

Branch Name:	Artificial Intelligence & Data Science
Semester/Year:	Semester VI/ Third Year
Subject Title:	Computer Network and Internet Protocol
Subject Code:	1ET1080605
Pre-Requisite:	Fundamental of basic computer topologies, types of networks, basic networking protocols

Course Objective:

1. Describe various protocols, models in networks.
2. Illustrate use of Subnets, Ipv4 and Ipv6 in computer networks.
3. Identify and solve network operational problems.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	00	02	04	70	30	30	20	150

Subject Contents

Sr. No	Topic	Total Hours	Weight (%)
1	Introduction to Data Communication and Networking Data communication, use of Networks, Internet Protocols and standards, OSI model, TCP/IP model. Types of Transmission Media: Guided Media, Un Guided Media, Network devices: Repeaters, Hubs, Routers, Access Points, Gateways, Bridges, Difference between Layer 2 and Layer 3 Switches	6	18
2	Physical Layer Transmission media (Twisted pair, Coaxial cable, Fiber optic cable), Wireless Medium as Physical Layer (Electromagnetic Spectrum, ISM Band, Light wave Transmission), Circuit switching, DSL technology, Cable modem.	3	10
3	Data Link Layer Services to N/W layer, Framing, Bit Stuffing, Character Stuffing, Error control, Flow control, mechanism stop & wait, Go-back-, Selective repeat. Example data link protocol HDLC, PPP.	6	10
4	Medium Access Layer Channel allocation problem, Multiple Access, CSMA, CSMA/CD, CSMA/CA.	5	12
5	Local Area Network Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN, Blue tooth, Zigbee, Connecting devices- Repeaters, Hub, Bridges, Switch, Router, Gateways, Broadband Wireless Networks	9	15

6	Network Layer Packet Switching, Virtual circuits and datagram, Static and Dynamic Routing Algorithms (Optimality principle, Static Routing Algorithms: Shortest Path, Flooding, Dynamic routing Algorithms: Distance Vector, Link state routing.), Congestion Control, IP Addressing, CIDR & NAT, IP layer protocols (ICMP, ARP, RARP, DHCP, BOOTP), IPv4 and IPv6.	10	10
7	Transport layer and Applications Layer Elements of Transport protocols - TCP & UDP, DNS- Domain Name System, E-mail, FTP, HTTP, WWW, Firewall, Network Security	5	10
8	IP Protocol IPv4, –IPv4: Characteristics, Advantages and Disadvantages, Packet structure, Address classes, Subnet & masking, Reserved Address, IPv6, Characteristics, Addressing modes, Address types, Special Address, DNS, Email, FTP, HTTP, Advantages and Disadvantages, Difference between IPv4 and IPv6	6	15

Course Outcome:

After learning this subject, students will be able to;

1. Understand various wireless standards along with types of wireless communications.
2. Understand and implement various mobile applications.

List of Text Books:

1. Data Communication and Networking, Forouzen, Tata McGraw Hill
2. A. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India

List Of Reference Book:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
3. Computer and Communication Networks, Nader F. Mir, Pearson Education
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K.W. Ross, 3rd Edition, Pearson Education.

List of Suggested titles of Experiments:

1. Study about Simulation Tool: CISCO PACKET TRACER
2. To Study of network devices in detail.
3. To Study of basic network command and network configuration command
4. Test TCP/IP Setup and create user accounts and user group.
5. To study about installation of network and file sharing.
6. Experiments of Packet capture tool: Wireshark
7. Demonstrate the simple network configuration with a router that connects two LAN segments using cisco packet tracer.
8. Demonstrate the dynamic routing configuration using RIP Protocol using Cisco Packet Tracer.
9. Experiment on Data Link Layer for Error Correction.
10. Design a simple tcl script for transferring FTP & CBR traffic in wireless topology of 6 nodes using NS-2.
11. Implementation of SUBNETTING using cisco packet tracer.
12. Experiment on Transport Layer.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the basic terminologies used in networking and layered architecture of computer network.	1 Remembering
CLO2	Comprehend basic protocols of application layer and how they can be used to assist in network design and implementation.	2 Understanding
CLO3	Describe and implement the essential principles of a connectionless and connection-oriented protocols used for reliable data transfer, flow control and congestion control.	2 Understanding 4 Analyze
CLO4	Design network architecture, assign IP addressing and apply various routing algorithms to find shortest paths for network-layer packet delivery.	3 Applying
CLO5	Illustrate different link layer terminologies like error detection-correction, Multiple access protocol and Link layer addressing used in network.	2 Understanding 3 Applying
CLO6	analyze, specify and design the topological and routing strategies for an IP based networking infrastructure	3 Applying 4 Analyze

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	L	H	L	L	M			L				H	L		
CLO2		L	M	H	L	L					L	L	L	M		
CLO3	H	L	M	L	M	L		M		L			M	L		
CLO4	L	M	M	L	M	M		M	L				M	M		
CLO5	M	L	M	L	L	M		M		L			H	L		
CLO6	L	M	L	L	M	H		M			L		H	L		

H: High, M: Medium, L: Low