17/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Program	Bachelor of Computer Application		
Subject Name	Programming In C	Semester	I
		Year	January, 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	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

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

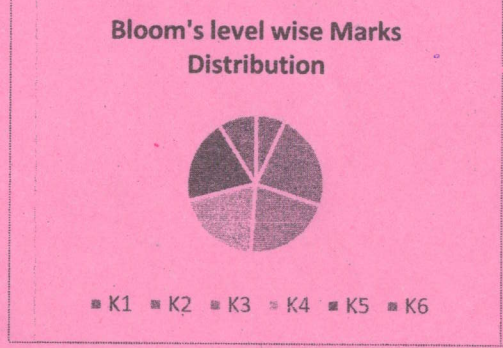
Q. N 1	QUESTIONS	Marks	COs	KL
i	What is a programming language, and why is it used?	02	CO1	KL1
ii	Name any two types of programming languages.	02	CO2	KL2
iii	What is the first step in the program development cycle?	02	CO1	KL2
iv	What does a compiler do during program execution?	02	CO4	KL3
v	Write the pseudocode to calculate the sum of two numbers.	02	CO2	KL6
vi	Name three common symbols used in flowcharts and their purposes.	02	CO1	KL5
vii	What is a variable in C programming?	02	CO3	KL4
viii	What is the difference between a variable and a constant in C?	02	CO3	KL2
ix	What is the symbol for the logical AND and bitwise AND operator in C?	02	CO1	KL4
x	Which loop in C guarantees execution at least once, even if the condition is false?	02	CO3	KL3

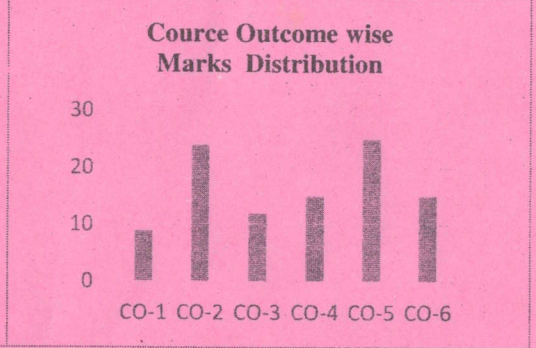
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**Cos**	**KL**
2	Write a program to add two arrays (2D) and display the result	05	CO4	KL1
3	Write a C program to check if a given number is a prime number using a for loop and an if statement	05	CO2	KL2
4	Write a C program using a switch statement to display the name of a day based on a number entered by the user (1 for Monday, 2 for Tuesday, etc.).	05	CO3	KL4
5	Explain the difference between primitive data types and derived data types in C. Provide examples of each.	05	CO1	KL5
6	Describe the basic structure of a C program, including the roles of the #include directive, main() function, and statements within the program.	05	CO2	KL6
7	Discuss the difference between formatted and unformatted input/output functions in C with examples of scanf, printf, getchar, and putchar.	05	CO3	KL1
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**Cos**	**KL**
8	What is the difference between the if-else and if-else if statements in C? Provide a scenario where you would use if-else if.	10	CO2	KL2
9	What is the purpose of variable declaration in C? Explain with an example of declaring and initializing a variable.	10	CO3	KL5
10	How are symbolic constants defined in C using the #define preprocessor directive? Provide an example.	10	CO2	KL6
11	Compare and contrast the while, do-while, and for loops in C. When would you use each loop in different programming scenarios?	10	CO1	KL3
12	Draw a flowchart to find the sum of the first 10 natural numbers.	10	CO1	KL2

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

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

GRAPHICAL REPRESENTATION





20/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A			**END SEM EXAMINATION** **School of Engineering & IT**
Program	**Bachelor of Computer Application**		
Subject Name	**Computer Architecture**	**Semester**	**I**
		Year	**January, 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	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

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

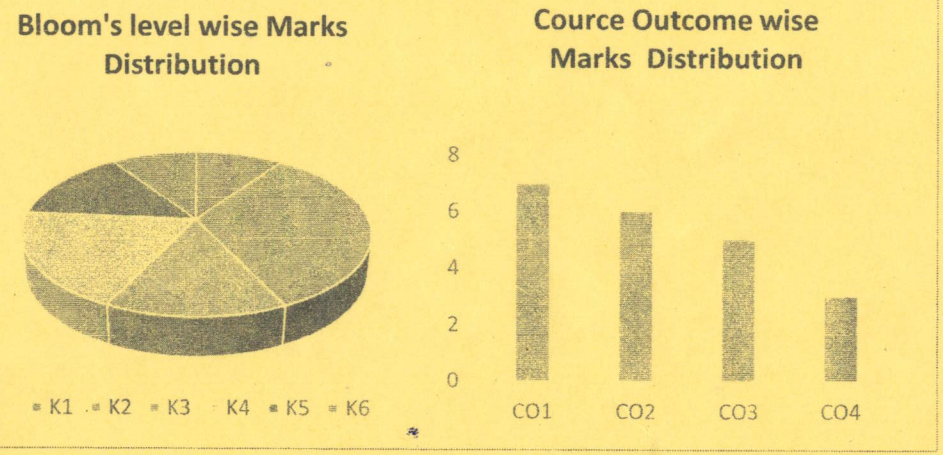
Q. N 1	QUESTIONS	Marks	COs	KL
i	What types of operations can the ALU perform?	02	CO1	K1
ii	How do you convert the binary number 11111111 to decimal?	02	CO2	K3
iii	What do you mean by virtual memory?	02	CO3	K2
iv	What is the primary function of the Control Unit in a CPU?	02	CO1	K2
v	How does primary storage differ from secondary storage?	02	CO2	K4
vi	What is the primary function of a data bus?	02	CO1	K4
vii	How does RAM impact overall system performance?	02	CO3	K1
viii	What is RAID, and what are its primary objectives?	02	CO4	K2
ix	Why NOT gate is called as the inverter? Explain.	02	CO1	K5
x	How do registers differ from cache memory?	02	CO3	K2

Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Convert the hexadecimal number 1A3 to octal. Show each step of your calculation.	05	CO1	K6
3	Explain De Morgan's Theorems with examples.	05	CO2	K2
4	What are the key components of a computer system, and what role does each play?	05	CO2	K6
5	What is the memory hierarchy in computer architecture, and why is it important?	05	CO1	K2
6	What are the main advantages of solid-state drives (SSDs) compared to traditional hard drives?	05	CO4	K5
7	What are the different types of I/O devices, and how do they communicate with the CPU?	05	CO3	K3
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	What is an interrupt? Describe the different types of interrupts.	10	CO2	K4
9	What are the primary logic gates, and what are their functions?	10	CO3	K4
10	Describe the concept of Direct Memory Access (DMA) and its benefits for I/O operations.	10	CO4	K5
11	Explain the von Neumann architecture, highlighting its key components and their functions.	10	CO1	K2
12	Discuss the advantages of using virtual memory in modern operating systems.	10	CO2	K3

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

Course Outcomes	CO1	Understand the fundamentals of Computer Architecture
	CO2	Learn about components and subsystems of Computer Architecture
	CO3	Explore real-world applications of different computer Architecture
	CO4	Analyze case studies and real-world examples of Computer Architecture.

GRAPHICAL REPRESENTATION



20/01/25

ARKA JAIN University, Jharkhand — NAAC GRADE A	END SEM EXAMINATION School of Engineering & IT	
Program	Bachelor of Computer Application (Cyber Security)	
Subject Name	Network From Security Perspective	Semester: I
		Year: January, 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, **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 1	QUESTIONS	Marks	COs	KL
i	Define encoding in the context of network security.	02	CO1	K1
ii	What is the difference between Wi-Fi and Bluetooth in wireless communication?	02	CO1	K5
iii	How many layers are in the OSI model?	02	CO4	K2
iv	Describe a scenario where encoding, decoding, sender, and receiver work together in a VPN.	02	CO3	K6
v	Name any two types of network topologies.	02	CO3	K2
vi	What does DHCP stand for, and what is its primary purpose?	02	CO4	K1
vii	What is the purpose of the ping command in network troubleshooting?	02	CO6	K2
viii	What does WLAN stand for, and how does it differ from LAN?	02	CO5	K6
ix	Explain how the private key is used for decoding in asymmetric encryption.	02	CO1	K4
x	Define a bus topology.	02	CO1	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
2	How does the Internet Protocol (IP) facilitate data transmission in digital communication? Discuss IPv4 and IPv6 differences.	05	CO3	K3
3	Designate the process of troubleshooting network connectivity issues.	05	CO6	K4
4	How does the OSI model differ from the TCP/IP model?	05	CO4	K6
5	Explicate the structure of a star topology and its applications.	05	CO4	K2
6	Dissimilarity between Classful vs. Classless network.	05	CO3	K5
7	Explicate the roles of switches and routers in a network.	05	CO4	K3

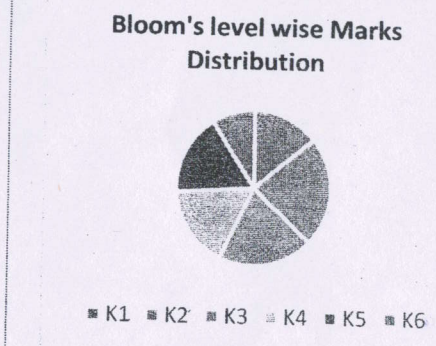
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

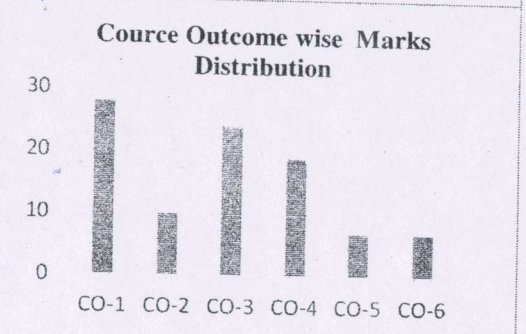
Q. No.	QUESTIONS	Marks	COs	KL
8	Write a scenario how does MAN help in connecting city-wide networks?	10	CO1	K5
9	Associate the roles of SMTP, IMAP, and POP in the email communication process.	10	CO2	K3
10	Define Internet protocol.	10	CO5	K2
11	Describe the working of a bus topology with its advantages and disadvantages.	10	CO3	K1
12	Compare and contrast LAN, MAN, and WAN with examples.	10	CO1	K4

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

Course Outcomes	CO1	Grasp core terminologies (sender, receiver, message, etc.), digital communication concepts, and network types (topology and geography-based).
	CO2	Study and utilize key protocols (e.g., DHCP, DNS, SSL, MIME, SMTP, FTP, TLS, etc.) and network devices to ensure efficient data communication and Employ advanced security protocols like S/MIME, PGP, DNSSEC, and SFTP for secure communication.
	CO3	Develop a comprehensive understanding of IP networking, switching, and routing concepts, including IP addressing, Classful vs. Classless addressing, subnetting, supernetting, VLANs, and ACLs. Analyze and implement various network topologies and protocols to design efficient, secure, and scalable networks.
	CO4	Understand and implement networking infrastructure components, including cabling, routers, switches, OSI & TCP/IP Model and protocols, while planning and configuring IPv4/IPv6 addressing, DHCP, DNS, and IPAM services to build and manage efficient, scalable networks.
	CO5	Master Linux networking by configuring firewalls, IPv6, NAT, and routing; managing services like Apache and NFS with security features such as SELinux and Kerberos; and implementing advanced system configurations for efficient and secure network environments.
	CO6	Develop advanced networking skills by configuring remote access, NAT, WAP, and DAS, implementing branch office solutions like DFS and BranchCache, and exploring high-performance networking, Hyper-V, SDN, network virtualization, and Network Controller for modern enterprise environments.

GRAPHICAL REPRESENTATION





22/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			**END SEM EXAMINATION** **School of Engineering & IT**
Program	**Bachelor of Computer Application**		
Subject Name	**Introduction to Linux**	**Semester**	I
		Year	January, 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	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

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

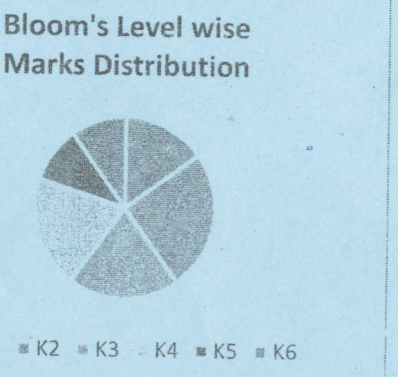
Q. N 1	QUESTIONS	Marks	COs	KL
i	Explain the concept of open source software.	02	CO1	K2
ii	Define what a shell is in the context of Linux.	02	CO1	K1
iii	Explain the purpose of the ls and ls -t command.	02	CO2	K2
iv	What is a process in Linux, and how is it managed?	02	CO2	K4
v	Explain the significance of the process ID (PID).	02	CO4	K5
vi	Describe the use of the kill command.	02	CO3	K3
vii	What is a shell script?	02	CO2	K3
viii	What is a workspace?	02	CO3	K2
ix	How does batch processing differ from single tasking?	02	CO4	K3
x	What is the difference between shutdown and halt?	02	CO3	K6

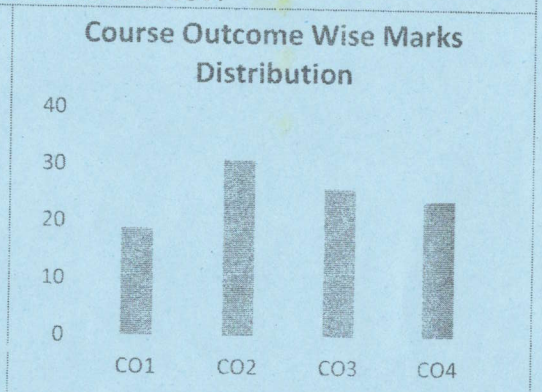
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	What are the advantages of using Linux for server environments?	05	CO3	KL4
3	Explain the concept of file ownership and group in Linux.	05	CO4	KL1
4	Explain the difference between a user and a super- user in Linux.	05	CO2	KL2
5	What is network interface in Linux? How manually configure a network interface?	05	CO1	KL4
6	What is a shell script, and how is it used in Linux?	05	CO3	KL3
7	What tools are available for monitoring system performance?	05	CO4	KL1
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 differences between monolithic and micro kernel architectures, and where does Linux fit in?	10	CO1	KL2
9	How does Linux manage system resources compared to other operating systems?	10	CO3	KL4
10	What do you mean by CLI? What is the difference between pwd, rmdir and mv command?	10	CO2	KL6
11	What is the File System Hierarchy Standard (FHS), and why is it important for Linux systems?	10	CO4	KL2
12	Write a find command to find all files in the current directory whose size is between 1000 and 10,000 bytes. Assume for questions 42 through 50, we have the following partial long listing of Files and subdirectories in the current directory. Also assume that you are not user foxr but you are in the group cool. Answer each question independently (i.e., do not Assume that a previous instruction changed the permissions as shown below). (a) drwxrwxr-- foxr foxr . . . subdir1 (b) drwxr-xr-- foxr cool . . . subdir2 (c) -rw-rw-r-- foxr foxr . . . foo1 (d) -r-xr-xr-- foxr foxr . . . foo2 (e) -rwxr----- foxr cool . . . foo3 (f) -rw-r--r-- foxr foxr . . . foo4 (g) -rw-rw-rw- foxr foxr . . . foo5	10	CO2	KL5

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

Course Outcomes	CO1	Understand the fundamentals of Linux Operating System
	CO2	Learn about Operating System components
	CO3	Explore effective use of Unix utilities, and scripting languages
	CO4	Configure and manage simple TCP/IP network services on a Linux system

GRAPHICAL REPRESENTATION





22/01/25

JGi ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Program	Bachelor of Computer Application (Cyber Security)		
Subject Name	Operating Systems From Security Perspective	Semester	I
		Year	January, 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	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 1	QUESTIONS	Marks	COs	KL
i	Define an Operating System.	02	CO1	K1
ii	List two OS security features in Windows 11.	02	CO4	K1
iii	What are the benefits of using a graphical user interface (GUI) over a command-line interface (CLI)?	02	CO3	K4
iv	What is the role of OS in managing Software resources?	02	CO2	K2
v	Define the kernel and shell.	02	CO1	K1
vi	What is a process in an operating system?	02	CO1	K3
vii	List two services provided by the OS.	02	CO2	K5
viii	What is user management in Operating System?	02	CO4	K2
ix	Define multithreading.	02	CO1	K2
x	What are file permissions?	02	CO5	K3

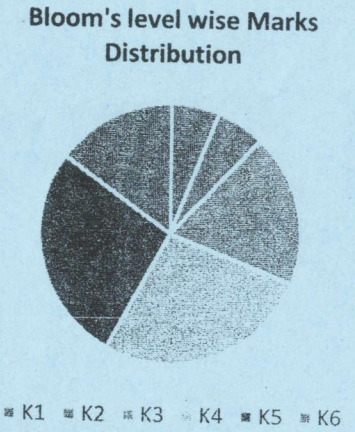
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Designate the essential services provided by an operating system.	05	CO2	K5
3	Explain the key components of an OS: Kernel, Shell, and User Interface.	05	CO1	K3
4	Describe the steps to configure Active Directory in Windows.	05	CO3	K6
5	Label any 3 Security Features in Linux.	05	CO4	K5
6	Designate File Metadata in Linux.	05	CO1	K4
7	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.	05	CO6	K5

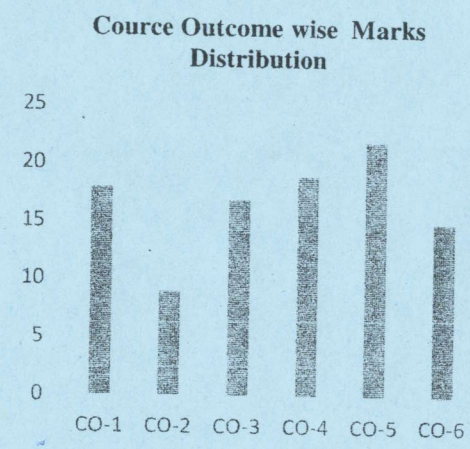
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain Linux file permissions (Read, Write, Execute) and demonstrate the chmod command with examples.	10	CO6	K6
9	Explain the Linux file system hierarchy with a neat diagram and examples of directories.	10	CO5	K5
10	Describe the concept of OS security and discuss any three security features of Windows 11.	10	CO4	K4
11	Explain the process of creating and managing user accounts in Windows OS with examples.	10	CO3	K3
12	Analyze the benefits and limitations of multithreading and multiprocessing in modern systems.	10	CO5	K4

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

Course Outcomes	CO1	Understand the fundamentals of operating systems, including components, types, and their working from hardware and software perspectives.
	CO2	Comprehend OS services, process management, and scheduling algorithms.
	CO3	Manage system memory, I/O operations, and file systems, including virtual memory concepts and platform-agnostic mechanisms.
	CO4	Implement OS security and user management in Windows and Linux, addressing security features, vulnerabilities, and system hardening.
	CO5	Utilize OS commands and tools to manage files, networks, and system configurations effectively in both Windows and Linux environments.
	CO6	Apply advanced security techniques such as VPN setup, SELinux implementation, RAID configuration, and rootkit mitigation to enhance system security.

GRAPHICAL REPRESENTATION

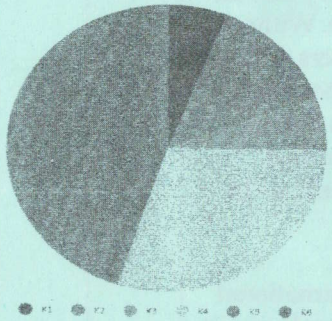


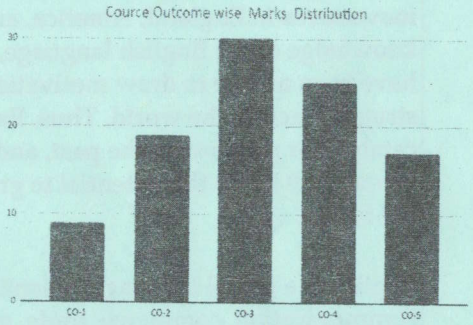


CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	To build the students' confidence and to enhance competitiveness by projecting a strong personality.
	CO2	Students shall be able to improve their listening & speaking abilities.
	CO3	They will be able to work on their ability to write error free while improvising vocabulary & grammar.
	CO4	Students will be able to deliver an effective oral business presentation
	CO5	They will be able to demonstrate his verbal and non-verbal communication ability through presentations.

GRAPHICAL REPRESENTATION





24/01/25

ARKA JAIN University
Jharkhand

NAAC GRADE A ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Program	**Bachelor of Computer Application**		
Subject Name	**Business Communication**	**Semester**	I
		Year	January, 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	**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 1	QUESTIONS	Marks	COs	KL
i	Define communication and its elements.	02	CO1	K1
ii	List any two barriers to communication and suggest ways to overcome them.	02	CO1, CO3	K2
iii	What is the difference between formal and informal communication?	02	CO2	K2
iv	Explain the communication process/cycle briefly.	02	CO1	K1
v	Write two advantages of formal communication.	02	CO2	K2
vi	How can one develop effective listening skills?	02	CO3	K3
vii	Describe the layout of a formal business letter.	02	CO4	K1
viii	What is the purpose of a résumé? Mention one key "do" while preparing it.	02	CO5	K3
ix	State the importance of precise writing in business communication.	02	CO5	K2
x	What is the role of body language in communication?	02	CO3	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Discuss the advantages and disadvantages of informal communication with examples.	05	CO2	K4
3	Explain the process of drafting a business report with an example.	05	CO4	K4
4	Write a formal letter to a company requesting information about their products.	05	CO4	K5
5	Describe the principles of oral communication and their importance in presentations.	05	CO3, CO4	K4
6	What are some common signs and symbols in communication, and how are they interpreted?	05	CO3	K2
7	Suggest strategies to improve public speaking skills effectively.	05	CO3, CO5	K4

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Draft a report on a recent company event, including its purpose, execution, and outcomes.	10	CO4	K5
9	Explain the dos and don'ts of group discussions and suggest strategies to perform well.	10	CO3, CO4	K4
10	Discuss the process and significance of delivering an effective PowerPoint presentation.	10	CO3, CO5	K4
11	Elaborate on the importance of non-verbal communication and its role in professional settings.	10	CO3	K5
12	Write a précis of the following passage: English education and the English language have brought significant benefits to India, despite their obvious drawbacks. The ideas of democracy and self-government were born out of English education. Many of the leaders who fought and sacrificed their lives for India's freedom were deeply influenced by English thought and culture. The West has contributed greatly to the East, with the history of Europe igniting the passion of our leaders. Our struggle for independence was inspired by similar movements in England, America, and France. Without knowledge of the English language, our leaders would have been unable to draw motivation from these heroic struggles across the world. Thus, English has been a catalyst for progress in the past, and when studied properly, it holds the potential to greatly benefit us in the future. English is a global language, essential for international communication, commerce, trade, and the development of practical and scientific ideas. It is a treasure trove of literature, and our own literary heritage has been enriched by it. To forget the works of Shakespeare, Milton, Keats, and Shaw would be a great loss. English, therefore, is not just a foreign language but a bridge to the broader world, offering us inspiration and resources for growth and development.	10	CO5	K6

28/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Program	Bachelor of Computer Application		
Subject Name	Discrete Mathematics	Semester	I
		Year	January, 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	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. No.	QUESTIONS	Marks	COs	KL
i	In a complete graph with 6 vertices, how many edges are present?	02	CO4	K4
ii	A binary tree with n nodes has a maximum number of edges equal to……	02	CO4	K3
iii	A graph with no cycles is called……	02	CO4	K1
iv	What is the maximum number of edges in a directed graph with n vertices?	02	CO4	K5
v	Which of the following compound statements is a tautology? a) (P∧Q)∨(¬P∧Q) b) P∨(¬P∧Q) c) P∨¬P d) P∧¬P	02	CO2	K1
vi	Which of the following is **not** a prime number? a) 2 b) 19 c) 21 d) 23	02	CO1	K4
vii	Which term of AP 27, 24, 21, …… is 0?	02	CO1	K5
viii	What is the nth term of the arithmetic sequence: 4,8,12,16,… a) 4n+2 b) 4n−4 c) 4n d) 4n+4	02	CO1	K5
ix	The first term of a geometric sequence is 5, and the common ratio is 3. What is the 4th term? a) 45 b) 75	02	CO1	K5

	c) 135 d) 108			
x	A bag contains 5 red balls and 7 green balls. What is the probability of randomly selecting a red ball? a) 7/12 b) 5/12 c) 5/6 d) 1/2	02	CO3	K5

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explains Relations on Sets, Reflexivity, and Symmetry.	05	CO4	K2
3	Explain Quantifiers Statement.	05	CO1	K2
4	Explain De Morgan's laws.	05	CO1	K1
5	Find the 28th term from the end of the AP 6, 9, 12, 15, 18… 102.	05	CO1	K5
6	What is spanning trees and shortest paths?	05	CO3	K1
7	Write Variance and standard deviation of Random Variable?	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	If a random variable has a Poisson distribution such that P (1) =P (2) then find the mean of distribution. Also find p (3).	10	CO3	K3
9	A non-directed graph G has 8 edges. Find the number of vertices, if the degree of each vertex in G is 2.	10	CO3	K3
10	If 7 times the 7th term of an AP is equal to 11 times its 11th term, show that the 18th term of the AP is zero.	10	CO1	K5
11	The sum of some terms of a GP is 315. Its first term is 5 and the common ratio is 2. Find the number of its terms and the last term.	10	CO1	K5
12	Use mathematical induction to show that $1+2+3+\cdots+n=n(n+1)/2$ for all integers $n\geq 1$	10	CO3	K5

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

Course Outcomes	CO1	Construct mathematical arguments using logical connectives and quantifiers
	CO2	Verify the correctness of an argument using propositional and predicate logic and truth tables
	CO3	Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction
	CO4	Perform operations on discrete structures such as sets, relations and functions and be familiarwith concepts like Groups and Rings

GRAPHICAL REPRESENTATION