





**Government Holkar (Model, Autonomous) Science
College, Indore (M.P.)**


Computer Science Department


Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)		Class – B.C.A. III Semester	Year- 2024 Session- 2024-25
Course Type (Computer Applications) Major			
1	Course Code	S3-BCA11	
2	Course Title	Data Communication and Computer Networks	
3	Pre – requisite (If any)	To study this course, a student must have the basic knowledge of Computers.	
4	Course Learning Outcomes (CLO)	After the completion of this course, a successful student will be able to do the following: <ol style="list-style-type: none"> 1. Recall network fundamentals such as goals, structures, services, models, and standardization. 2. Explain the concepts of centralized, distributed, and collaborative networking models. Describe common network topologies and the basics of data transmission. 3. Apply knowledge to select appropriate network configurations and transmission media based on specific requirements. 4. Analyze differences between LANs and WANs, including their components, speeds, and cost implications. Evaluate the OSI Reference Model and critique various networking models. 5. Develop a foundational framework for understanding open systems and their role in networking. 6. Assess the significance of Internet standards within the context of Internet structure and layers. Evaluate the impact of multiplexing and switching techniques on network performance. 	
5	Credit Value	4 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35


Mr. Mohit Gupta
 Student
 Clause 06

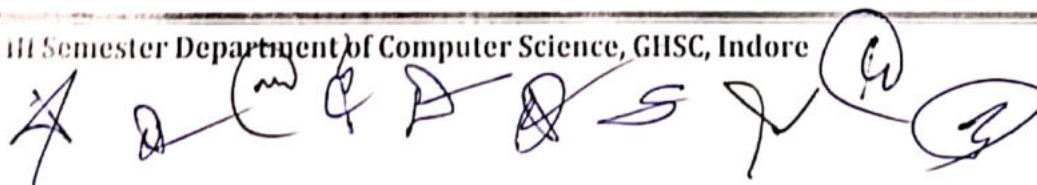

Mr. Manish Kumar
 Industrial Person
 Clause 05


Dr. Ugrasen Suman
 Subject Expert
 Clause 04


Dr. Sharad Gangele
 Subject Expert
 Clause 03


Dr. Sanjeev Sharma
 Subject Expert
 Clause 03


Dr. Pradeep Sharma
 Convener & HoD



Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A.III Semester	Year- 2024	Session- 2024-25
Course Type (Computer Applications) – Major			
Course Code	S3-BCA1T		
Course Title	Data Communication and Computer Networks		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Network goals and application, Network structure, Network services, Example of networks and Network Standardization. Networking models: centralized, distributed and collaborative. Network Topologies: Bus, Star, Ring, Tree, Hybrid: Selection and Evaluation factors.	10
II	Theoretical Basis for Data communication, Transmission media, Twisted pair (UTP, STP), Coaxial Cable, Fiber optics: Selection and Evaluation factors. Line of Sight Transmission, Communication Satellites. Analog and Digital transmission. Transmission and switching, frequency division and time division multiplexing, STDM, Circuit switching, packet switching and message switching.	10
III	Brief Overview of LAN (Local Area Network): Classification. Brief overview of Wide Area Network (WAN). Salient features and differences of LAN with emphasis on: Media, Topology, Speed of Transmission, Distance, Cost. Terminal Handling, Polling, Token passing, Contention. IEEE Standards: their need and developments.	10
IV	Open System: What is an Open System? Network Architectures, ISO-OSI Reference Model, Layers: Application, Presentation, Session, Transport, Network, Data Link & Physical. Physical Layer - Transmission, Bandwidth, and Signaling devices used media type. Data Link Layer - : Addressing, Media Access Methods, Logical link Control, Basic algorithms/protocols.	15
V	Network Layer: Routing: Fewest-Hops routing, Type of Service routing, Updating Gateway routing information. Brief overview of Gateways, Bridges and Routers, Gateway protocols, routing daemons. OSI and TCP/IP model. TCP/IP and Ethernet. The Internet: The structure of the Internet, the internet layers, Internetwork problems. Internet Standards.	15

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Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. III Semester	Year- 2024	Session- 2024-25
Course Type (Computer Applications) – Major			
Course Code	S3-BCAIT		
Course Title	Data Communication and Computer Networks		

Part – C Learning Resources
Text Books, Reference Books, Other Resources
<p>Suggested Readings:</p> <p>Text Books:</p> <ol style="list-style-type: none"> 1. Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1985.processing, Prentice Hall,1983. 2. Black: Computer Networks: Protocols, standords and Interfaces, Prentice Hall International Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1985.processing, Prentice Hall, 1983. 3. Fourauzan B., “Data Communications and Networking”, 3rd edition, TataMcGraw-HillPublications. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Coner D., “Computer Networks and Internet”, 2nd Edition, Pearson Education. 2. S.K.Basandra& S. Jaiswal, “Local Area Networks”, Galgoti Publications. 3. William Stallings, “Data and Computer Communication”. 4. Book published by M.P. Granth Academy, Bhopal. <p>Suggested Digital Platforms Web Links:</p> <ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/106/105/106105082/ 2. http://cse.iitkqp.ac.in/-sandipc/courses/cs31006/slides/application layer.pdf 3. https://onlinecourses.nptel.ac.in/noc22ee61/Preview 4. https://nptel.ac.in/course.html 5. https://Pll.harvard.edu/subiect/computer-networking 6. http://www.mohindiqranthacademy.org/ 7. http://www.mphindigranthacademy.org/ <p>Suggested Equivalent Online Courses:</p> <ol style="list-style-type: none"> 1. https://archive.nptel.ac.in/courses/106/101/106101209/ 2. https://www.edx.org//learn/computer-networking

Part A - Introduction			
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Course Type (Computer Applications) – Major			
Course Code	S3-BCA1T		
Course Title	Data Communication and Computer Networks		

Part – D Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks		External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours		
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.				
The division of marks is as follows:				
Test I	20 Marks	Best two test Marks = (20 + 20)	Section (A): 5 Objective Questions (1 mark each)	5 x 1 = 5
Test II	20 Marks		Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.		
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		




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Computer Science Department


Part A- Introduction (Practical)			
Programme – B.C.A. (Computer Applications - Major)		Class – B.C.A. III Semester	Year- 2024 Session- 2024-25
Course Type (Computer Applications) – Major			
1.	Course Code	S3-BCA1TP	
2.	Course Title	Computer Networks Lab	
3.	Pre-requisite (if any)	Open for All	
4.	Course Learning Outcomes (CLO)	After Completing this lab course, student will be able to: <ol style="list-style-type: none">1. Acquire knowledge about the different types cables employed in networking.2. Gain expertise in recognizing various connectors utilized for linking different cables.3. Utilize a range of tools to prepare connectors for cables.4. Set up and oversee various local area networks both in a home and a workplace environment.5. Troubleshoot and resolve network issues in both home and workplace environments.	
5.	Credit Value	2 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35



Mr. Mohit Gupta
Student
Clause 06

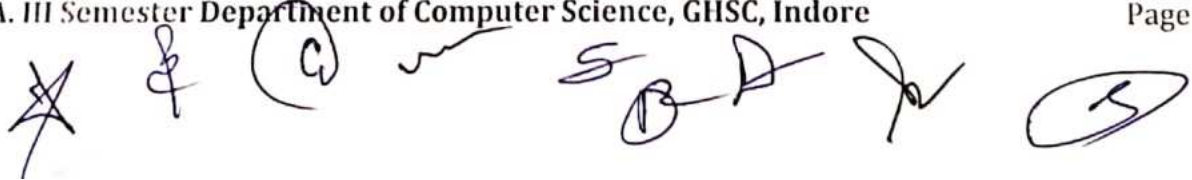

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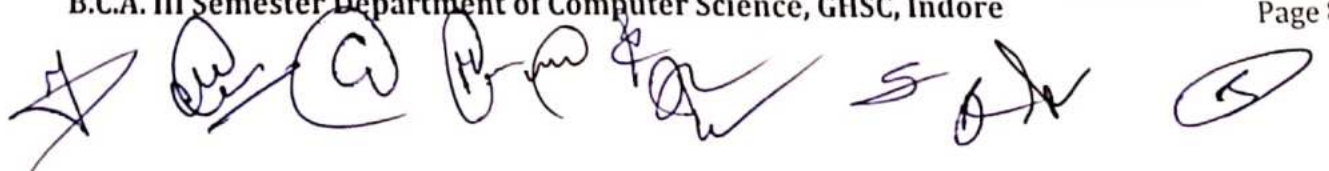

Dr. Pradeep Sharma
Convener & HoD



Part B- Content of the Course	
Total no. of lectures – As per UGC rules	
Suggestive List of Practicals	
1.	Study of UTP network cable: <ul style="list-style-type: none"> • Study the Color code of UTP cable • Categories of UTP n/w cable • Shielding of n/w cable • Electricity interference with n/w cable • Maximum Length for which data cable can be used • Crimping of RJ45 connector and Punching of data n/w. cable • Penta scanning of cabling work • Rule of UTP laying
2.	Knowledge of Structured Cabling and its components <ul style="list-style-type: none"> • Information outlet with box • Network Rack (4U, 6U, 9U, 12U, 24U, 24U, 32U, 42U) • Patch Panel • Rack Management
3.	Study of Optical Fiber Cable <ul style="list-style-type: none"> • Different cores of OFC (6 core, 12, 24 core) • Multimode & Single mode OFC cable • Shielding of OFC • Splicing/Termination of OFC • OTDR Testing • LIU fixing • LIU management (pigtail/fiber patchcord) • Media Convertor • SFP module • Rules of OFC laying
4.	Use of Tools <ul style="list-style-type: none"> • Crimping Tool • Punching Tool • Nose plier • Wire Stripping and Cable Cutter • Multimeter • RJ45 RJ11 RJ12 Cat5 Cat6 Network Cable Tester • In-Line Coupler (RJ45 F/F) • RJ45 NETWORK SPLITTER ADAPTER 2-way.
5.	Configuration / Management of Local Area Network <ul style="list-style-type: none"> • Implementation of file and printer sharing. • Installation of ftp server and client. • Connect the computers in Local Area Network. • Configuring Class A IP Address on LAN Connection in Computer LAB and then use following tools:

- | | |
|--|---|
| | <ul style="list-style-type: none">• Ping, ipconfig, getmac, hostname, nslookup, tracert, arp, pathping, systeminfo.• Configure static routing using packet tracer software• Configure Dynamic routing using packet tracer• Configure VLAN using Managed switch Device/ Packet tracer• Implementation of Subnetting in Class A, B and C• Ping between 2 systems using IPv6• Configuration of NAT for incoming packet request• Configuration of Software / Hardware firewall to block outgoing request to facebook.com |
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Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1985.processing, Prentice Hall,1983.
2. Black: Computer Networks: Protocols, standords and Interfaces, Prentice Hall International Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1985.processing, Prentice Hall, 1983.
3. Fourauzan B., "Data Communications and Networking", 3rd edition, TataMcGraw-HillPublications.

Reference Books:

1. Coner D., "Computer Networks and Internet", 2nd Edition, Pearson Education.
2. S. K. Basandra & S. Jaiswal, "Local Area Networks", Galgoti Publications.
3. William Stallings, "Data and Computer Communication".
4. Book published by M.P. Granth Academy, Bhopal.

Suggested Digital Platforms Web Links:

1. <https://nptel.ac.in/courses/106/105/106105082/>
2. [http://cse.iitkqp.ac.in/-sandipc/courses/cs31006/slides/application layer.pdf](http://cse.iitkqp.ac.in/-sandipc/courses/cs31006/slides/application%20layer.pdf)
3. <https://onlinecourses.nptel.ac.in/noc22ee61/Preview>
4. <https://nptel.ac.in/course.html>
5. <https://Pll.harvard.edu/subiect/computer-networking>
6. <http://www.mohindiqranthacademy.org/>
7. <http://www.mphindigranthacademy.org/>

Suggested Equivalent Online Courses:

1. <https://archive.nptel.ac.in/courses/106/101/106101209/>
2. <https://www.edx.org//learn/computer-networking>

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)