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

Computer Science Department

Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. III Semester	**Year**- 2024	**Session**- 2024-25
Course Type (Computer Science) – Major			

1	**Course Code**	S3-CSC1T	
2	**Course Title**	Computer Networks & Information Security	
3	**Pre – requisite (if any)**	-	
4	**Course Learning Outcomes (CLO)**	**After completing this course student be able to:** 1. Learn how computer networks are used for accessing information, communication, e-commerce, and the Internet of Things. 2. Identify different types of computer networks, including broadband, mobile, wireless, and enterprise networks. 3. Examine network technologies like PAN, LAN, MAN, WAN, and internetworks, using real-world examples. 4. Critique the OSI and TCP/IP reference models, understanding their strengths and weaknesses. 5. Investigate policy, legal, and social aspects of computer networks, including online speech, net neutrality, security, privacy, and disinformation.	
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	Mr. Manish Kumar	Dr. Ugrasen Suman	Dr. Sharad Gangele	Dr. Sanjeev Sharma	Dr. Pradeep Sharma
Student	Industrial Person	Subject Expert	Subject Expert	Subject Expert	Convener & HoD
Clause 06	Clause 05	Clause 04	Clause 03	Clause 03	

Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. III Semester	**Year**- 2024	**Session**- 2024-25
Course Type (Computer Science) – Major			
Course Code	S3-CSC11		
Course Title	Computer Networks & Information Security		

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	Introduction to Computer Network: Use of computer network: Access to information, person to person communication, electronic commerce, internet of things. Types of computer network: Broadband access network, Mobile and wireless network, content delivery network, transit network, Enterprise network. Network Technology: Personal Area Network, Local Area Network, Metropolitan Area Network, Wide Area Network, internetworks, example of network (Internet, Mobile network, wireless network-Wifi); Reference Model: OSI, TCP/IP, Critique of the OSI and TCP/IP reference models. Policy, Legal & Social Issues: Online speech, net neutrality, security & privacy, disinformation. Physical Layer: Guided Transmission Media: Twisted pairs, Coaxial cable, Fiber optics. Wireless Transmission: The electromagnetic spectrum, frequency hopping spread spectrum, direct sequence, spread spectrum, spread spectrum, ultra-wideband, communication. Cellular Network: Common concept- cells, handoff paging, 1G, 2G, 3G, 4G & 5G technology.	16

Part A - Introduction			
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Course Code	S3-CSC1T		
Course Title	Computer Networks & Information Security		

S. No.	Topics	No. of Lectures
II	Data Link Layer: Service Provided to Network Layer: Data Link Control: Framing, Flow and Error Control; Error detecting codes, Error correcting codes; Data Link Protocols: Basic transmission and receipt, simplex link layer protocol, Full duplex, Sliding window protocol, Packer over SONET, ADSL, Point-to-Point Protocol. Switching techniques: Packet switching, Circuit switching, Datagram networks, Virtual-Circuit Networks and Structure of a switch. Network Device Drivers: Router, Modem, Repeater, Hub, Switch, Bridge, gateways.	12
III	Network Layer: Network Layer issues, Routing algorithm: Optimality, Principle of shortest path algorithm, flooding, Distance Vector Routing, Broadcast Routing; congestion in network, traffic management approaches; IP Addresses, IPv4 Addresses, IPv6 Addresses. Virtual Circuit Network: Frame Relay and ATM, Transport Layer : Process-Process Delivery: UDP, TCP. Application layers: DNS, SMTP, POP, ftp, http and https. Basics of Wi-Fi (Fundamental concepts only). Streaming audio and video: digital audio and video, streaming stored media, real-time streaming.	12

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S. No.	Topics	No. of Lectures
IV	Network Security and Information Security: Fundamentals of network and information security: principles of security and attack. Security Goals (Confidentiality, Integrity, and Availability), Non-Repudiation. Overview of Security Threats and Vulnerability: Types of attacks on Confidentiality, Integrity and Availability. Vulnerability and Threats: Phishing Attacks, E-mail threats, Web-threats, Intruders and Hackers, Insider threats, SQL injection Attacks, Ransomware. Malware: Worms, Virus, Spams, Adware, Spyware, Trojans. Security Technology: Firewalls, Intrusion detection and prevention systems, Scanning and Analysis Tools: Biometric access controls, Cipher methods, Cryptographic algorithms, Cryptographic tools, Protocols for secure communication.	10
V	Computer and Cyber-crimes: Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives, Kinds of cybercrimes, cyber stalking, forgery and fraud, crime related to IPRs, Cyber terrorism, Ransom ware attacks, computer vandalism. Cyber Laws- Introduction to IT laws & Cyber Crimes: Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy Intellectual property, Legal System of Information Technology, Social Engineering, mail Bombs, Bug Exploits. Scope of cyber laws: e-commerce, online contracts, IPRs (copyright, trademarks and software patenting), e-taxation, e-governance and cyber-crimes, Cyber law in India with special reference to Information Technology Act, 2000 and Recent amendments.	10

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Course Code	S3-CSC11		
Course Title	Computer Networks & Information Security		

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Andrew S. Tanenbaum Nick Feamster, david J. Wetherall, Computer Networks, 6th Edition, (2021), Pearson.
2. Michael E. WhitmanS and Herbert J Mattord, Principles of Information Security, Fourth Edition, CENGAGE Learning, 6th Indian Reprint.
3. M. Markow, Breithaupt iInformation Security Principles and Practices, 2nd Edition. 2014, Person Education.
4. G. R. F. Snyder, T. Pardoe, Network Security, Cengage Learning.
5. Praveen Kumar Shukla, Surya Prakash Tripathi, Ritendra Goel "Introduction to Information Security and Cyber Laws", 2014, Dreamtech Press.
6. Faiyaz Ahamad, KLSI "Cyber Law and Information Security", 2013, Dreamtech Press.
7. Books published by M.P. Hindi Granth Academy, Bhopal.

Reference Books:

1. Kurose James F., Ross Keith W., Computer Networking, A Top-Down Approach, Sixth Edition, 2017, Pearon.
2. Micki Krause, Harold F. Tipton, Handbook of Information Security Management, Vol. 1-3, CRC Press LLC.
3. B. A. Forouzan: Data Communications and Networking, Fourth edition, TMH Publishing Company Ltd.
4. Basta, W.Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India.

Suggested Digital Platforms Web Links:

1. http://www..youtube.com/watch?=qiOR5r1Sshw
2. https://www.youtube.com/watch?v=n2DloaM2s
3. https://www.youtube.com/watch?v=H8W9oMNSuwo
4. https://www.youtube.com/watch?v=t-ai8JzliHuY

5. https://we.youtube.com/watcli?v=ieTH5lVhNaY
6. https://www.youtube.com/fwatch?v=IYbtai7Nu2g
7. https://www.youtube.com/watch?v=Ig0dSaODI8
8. https://www.youtube.com/watch=3ROdsfEUuhs
9. https://www.youtube.com/watch?v=ZNuXyOXae5U
10. https://www.youtube.com/watch?=rwkHfsWQwy8
11. http://www.mphindigranthacademy.org/

Suggested Equivalent Online Courses:

1. https://archive.nptel.ac.in/courses/106/101/106101209/
2. https://archive.nptel.ac.in/courses/106/106/106106141/
3. https://www.edx.org//1earn/computer-networking

Part A - Introduction			
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Course Title	Computer Networks & Information Security		

Part – D Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc. The division of marks is as follows:			**External Evaluation (Summative Assessment):** **End Semester Exam:60 Marks** Time: 03 hours	
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.Sc. (Computer Science - Major)	**Class** – B.Sc. III Semester	**Year**- 2024	**Session**- 2024-25
Course Type (Computer Science) – Major			

1.	Course Code	S3-CSC1TP	
2.	Course Title	Computer Networks Lab	
3.	Pre-requisite (if any)		
4.	Course Learning Outcomes (CLO)	**After Completing this lab course, student will be able to:** 1. Acquire knowledge about the different types of 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	Mr. Manish Kumar	Dr. Ugrasen Suman	Dr. Sharad Gangele	Dr. Sanjeev Sharma	Dr. Pradeep Sharma
Student	Industrial Person	Subject Expert	Subject Expert	Subject Expert	Convener & HoD
Clause 06	Clause 05	Clause 04	Clause 03	Clause 03	

Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 30	
Suggestive List of Practicals	
1.	**Study of UTP network cable:** • 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** • Information outlet with box • Network Rack (4U, 6U, 9U, 12U, 24U, 24U, 32U, 42U) • Patch Panel • Rack Management
3.	**Study of Optical Fiber Cable** • 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** • 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** • 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:

	• 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

Part – C Learning Resources

Text Books, Reference Books, Other Resources

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3. M. Markow, Breithaupt iInformation Security Principles and Practices, 2nd Edition, 2014, Person Education.
4. G. R. F. Snyder, T. Pardoe, Network Security, Cengage Learning.
5. Praveen Kumar Shukla, Surya Prakash Tripathi, Ritendra Goc1 "Introduction to Information Security and Cyber Laws", 2014, Dreamtech Press.
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3. https://www.youtube.com/watch?v=H8W9oMNSuwo
4. https://www.youtube.com/watch?v=t-ai8JzliIuY
5. https://we.youtube.com/watcli?v=icTH5lVhNaY
6. https://www.youtube.com/fwatch?v=IYbtai7Nu2g
7. https://www.youtube.com/watch?v=Ig0dSaOD18
8. https://www.youtube.com/watch=3ROdsfEUuhs
9. https://www.youtube.com/watch?v=ZNuXyOXac5U
10. https://www.youtube.com/watch?=rwkHfsWQwy8
11. http://www.mphindigranthacademy.org/

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2. https://archive.nptel.ac.in/courses/106/106/106106141/
3. https://www.edx.org//1earn/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)**