COMPUTER NETWORKS	
CSE 224	**Credits : 3**
Instruction **:** 3 Periods & 1 Tut/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

Prerequisites:

Good Knowledge on Data Communications and Networking technologies

Good Knowledge of Programming Languages (such as C, JAVA) for better understanding of network programming.

Course Objectives:

The course should enable the students:

Course Objectives:

- To make the student understand the contemporary technologies in network protocols and network architecture.
- To acquire the knowledge on design principles of network infrastructure
- To learn and understand the design issues in framing and error handling
- To gain a sufficient knowledge on addressing the nodes in the network and connecting them using the network level protocols.
- To make them familiarize with different application layer protocols and network management elements.

Course Outcomes:

the end of the course, the student will be able to:	
1.	Identify the Network Components required to build different types of network and Hardware devices, signal modulation techniques at Physical Layer.
2.	Apply appropriate error control, flow control techniques and MAC protocols.
3.	Contrast connection-oriented and connectionless services for datagram. Identify Routing Algorithms and congestion control techniques.
4.	Trace the flow of information from one node to another in the network.
5.	Classify the network services and analyze how to manage the network.

Mapping of Course Outcomes with Program Outcomes:

Mapping		**PO**												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	**3**	**3**	**2**	**1**	**3**				**2**	**1**		**3**	**1**	**2**
	2	**3**	**3**	**2**	**2**	**1**				**2**	**2**		**2**	**1**	**2**
	3	**3**	**3**	**2**	**2**	**1**				**2**	**2**		**2**	**1**	**2**
	4	**3**	**3**	**2**	**2**	**1**				**2**	**1**		**2**	**1**	**2**
	5	**3**	**3**	**2**	**2**	**1**		**2**		**2**	**2**		**2**	**1**	**2**

SYLLABUS

UNIT-I: **10 periods**

Introduction to Computer Networks:

Introduction to Data Communication, Network- Components, Categories and classification, Network Topologies, Reference Models-ISO/OSI, TCP/IP, Transmission Media, ARPANET, Network related tools and commands.

Physical Layer:

Hardware devices, Signal Representation, Modulation and Demodulation Techniques, Spread Spectrum,

Security issues, Switching Techniques: Circuit Switching, Packet Switching, Message Switching.
Learning Outcome: At the end of this Unit the student will be able to

- Identify the various design parameters and their influence on link utilization performance
- Identify the Network Components required to build different types of network and Hardware devices, signal modulation techniques at Physical Layer.

UNIT-II: **10 periods**

Data Link Layer:

LLC: DataLink Layer Design Issues, Error-Error Detection,Control and Correction- Parity,LRC,CRC-Hamming Code, Flow Control- Sliding Window Protocols-Go Back N, Selective Repeat, HDLC.

Medium Access Control Layer:

Channel Allocation Problems- Static and Dynamic, MAC protocols: ALOHA, CSMA- CSMA/CD, CSMA/CA, IEEE 802.3- Ethernet Frame Format, Backoff Algorithm, IEEE 802.4, IEEE 802.11.

Learning Outcome: At the end of this Unit the student will be able to

- Compare Scenario-Specific Protocols for Wired Communication.
- Apply appropriate error control, flow control techniques and MAC protocols.

UNIT-III: **14 periods**

Network Layer:

Packet Switching and Datagram Approach, Protocols-ARP,DHCP,IPv4, IPv6, ICMP, Fragmentation, Routing Algorithms(including Border Gateway). Subnetting Concept, Network Address Translation, Congestion Control Techniques, Tunneling, Security issues.

Learning Outcome: At the end of this Unit the student will be able to

- Apply Different technologies to Connection oriented and connectionless for real time.
- Contrast connection-oriented and connectionless services for datagram

UNIT-IV: **14 periods**

Transport Layer:

Transport Layer Responsibilities, Reliable end to end Protocols: (TCP, UDP), TCP and UDP Protocol's Congestion and flow control mechanisms, TCP Extensions, QOS, Security issues.

Learning Outcome: At the end of this Unit the student will be able to

- Evaluate the challenges in end to end Data delivery
- Trace the flow of information from one node to another in the network.

UNIT-V: **12 periods**

Application Layer:

Protocols: SMTP, FTP, TFTP, BOOTP, HTTP/HTTPS, MIME, POP.

Network Services and Management:

Client-Server and Peer-to-Peer Architectures-www-e-mail-DNS-VoIP, SNMP management.

Basics of Network Security: Attacks, Symmetric and Asymmetric Cryptography.

Learning Outcome: At the end of this Unit the student will be able to

- Design efficient network services using network management strategies
- Classify the network services and analyze how to manage the network.

Text Books:

1. Andrew S. Tanenbaum, "*Computer Networks*", 5th edition, Prentice-Hall Publisher
2. Behrouz A Forouzan "*Data Communications and Networking*" , 4th Edtion, Tata McGraw-Hill.

Reference Books:

1. William Stallings, "*Data and Computer Communications*". 7th edition, Pearson Education
2. J F Kurose, K W Ross, "*Computer Networking: A Top-Down Approach"*, 5th Edition, Addison-Wesley.

Web Resources:

1. https://nptel.ac.in/courses/106/105/106105081/
2. https://swayam.gov.in/nd1_noc20_cs23/preview
3. https://www.gatevidyalay.com/computer-networks/

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