Maharashtra State Board of Technical Education, Mumbai
TEACHING PLAN (TP)

K-1

Academic Year: 2025-26 **Date:** 10/12/2025
Institute Name & Code: K. K. Wagh Polytechnic, Nashik-3 (0078)
Program & Code: Artificial Intelligence & Machine Learning (AN) **Course Code &. Abbr.: 314318** (DCN)
Course Name: Data Communication and Computer Network **Name of Faculty:** Mr. S. V. Waghmare
Class: SYAN **Course Index:** 403 **Semester:** IVth **Scheme:** K **Total Hrs:** 45

• Teaching-Learning and Assessment Scheme:

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs/Week			SLH	NLH			Theory				Based on LL Practical				Based on SL		
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
314318	Data Communication and Computer Networks	DCN	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 Learning Outcomes (TLOs):

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

CO No.	TLO No.	Course Outcomes (COs) / Theory Learning Outcomes (TLOs)
CO403.1		**Analyze the functioning of Data Communication & Computer Network**
	1.1	1.1 Process of data communication and its components: Transmitter, Receiver, Medium, Message, Protocol
	1.2	1.2 Protocols, Standards, Standard organizations. Bandwidth Data Transmission Rate, Baud Rate and Bits per second
	1.3	1.3 Modes of Communication (Simplex, Half duplex, Full Duplex)
	1.3	1.4 Analog Signal and Digital Signal, Analog and Digital Transmission: Analog To Digital, Digital To Analog .Conversion
	1.4	1.5 Fundamental Of Computer Network: Definition And Need Of Computer Network, Applications, Network Benefits
	1.4	1.6 Classification Of Network: LAN, WAN,MAN
CO403.2		**Select relevant Transmission media & switching techniques as per need**
	2.1	2.1 Communication Media: Guided Transmission Media, Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable
	2.2	2.2 Unguided Transmission Media: Radio Waves.Microwaves, Infrared, Satellite
	2.3	2.3 Line-of-Sight Transmission, Point-to-Point, Broadcast
	2.4	2.4 Multiplexing: Frequency-Division Multiplexing, Time Division Multiplexing
	2.5	2.5 Switching: Circuit-switched network, Packet switched network
CO403.3		**Analyze the transmission errors with respect to IEEE Standards**
	3.1	3.1 Types of Errors, Forward Error Correction Versus Retransmission
	3.1	3.2 Framing: Fixed Sized and Variable Sized Framing
	3.1	3.3 Error Detection: Repetition codes, Parity bits, Checksums, CRC
	3.2	3.4 Error Correction: Automatic Repeat Request (ARQ) Hamming Code
	3.3	3.5 Wireless LAN IEEE 802.11 standard Architecture,

		Features of IEEE 802.| versions: 802.11,802.11a, 802.11b, 802.11g, 802.11n, 802.11p
	3.4	3.6 Bluetooth Architecture: Piconet, Scatternet
	3.5	3.7 Mobile Generations: 3G, 4G and 5G
CO403.4		**Configure various networking devices**
	4.1	4.1 THE OSI MODEL: Layered Architecture, Encapsulation
	4.2	4.2 Layers in OSI Model (Functions of each layer)-Physical Layer, Data-Link Layer, Network Layer. Transport Layer, Session Layer, Presentation Layer, Application Layer
	4.3	4.3 TCP/IP Layers and their functions: Host To Network Layer, Internet Layer, Transport Layer, Application Layer
	4.3	4.4 Protocols: Host To Network Layer-SLIP,PPP, Internet Layer-IP, ARP,RARP,ICMP, Transport Layer-TCP and UDP, Application Layer-FTP,HTTP, SMTP, TELNET, BOOTP, DHCP
	4.4	4.5 Addressing: Physical Address, Logical Address, Port Address
	4.4	4.6 IP Address-Concept, Notation, Address Space
	4.4	4.7 IPv4 Addressing: Classful and Classless Addressing subnet mask, supernetting. subnetting
	4.5	4.8 IPV6 Addressing scheme and basic structure
CO403.5		**Implement relevant Network Topology using Networking Devices**
	5.1 5.2	5.1 Network Computing Model: Peer To Peer, Client Server
	5.3	5.2 Network Topologies: Introduction, Definition, Selection criteria, Types of Topology- Star, Mesh, Tree, Hybrid
	5.4 5.5	5.3 Network Connecting Devices: Switch, Router, Repeater Bridge, Gateways and Modem

- **Teaching Plan:**

Unit No. (Allotted Hrs.)	TLOs	Title/Topic Details with CO	Plan (From-To & No. of Lectures)	Actual Execution (From-To & No. of Lectures)	Pedagogy used (Teaching Method/ Media)	Remark
01. (10 hrs)		**UNIT 1 : Fundamentals of Data Communication & Computer Networks[CO403.1]**				
	1.1	1.1 Process of data communication and its components: Transmitter, Receiver, Medium, Message, Protocol	**04/12/2025 To 06/12/2025** (03)		Chalk-Board, PPT,	
	1.2	1.2 Protocols, Standards, Standard organizations. Bandwidth Data Transmission Rate, Baud Rate and Bits per second	**11/12/2025 To 12/12/2025** (02)			
	1.3	1.3 Modes of Communication (Simplex, Half duplex, Full Duplex)	**13/12/2025** (01)			
	1.3	1.4 Analog Signal and Digital Signal, Analog and Digital Transmission: Analog To Digital, Digital To Analog .Conversion	**18/12/2025 to 19/12/2025** (02)			
	1.4	1.5 Fundamental Of Computer Network: Definition And Need Of Computer Network, Applications, Network Benefits	**20/12/2025** (01)			
	1.4	1.6 Classification Of Network: LAN, WAN,MAN	**26/12/2025** (01)			

02. (10 hrs)		**UNIT 2: Transmission Media and Switching[CO403.2]**				
	2.1	2.1 Communication Media: Guided Transmission Media, Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable	**27/12/2025 to 01/01/2026** (02)		Chalk-Board, PPT,	
	2.2	2.2 Unguided Transmission Media: Radio Waves.Microwaves, Infrared, Satellite	**02/01/2026 to 03/01/2026** (02)			
	2.3	2.3 Line-of-Sight Transmission, Point-to-Point, Broadcast	**08/01/2026 to 09/01/2026** (02)			
	2.4	2.4 Multiplexing: Frequency-Division Multiplexing, Time Division Multiplexing	**10/01/2026 to 15/01/2026** (02)			
	2.5	2.5 Switching: Circuit-switched network, Packet switched network	**16/01/2026 to 17/01/2026** (02)			
03. (08 hrs)		**UNIT 3: Error Detection, Correction and Wireless Communication [CO403.3]**				
	3.1	3.1 Types of Errors, Forward Error Correction Versus Retransmission	**22/01/2026** (01)		Chalk-Board, PPT,	
	3.1	3.2 Framing: Fixed Sized and Variable Sized Framing	**23/01/2026** (01)			
	3.1	3.3 Error Detection: Repetition codes, Parity bits, Checksums, CRC	**24/01/2026 to 29/01/2026** (02)			
	3.2	3.4 Error Correction: Automatic Repeat Request (ARQ) Hamming Code	**30/01/2026** (01)			
	3.3	3.5 Wireless LAN IEEE 802.11 standard Architecture,Features of IEEE 802.| versions: 802.11,802.11a, 802.11b, 802.11g, 802.11n, 802.11p	**31/01/2026** (01)			
	3.4	3.6 Bluetooth Architecture: Piconet, Scatternet	**05/02/2026** (01)			
	3.5	3.7 Mobile Generations: 3G, 4G and 5G	**06/02/2026** (01)			
04. (12 hrs)		**UNIT 4: Network Topologies and Devices[CO403.4]**			Chalk-Board, PPT,	
	4.1	4.1 THE OSI MODEL: Layered Architecture, Encapsulation	**07/02/2026 to 12/02/2026** (02)			
	4.2	4.2 Layers in OSI Model(Functions of each layer)-Physical Layer, Data-Link Layer, Network Layer. Transport Layer, Session Layer, Presentation Layer, Application Layer	**13/02/2026 to 14/02/2026** (02)			

	4.3	4.3 TCP/IP Layers and their functions: Host To Network Layer, Internet Layer, Transport Layer, Application Layer	**20/02/2026 to 21/02/2026** (02)			
	4.3	4.4 Protocols: Host To Network Layer-SLIP,PPP, Internet Layer-IP, ARP,RARP,ICMP, Transport Layer-TCP and UDP, Application Layer-FTP,HTTP, SMTP, TELNET, BOOTP, DHCP	**26/02/2026 to 27/02/2026** (02)			
	4.4	4.5 Addressing: Physical Address, Logical Address, Port Address	**28/02/2026** (01)			
	4.4	4.6 IP Address-Concept, Notation, Address Space	**05/03/2026** (01)			
	4.4	4.7 IPv4 Addressing: Classful and Classless Addressing subnet mask, supernetting. subnetting	**06/03/2026** (01)			
	4.5	4.8 IPV6 Addressing scheme and basic structure	**07/03/2026** (01)			
05. (05 hrs)		**UNIT 5: Reference Models[CO403.5]**				
	5.1 5.2	5.1 Network Computing Model: Peer To Peer, Client Server	**12/03/2026** (01)		Chalk-Board, PPT,	
	5.3	5.2 Network Topologies: Introduction, Definition, Selection criteria, Types of Topology- Star, Mesh, Tree, Hybrid	**13/03/2026 to 20/03/2026** (03)			
	5.4 5.5	5.3 Network Connecting Devices: Switch, Router, Repeater Bridge, Gateways and Modem	**27/03/2026** (01)			
45 Hrs.		**Total**	**45 Hrs.**			

- **COs-POs & PSOs Matrix:**

Course Outcomes (COs)	Programme Outcomes (POs)							PSOs	
	PO-1 Basic and Discipline Specific Knowledge	**PO-2 Problem Analysis**	**PO-3 Design/ Development of Solutions**	**PO-4 Engineering Tools**	**PO-5 Engineering Practices for Society, Sustainability and Environment**	**PO-6 Project Management**	**PO-7 Life Long Learning**	**PSO-1**	**PSO-2**
CO403.1	**1**	**-**	**2**	**1**	**-**	**-**	**3**	**1**	**1**
CO403.2	1	**1**	**2**	**2**	**-**	1	**3**	**1**	**2**
CO403.3	1	**2**	**1**	**3**	**-**	**-**	**3**	**2**	**2**
CO403.4	1	**2**	**2**	**3**	**-**	1	**3**	**2**	**2**
CO403.5	**-**	**2**	**2**	**3**	**1**	1	**3**	**2**	**2**

Legends: High:03, Medium:02, Low:01, No Mapping: -

PSO1: Apply fundamental concepts of Computer Engineering and Artificial Intelligence and machine learning to solve technical problems.

PSO2: Implement the domain knowledge to achieve successful career as an engineering professional.

- **Rules for Theory Assessment:**

➢ **Self Learning:**

✓ **Assignment:**

- Solve an assignment on relevant topics given by the Teacher

✓ **Micro project:**

Develop an model using Data communication and Computer Network for relevant Topics

- Install and configure NIC and find MAC Address of Device
- Design a network using any topology and do fault identification
- Create a tool that monitors network bandwidth usage in real-time

➢ **Formative assessment (Assessment for Learning)**

- Two offline class tests of 30 marks each will be conducted. Average of two class tests marks will be considering as Formative assessment for Theory marks out of 30.

➢ **Summative Assessment (Assessment of Learning)**

- End semester examination of 70 marks through paper based examination by MSBTE.
- Total theory marks (100) will be calculated as marks of Formative Assessment (30) + marks of Summative Assessment (70).

- **References:**

1. **Suggested Books:**

Sr. No	Title	Author	Publisher
01	Data Communications & Networking	Behrouz A. Forouzan	Tata McGraw Hill, New Delhi, 2006, ISBN:9780-07-296775-3
02	Computer Networks	Andrew S. Tanenbaum	PHI Learning Pvt. Ltd. Delhi, ISBN-13:978-0-13-212695-3
03	Data Communication & Networks	Achyut Godbole	Tata McGraw Hill, New Delhi, 2006, ISBN: 0070472971
04	Internetworking with TCP/IP, Principles, Protocols & Architecture	Comer Douglas E.	PHI Learning Pvt. Ltd. Delhi, ISBN-81-203-2065-4

2. **Learning Web Sites:**

Sr. No.	Link /Portal	Description
1	http://ww38.nptelvideos.in/2012/11/data-communication.html	data-communication
2	http://www.myredingroom.co.in/notes-and-studymaterial/68-den/750-conversion-techiniques.html	Conversion techniques notes and study material
3	http://www.tutorial-reports.com/wireless/wlanwifi/wifi_architecture.php	Wifi Architechture
4	https://www.standards.ieee.org/about/get/802/802.11.html	IEEE Standard
5	www.tutorialspoint.com/data_communication_computer_network	Computer Networks
6	https://www.studytonight.com/computer-network/overview-of-computer-networks	Computer Network Overview
7	https://www.whirlpool.net.au/wiki/windows_nw_diags_cmds	Windows Network Commands
8	https://www.scanftree.com/programs/c/c-program-to-implement-crc-cycic-redundancy-code	CRC Redundancy

3. **Learning URLs of referenced YouTube Videos:**

Sr. No.	URL of YouTube Video	Topic
1	https://youtu.be/eFJJ2anv41Q	Install operating System
2	https://youtu.be/OZReBdwRY-c	Create network cable including cross cable and test by using cable tester
3	https://youtu.be/ECP16xRNR3A	Configure peer-to-peer network with at least three hosts AND Configure static and dynamic IP addresses
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/sB3iUOXA9Fw	Vertical Redundancy Check and Longitudinal Redundancy Check
9	https://youtu.be/SViRu-4q1Lk	Error Detection and Correction, Types of Errors, Redundancy
10	https://youtu.be/8DPzqnhLpow	Forward Error Correction
11	https://youtu.be/4KITNWpaLy4	Cyclic Redundancy Check
12	https://youtu.be/P-kSVO88zxotps	IEEE 802 (802.1, 802.2, 802.3, 802.4, 802.5)

4. **Tools used:**, MKCL LMS-Learn Live, YouTube, Google Classroom.

Mr. S. V. Waghmare
(Subject Teacher)

Mrs. R. Y. Thombare
(HOD-AN)

CC- 1. Course File-DCN