion.	10	CO4	K4
11	Write the postfix form for the expression -A+B-C+D? Create an algorithm for Push and Pop operations on Stack using Arrays.	10	CO5	K3
12	Create a Doubly linked list by inserting following elements in a list 13,45,23,20,25. Write algorithm for insert and delete a node from doubly linked list.	10	CO5	K5

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

Course Outcomes	CO1	CO2	CO3	CO4	CO5
	Demonstrate different data structures, its operations using C programming.	Analyze the performance of Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques.	Implement some applications of data structures in a high-level language such as C/C++	Design and apply appropriate data structures for solving computing problems.	Compute the efficiency of algorithms in terms of asymptotic notations for the given problem.

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution



		ARKA JAIN University Jharkhand				[24-06-2025] END SEM EXAMINATION School of Engineering & IT		
Program		Master of Computer Application						
Subject Name		Database Management 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 Four out of Six of Section B • Answer Any Three 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 in the 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	
i	What is an instance of a database?	02	CO1	K1	
ii	Define the concept of atomicity in transactions.	02	CO5	K2	
iii	Write any two SQL DDL commands.	02	CO4	K3	
iv	What is a composite attribute?	02	CO2	K4	
v	What is the function of the HAVING clause in SQL?	02	CO4	K5	
vi	Define functional dependency with an example.	02	CO5	K3	
vii	What is a weak entity? Provide an example.	02	CO2	K5	
viii	What is a checkpoint in recovery?	02	CO5	K1	
ix	What is the purpose of keys in a relational database?	02	CO1	K2	
x	What is the purpose of the ROLLBACK statement in SQL?	02	CO4	K2	

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the concept of referential integrity with an example.	05	CO3	K1
3	How does the three-schema architecture support data abstraction?	05	CO1	K2
4	What are ACID properties? Explain with an example.	05	CO5	K6
5	Explain the different types of attributes in an ER model with examples.	05	CO2	K1
6	Describe the difference between DDL, DML, and DCL in SQL with examples.	05	CO4	K4
7	Discuss normal forms up to 2NF with suitable examples.	05	CO5	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain concurrency control in DBMS. Compare locking, timestamp, and multiversion techniques.	10	CO5	K4
9	Write a detailed note on basic SQL operations, including insert, update, delete, and retrieval queries using group by and having clauses.	10	CO4	K4
10	Describe the characteristics of the database approach. Compare it with the traditional file-based approach.	10	CO1	K5
11	Discuss the Entity-Relationship model in detail. How is it used to design a conceptual database schema?	10	CO2	K2
12	Compare 2NF, 3NF, and BCNF with examples. Explain the normalization process.	10	CO5	K3

CO- Course Outcomes,

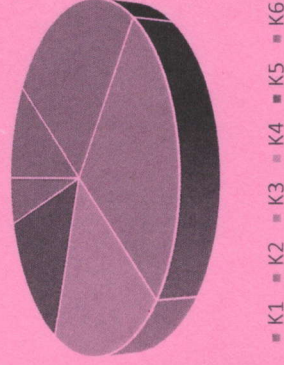
KL- Knowledge Level,

PO – Program Outcome

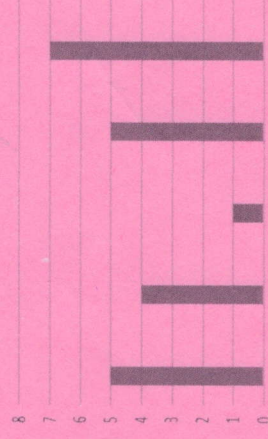
CO1	Apply the basic concepts of database management in designing the database for the given problem.
CO2	Design entity-relationship diagrams to the given problem to develop database application with appropriate fields and validations.
CO3	Implement a database schema for a given problem domain.
CO4	Formulate SQL queries in Oracle to the given problem.
CO5	Apply normalization techniques to improve the database design to the given problem.

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution





**ARKA JAIN
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Jharkhand



[26-06-2025]

END SEM EXAMINATION
School of Engineering & IT

Program	Master in Computer Application		
Subject Name	Software Engineering	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)		
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Knowledge Level (KL)	• 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> .		
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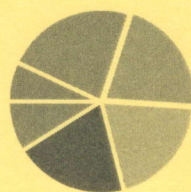
Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)				
Q. N	QUESTIONS	Marks	COs	KL
1				
i	Define software engineering. *	02	CO1	KL1
ii	What is meant by software engineering diversity?	02	CO2	KL2
iii	What is requirement validation?	02	CO4	KL2
iv	What is object orientation?	02	CO3	KL1
v	What is the role of ethics in software development?	02	CO2	KL3
vi	Define agile methodology.	02	CO1	KL4
vii	What is the purpose of a package in OO modelling?	02	CO3	KL3
viii	What is multiple inheritance?	02	CO5	KL5
ix	What is concurrency in state models?	02	CO3	KL4
x	What is a use case model?	02	CO4	KL6

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 attributes of good software with examples.	05	CO2	KL1
3	Compare and contrast plan-driven and agile development methodologies.	05	CO3	KL3
4	Differentiate between functional and non-functional requirements with examples.	05	CO1	KL3
5	What are nested states and concurrency in state modelling?	05	CO4	KL4
6	Define testing and all its types.	05	CO5	KL1
7	What is project scheduling and staffing?	05	CO3	KL5
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Discuss the key principles of object-oriented development. How do these principles improve design quality and maintainability?	10	CO1	KL1
9	Compare the waterfall, incremental, and prototype software process models with suitable diagrams. What are the strengths and weaknesses of each?	10	CO2	KL2
10	What are abstract classes and multiple inheritance? Discuss their usage, benefits, and challenges with examples.	10	CO3	KL4
11	Define link and association concept of object oriented design.	10	CO4	KL3
12	Suppose that a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three modes i.e., organic, semidetached and embedded.	10	CO5	KL5

CO- Course Outcomes,	KL- Knowledge Level,	PO - Program Outcome
CO1	Identify and define different requirements for the given problem and present in the IEEE format.	
CO2	Use modern tool to create UML diagrams to create the design for the given problem.	
CO3	Draw class diagram, analyze the different types of association that exists as per the given problem and represent them using UML notations	
CO4	Analyze the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/ open source tool	
CO5	Design the static/ dynamic models to meet application requirements of the given system.	

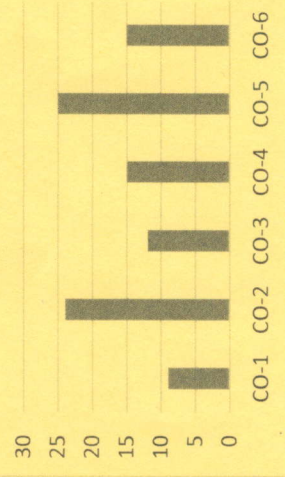
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



	ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	[02-07-2025] END SEM EXAMINATION School of Engineering & IT
Program	Master of Computer Application		
Subject Name	Web Development using PHP		Session Even, 2024-2025
Semester	II	Year	June, 2025
• Start writing from 2nd page onwards; <u>don't Write on the 1st Page</u> 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 Time: 3 Hour Max. Marks : 70			
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
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• 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 in the Cancellation of the Paper(s)</u>.			

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)				
Q. N	QUESTIONS	Marks	COs	KL
i	What are the basic data types supported in PHP?	02	CO1	K1
ii	What is the purpose of isset() and empty() functions in PHP?	02	CO2	K2
iii	Write a single-line PHP script to display the current date.	02	CO1	K3
iv	List any two functions used for database connectivity in PHP.	02	CO3	K1
v	Mention any two security threats in PHP web development.	02	CO5	K1
vi	What is the purpose of session_start() in PHP?	02	CO4	K2
vii	What is form validation in PHP?	02	CO2	K2
viii	What is the difference between GET and POST methods in PHP?	02	CO2	K2
ix	Define a session in PHP. Why is it used?	02	CO4	K2
x	Mention any two file handling functions in PHP.	02	CO4	K1

Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Discuss the role of htmlspecialchars() and mysqli_real_escape_string() in security.	05	CO5	K2
3	How can you connect to a MySQL database and fetch all rows from a table in PHP?	05	CO3	K3
4	Discuss how cookies and sessions differ in PHP. Give examples.	05	CO4	K2
5	Explain the different control structures used in PHP with examples.	05	CO1	K2
6	Evaluate different techniques to secure a PHP application against SQL Injection.	05	CO5	K5
7	Write a PHP statement to define a function that returns the square of a number.	05	CO1	K3
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Demonstrate how to fetch and display records from a MySQL database using PHP.	10	CO3	K3
9	Explain error handling in PHP. How can it be used to improve application security?	10	CO5	K2
10	Analyze the importance of file handling in a PHP-based content management system.	10	CO4	K4
11	Write a complete PHP application to collect user registration details and save them to MySQL.	10	CO3	K6
12	Explain the concept of superglobal variables in PHP. Discuss at least four different superglobal arrays with syntax and suitable examples. How do these variables facilitate web development in PHP?	10	CO2	K4

CO- Course Outcomes,		KL- Knowledge Level,	PO - Program Outcome
Course Outcomes	CO1	Understand the fundamentals of PHP programming language, including syntax, data types, control structures, and functions.	
	CO2	Develop proficiency in using PHP to interact with web forms, process user input, and perform server-side validation.	
	CO3	Integrate PHP with MySQL database to perform CRUD operations and build dynamic, data-driven web applications.	
	CO4	Implement session management, cookies, and file handling in PHP to enhance user experience and functionality of web applications.	
	CO5	Apply security best practices in PHP programming to mitigate common security vulnerabilities and ensure the integrity and confidentiality of web applications.	
GRAPHICAL REPRESENTATION			
Bloom's level wise Marks Distribution		Course Outcome wise Marks Distribution	
■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6			

			[02-07-2025]		END SEM EXAMINATION		School of Engineering & IT	
Program	Master of Computer Application							
Subject Name	Data Communication and Networking		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</u> * <u>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 in the 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 is multiplexing in data communication?					02	CO1	K1
ii	List two functions of the transport layer.					02	CO2	K2
iii	What is the use of MAC address?					02	CO4	K1
iv	Differentiate between guided and unguided transmission media.					02	CO2	K2
v	Define the term "network congestion."					02	CO3	K1
vi	Mention any two differences between IPv4 and IPv6.					02	CO4	K2
vii	What is port number in TCP/IP?					02	CO4	K1
viii	Write two functions of a router.					02	CO4	K2
ix	Name any two error detection techniques.					02	CO4	K1
x	What is meant by circuit switching?					02	CO2	K2

Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain different layers of TCP/IP protocol suite with their functions.	05	CO2	K2
3	Explain the roles of different networking devices: hub, switch, router, and gateway.	05	CO4	K3
4	Explain frequency division multiplexing and time division multiplexing with diagrams.	05	CO2	K2
5	Describe the working of DHCP and its role in IP addressing.	05	CO4	K3
6	Differentiate between client-server and peer-to-peer networks with examples.	05	CO3	K4
7	Discuss any one error detection method with suitable diagram and example.	05	CO4	K3
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Analyze the functionality of each layer in the OSI model with real-world examples.	10	CO2	K5
9	Design and implement a basic LAN setup for a computer lab. Include IP scheme and hardware layout.	10	CO5	K6
10	Evaluate and compare the effectiveness of different switching techniques: circuit, packet, and message switching.	10	CO3	K5
11	Explain the different types of transmission media with examples.	10	CO2	K2
12	Compare OSI and TCP/IP reference models in detail.	10	CO3	K4

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

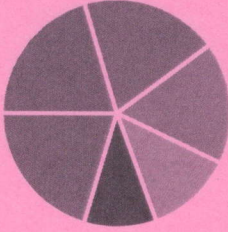
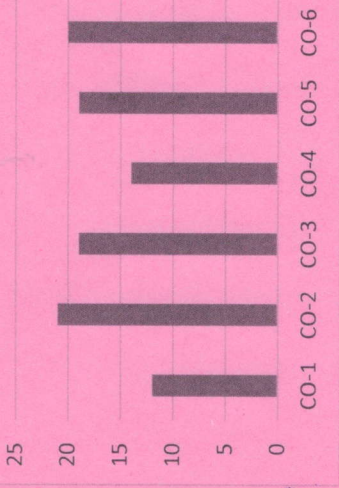
Course Outcomes	CO1	Understand the fundamental concepts of data communication and networking.
	CO2	Explain different communication models and transmission techniques.
	CO3	Analyse and compare various network architectures and topologies.
	CO4	Configure and troubleshoot networking devices and protocols.
	CO5	Design and implement simple computer networks.
GRAPHICAL REPRESENTATION		
Bloom's level wise Marks Distribution		Course Outcome wise Marks Distribution
■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6		

	ARKA JAIN University Jharkhand		[04-07-2025] END SEM EXAMINATION School of Engineering & IT
Program	Master of Computer Application		
Subject Name	Cloud Fundamentals	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 Four out of Six of Section B - Answer Any Three 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 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	K5 : Evaluating
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Q.N	QUESTIONS			Marks	COs	KL
1						
i	List any four important characteristics that define cloud computing.			02	CO1	K1
ii	What is virtualization in the context of cloud computing?			02	CO2	K1
iii	Define the terms "region" and "zone" with reference to IBM Cloud's infrastructure.			02	CO2	K1
iv	What is the main function of the IBM Cloud Catalog?			02	CO2	K2
v	What do you understand by the term "cloud workload"?			02	CO3	K1
vi	How is authentication different from authorization in cloud systems?			02	CO3	K3
vii	Briefly explain virtualization and its relevance in the cloud environment.			02	CO5	K2
viii	What is a hypervisor in cloud computing?			02	CO5	K1
ix	What is IBM Cloudant and what is it used for?			02	CO4	K1
x	Name any two types of query methods that IBM Cloudant supports.			02	CO4	K4

Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Define rapid elasticity and discuss how it helps in managing scalability and reducing costs in cloud systems.	05	CO1	K4
3	Why is JSON important in cloud-based applications? Explain how it simplifies data exchange between systems.	05	CO1	K4
4	What are the major threats to data stored in the cloud? Describe how these threats can be reduced or prevented.	05	CO3	K5
5	Define IBM Cloud Zones and Multi-Zone Regions. Explain with an example how they help in service availability and disaster recovery.	05	CO2	K5
6	Describe recent trends in cloud computing such as multi-cloud, serverless computing, and edge computing. How are these trends useful for enterprises?	05	CO6	K3
7	Explain the role of a hypervisor in virtualization. Differentiate between Type 1 and Type 2 hypervisors with examples.	05	CO5	K2
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Describe the complete procedure for setting up and using Text-to-Speech and Speech-to-Text services in IBM Cloud. Include key steps and a relevant real-world application.	10	CO3	K1
9	Explain the working of a REST API. Describe with an example showing the use of headers, parameters, and a JSON response.	10	CO2	K6
10	How are query selectors and indexes used in IBM Cloudant to improve search operations? Explain with examples.	10	CO4	K6
11	Compare the following NoSQL database types: key-value, document-based, column-family, and graph-based. Provide suitable use cases for each.	10	CO5	K3
12	Describe the functions of the IBM Cloud Dashboard and the IBM Cloud Catalog. How do these tools help users manage cloud services effectively?	10	CO6	K2

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

Course Outcomes	CO1	Understand cloud computing fundamentals and IBM Cloud infrastructure.
	CO2	Demonstrate practical use of IBM Cloud services and compute options
	CO3	Analyze IBM Cloud architecture with a focus on security and workload management.
	CO4	Apply IBM Cloud data services and APIs in application development.
	CO5	Develop cloud-native applications using IBM Cloud DevOps tools and Node-RED.
	CO6	Evaluate future IT trends and strategize solutions using IBM Cloud.
GRAPHICAL REPRESENTATION		
Bloom's level wise Marks Distribution  ■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6		
Course Outcome wise Marks Distribution  CO-1 CO-2 CO-3 CO-4 CO-5 CO-6		