

Maharashtra State Board of Technical Education, Mumbai

Laboratory Plan (LP-PR)/ Course Information Sheet (CIS)

K-2

Academic Year: 2025-26

Date: 08/12/2025

Institute Name: K. K. Wagh Polytechnic, Nashik

Institute Code: 0078

Program and Code: Computer Technology (CM)

Course Code & Abbr.: 314318 (DCN)

Course Name: Data Communication & Computer Network (DCN)

Course Index: CI403 **Scheme:** K

Class: SYCM-Mac

Semester: 4th

Name of Faculty: Mrs.S.S.Gaikwad

Learning Hrs: 45

● Teaching-Learning & Assessment Scheme:

Course Title	Course Code / Abbr	Course Category	Learning Scheme					Credits	TH Paper Duration (Hrs.)	Assessment Scheme										Total Marks
			Actual Contact Hrs/ Week			SLH	NLH			Theory			Based on LL & TSL Practical				Based on SL			
			CL	TL	LL					FA TH	SA TH	Total	FA-PR		SA-PR		SLA			
													Max	Max	Max	Min	Max	Min	Max	
Data Communication & Computer Network	DCN 314318	DSC	3	-	4	1	8	4	3	30	70	100	40	25	10	25 @	10	25	10	175

Abbreviations: CL- Class Room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS – Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

● Course Outcomes (COs): Theory & Practical

By learning course Data Communication & Computer Network (DCN-314318), Second Year students will be able to:

CO No.	Course Outcomes (COs) / Unit Outcomes (UOs)
CO403.1(CO1)	Analyze the functioning of Data Communication and Computer Network
CO403.2(CO2)	Select relevant Transmission Media and Switching Techniques as per need.
CO403.3(CO3)	Analyze the Transmission Errors with respect to IEEE standards
CO403.4(CO4)	Configure different TCP/IP services
CO403.5(CO5)	Implement relevant Network Topology using Networking Devices

● COs, Practical Laboratory Learning Outcome (LLOs) and Mapping:

Pr. No	COs	LLO	Practical -Laboratory Learning Outcome (LLO)
PR 1	CO403.3 (CO3)	LLO 1.1	Implement Amplitude Shift Keying(ASK)
PR 2	CO403.3 (CO3)	LLO 2.1	Implement Frequency Shift Keying(FSK)
PR 3	CO403.3 (CO3)	LLO 3.1	Implement Phase Shift Keying(PSK)
PR 4	CO403.2 (CO2)	LLO 4.1	Create standard network straight cable by using cable tester.
PR 5	CO403.2 (CO2)	LLO 5.1	Create standard Cross network cable by using cable tester.
PR 6	CO403.2 (CO2)	LLO 6.1	6.1 Use basic programming skills to simulate communication
PR 7	CO403.2 (CO2)	LLO 7.1	6.2 Debug and execute the program for Time Division Multiplexing
PR 8	CO403.3 (CO3)	LLO 8.1	Transfer data using Bluetooth.
PR 9	CO403.3 (CO3)	LLO 9.1	8.1 Identify different error detection methods.
PR 10	CO403.3 (CO3)	LLO 10.1	8.2 Detect errors using Checksum.
PR 11	CO403.3 (CO3)	LLO 11.1	Create WI-FI environment.
PR 12	CO403.3 (CO3)	LLO 12.1	10.1 Draw block diagram for parity check.
PR 13	CO403.3 (CO3)	LLO 13.1	10.2 Implement parity check with examples.
PR 14	CO403.3 (CO3)	LLO 14.1	Implement C Program for CRC
PR 15	CO403.3 (CO3)	LLO 15.1	Implement Hamming code in any suitable programming language.
PR 16	CO403.4 (CO4)	LLO 16.1	Use IP address and appropriate subnet mask for given problem
PR 17	CO403.4 (CO4)	LLO 17.1	Implement IP addresses for intranet in Class A, Class B, Class C
PR 18	CO403.4 (CO4)	LLO 18.1	Troubleshoot computer network using commands
PR 19	CO403.4 (CO4)	LLO 19.1	Troubleshoot computer network using commands.

PR 17	CO403.4 (CO4)	LLO 17.1	Use Wireshark packet sniffer software.
PR 18	CO403.4 (CO4)	LLO 18.1	Measure various types of Delay by using Wireshark.
PR 19	CO403.4 (CO4)	LLO 19.1	Filter ARP and ICMP packet Traffic using Wireshark.
PR 20	CO403.1 (CO1)	LLO 20.1	Install server operating system
PR 21	CO403.4 (CO4)	LLO 21.1	Create FTP Server
PR 22	CO403.4 (CO4)	LLO 22.1	Implement IPv6addressing scheme on a network.
PR 23	CO403.4 (CO4)	LLO 23.1	Configure HTTP server on given operating system.
PR 24	CO403.5 (CO5)	LLO 24.1	Use star topology for a given situation.
PR 25	CO403.5 (CO5)	LLO 25.1	Use Network simulator CISCO packet tracer.
PR 26	CO403.4 (CO4)	LLO 26.1	Implement remote login feature.
PR 27	CO403.1 (CO1)	LLO 27.1	Survey existing network infrastructure
PR 28	CO403.1 (CO1)	LLO 28.1	28.1 Transfer a file from one computer to another. 28.2 Print documents from remote system in a network.

• **Practical Plan:**

Sr No	LLOs	Practical Titles	Planned Dates		Remark & Faculty Sign with Date
			From	To	
1	LLO 1.1	*Amplitude Shift Keying(ASK) using any simulator	A- 01/01/2025 B- C-	A-03/01/2025 B- C-	
2	LLO 2.1	Frequency Shift Keying(FSK) using any simulator	A- B- C-	A- B- C-	
3	LLO 3.1	Phase Shift Keying(PSK) using any open source simulation software	A- B- C-	A- B- C-	
4	LLO 4.1	*Create and Test standard straight network cable(Universal Colour Code) using crimping tool	A- B- C-	A- B- C-	
5	LLO 5.1	Create and Test standard Cross network cable(Universal Colour Code) using crimping tool	A- B- C-	A- B- C-	
6	LLO 6.1	*Generate a Time Division Multiplexing(TDM) signal using relevant simulation software	A- B- C-	A- B- C-	
7	LLO 7.1	*Create a Hybrid Network Using Bluetooth	A- B- C-	A- B- C-	
8	LLO 8.1	*Locate the error bit in the given data string by applying checksum error detection method	A- B- C-	A- B- C-	
9	LLO 9.1	*Implement Wireless network	A- B- C-	A- B- C-	
10	LLO 10.1	Write a 'C' program for parity check error detection	A- B- C-	A- B- C-	
11	LLO 11.1	*Write a 'C' program for Cyclic Redundancy Check(CRC) error detection	A- B- C-	A- B- C-	
12	LLO 12.1	*Write a 'C' program for error correction using Hamming code	A- B- C-	A- B- C-	
13	LLO 13.1	*Configure static IP address in operating system along with appropriate subnet mask for given problem	A- B- C-	A- B- C-	
14	LLO 14.1	*Implement Classful Address in a given network	A- B-	A- B-	

		node i)Identify range of IP Address in various classes ii)Justify the reason to choose various IP address classes for creating given network	C-	C-	
15	LLO 15.1	*Execute TCP/IP network commands: ipconfig, ping, tracert	A- B- C-	A- B- C-	
16	LLO 16.1	*Execute TCP/IP network commands: netstat, pathping, route	A- B- C-	A- B- C-	
17	LLO 17.1	*Install Wireshark and configure as packet sniffer-	A- B- C-	A- B- C-	
18	LLO 18.1	Capture IP,TELNET, FTP packets using Wireshark	A- B- C-	A- B- C-	
19	LLO 19.1	Capture TCP and UDP packet using Wireshark	A- B- C-	A- B- C-	
20	LLO 20.1	Capture ARP and ICMP packet Traffic using Wireshark	A- B- C-	A- B- C-	
21	LLO 21.1	Install Operating System Linux/Windows/Any other Server	A- B- C-	A- B- C-	
22	LLO 22.1	Use FTP protocol to transfer file from one system to another system	A- B- C-	A- B- C-	
23	LLO 23.1	Create IPv6 environment in a small network using simulator	A- B- C-	A- B- C-	
24	LLO 24.1	*Create HTTP server	A- B- C-	A- B- C-	
25	LLO 25.1	*Create computers using Star topology with wired media	A- B- C-	A- B- C-	
26	LLO 26.1	Create Tree topology using CISCO packet tracer software	A- B- C-	A- B- C-	
27	LLO 27.1	Configure TELNET for remote login	A- B- C-	A- B- C-	
28	LLO 28.1	*Visit your computer laboratory	A- B- C-	A- B- C-	

Note: -Out of above suggestive LLOs -'*' Marked Practicals (LLOs) Are mandatory.
 -Minimum 80% of above list of lab experiment are to be performed.
 -Judicial mix of LLOs are to be performed to achieve desired outcomes.

● **Formative & Summative Assessment Criteria:**

● **Theory Assessment:**

a) **Formative assessment (TH-FA):**

- Two offline class tests each of 30 marks will be conducted as per MSBTE guidelines. The average of two class test marks will be consider for final TH-FA(Average) out of 30 marks.

b) **Summative Assessment (TH- SA):**

- The comprehensive End semester assessment will be done by MSBTE by a Theory written Examination for 70 marks. Question Paper and Assessment is performed by MSBTE.
- Final Theory Score out of 100 Marks will be derived as the total score as below:

$$\text{TH-SA [out of 70]} + \text{TH- FA [Average out of 30]} = 100 \text{ Marks}$$

● Practical Assessment:

1. Formative Assessment (FA) of each practical/experiment will be performed progressively for 50 marks. The assessment will be performed based on the Regularity in Practical Performance, Tool Selection Ability, Use of Appropriate tool to perform the Identified tasks, Algorithm/Solution developed, Quality of output achieved, Answer to sample questions and Submit report in total time.
2. Final Term Work (FA-PR) of 50 marks is calculated based on scores in Formative Assessment for all practicals/experiments as:

$$\text{Term Work Marks} = ((\text{Sum of Total Marks Scored in FA} * 50) / (\text{Total of Number of Experiments})) * 100$$
3. Self-learning Activities (SLA) includes Micro project / Assignment / other activities related to subject/course and it will be evaluated out of 25 Marks.
4. A Summative (comprehensive) Assessment (SA-PR) of Practical will be performed as End Semester Examination (ESE). The SA-PR will be for 50 Marks with MSBTE guidelines at the end of semester. The schedule of MSBTE Practical ESE will be display on Notice board prior to examination.

● References:

1. Suggested Books for Reference:

Sr. No	Author	Title of the Book	Publisher
1.	Behrouz A. Forouzan	Data Communication and Networking	McGraw-Hill Education, 2012 ISBN- 0073376221, 9780073376226
2.	Behrouz A. Forouzan	TCP/IP Protocol Suite	McGraw Hill Education; 4th edition (1 July 2017) ISBN-13:978-0070706521
3.	A.S. Tanenbaum	Computer Networks	Pearson; 5th edition (2 Dec.2010), ISBN-10:0132126958 ISBN-13:978-0132126953
4.	Godbole Achyut	Data Communication and Networks	McGraw-Hill Education (India) Pvt Limited, 2011 ISBN-0071077707, 9780071077705
5.	Comer Douglas E.	Internetworking With TCP/IP Principles, Protocols, And Architecture - Volume I	PHI (1 January 2013) ISBN-10:9332550107 ISBN-13:978-9332550100

2. Learning Websites & Portals:

Sr. No	Website /Portal Link/URL	Description
1	https://www.geeksforgeeks.org/data-communication-definition-components-types-channels/	Data Communication-Definition, Components, Types, Channels
2	https://www.tutorialspoint.com/data_communication_computer_network/index.htm	Data Communication and Computer Network
3	https://nptel.ac.in/courses/106105081	Computer Networks
4	https://nptel.ac.in/courses/106105183	Computer Networks and Internet Protocol
5	Introduction To Computer Networks Study to night	Introduction To Computer Networks
6	http://www.myredingroom.co.in/notes-and-studymaterial/68-den/750-conversion-techniques.html	Conversion Techniques
7	http://www.standards.ieee.org/about/get/802/802.11.html	802 standards
8	http://www.studytonight.com/computer-network/overview-of-computer-networks	Overview of computer networks
9	http://www.nptel.ac.in/downloads/106105080/	computer networks basics
10	http://www.scanfree.com/programs/c/c-program-to-implement-crc-cyclic-redundancy-code	c-program to implement cyclic redundancy code

3. URLs of referred YouTube Videos:

Sr. No	URL/YouTube Link	Topic/ Description
1	https://youtu.be/eFJJ2anv41Q	Data Communication & computer Network
2	https://youtu.be/OZReBdwRY-c	Create network cable including cross cable and test by using cable tester
3	https://youtu.be/ECP16xRNR3A	Peer to peer configuration
4	https://youtu.be/ik-Y5n-U2So	Connect computers using given topology (Star)
5	https://youtu.be/Mhru18gxIXo	Share printer and folder in a network and transfer a file from one computer to another
6	https://youtu.be/ZIw7Pw7iL58	IEEE 802.11 Standard (Wireless networking)
7	https://youtu.be/IbqZPbx8K58	IEEE 802.11 Addressing Mechanism
8	https://youtu.be/4KITNWpaLy4	Cyclic Redundancy Check

4. Self-Prepared Video URLs:

Sr. No	URL/YouTube Link	Topic/ Description
1	https://www.youtube.com/watch?v=2ll5-ujFQY4	Fundamentals of Data Communication & Computer Network
2	https://www.youtube.com/watch?v=zgXNcCxJLAI	NETWORK Connecting DEVICES
3	https://www.youtube.com/watch?v=xL_y4LlsRo8	Transmission Media
4	https://www.youtube.com/watch?v=xhnUYVcJ4c	OSI Reference Model
5	https://www.youtube.com/watch?v=EETAaM-hO2w	TCP/IP Reference Model
6	https://www.youtube.com/watch?v=mDRq6-mS1do	IEEE Standards & Bluetooth Architecture
7	https://www.youtube.com/watch?v=pySK83e1krl	NETWORK TOPOLOGIES

5. Laboratory Equipment / Instruments / Tools / Software Required

Sr. No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Desktop Computer with basic configuration	All
2	Network Tool Kit: Crimping Tool for RJ-45 connector, 3in 1 modular crimping tool for RJ-45UTP CAT-5/CAT-6 Networking Cable, LAN Cutter 8P/6pP/4P All-in-One or similar, Cable Tester/LAN Tester(Specification: Network Cable Tester for LAN RJ-45/CAT5/CAT6 UTP Wire Test Tool or similar)	All
3	Network Accessories: RJ45 connector, UTP cable, optical fibre cable, Coaxial cable, various connectors, 1000Mbps NIC	All
4	UPS 6 KVA online	All
5	Ethernet Switch- 4/8/16/24/32	All
6	Router-256MB Memory storage capacity, compatible with Desktop and Laptop, Rack Mountable, Wireless Connectivity	All
7	Printer	All
8	Wireshark (https://www.wireshark.org/download.html) or any other Packet Analyzer Tool	All
9	Simulation Software: CISCO Packet Tracer, CORE Network Emulator or Similar	All

6. Tools to Use for Practical Teaching-Learning, Assessment and Evaluation:

- **MKCL LMS Era:** It is helpful for Teacher to share practical study material, notes, assignments with students. Teachers can create, distribute and teach the practical learning content as per the curriculum.
- Wireshark or any other Packet Analyzer Tool,
- Simulation Software: CISCO Packet Tracer, CORE Network Emulator or Similar
- Desktop PC, Crimping Tool, Networking Cable, LAN Cable Tester/LAN Tester

Mr. A. D. Talole
(Faculty Name & signature)

Prof. G. B. Katkade
(HOD-Computer Tech. Dept.)

CC-

1. Lab File
2. DCN - 314318 Course File
3. Notice Board / ERP
4. Institute Website / CIAAN Coordinator
5. Progressive Assessment