COURSE HANDOUT

COMPUTER NETWORKS (COM-502)

CSE- 5th SEMESTER

ACADEMIC YEAR (2024-25)

Ms. Vishalika, Mr. Shubham Gupta

Assistant Professor

Department of Computer Science and Engineering

Department of Computer Science and Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

www.mietjmu.in

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-502	Computer Networks	PCC	4	3	1	0	50	100	150
Faculty Details	vishalika.it@mietjammu.in								

Section-A

Unit 1: Introduction: Data Communication-communication system, synchronous and asynchronous systems, serial and parallel systems, dataflow-simplex, half-duplex, full-duplex, computer network-uses of computer network, categories of computer networks, protocol and standards, Reference Model-OSI and TCP/IP reference model, their comparison and critique, Network Topologies.

(12 Hrs)

Unit 2: Physical Layer: Data Transmission-Digital to Digital Conversion-Line Coding Scheme, Transmission Media, RS-232 Interface, Switching mechanisms and Comparison –circuit, packet, message, Modem and its types.

(11 Hrs)

Unit 3: Data Link Layer: Design Issues, Error Detection and Correction, Flow Control-Elements of data link protocol, Sliding Window Protocol, Example of Data Link Protocol (HDLC), Channel Allocation Problems, Multiple Access Protocol-ALOHA, Carrier Sense Multiple Access Protocols, Collision Free Protocols, IEEE standards-802.3, 802.4, 802.5.

(9 Hrs)

Section-B

Unit 4: Network Layer : Design Issues, Routing Algorithms–the optimality principle, shortest path algorithm, flooding, distance vector routing, link state routing and hierarchical routing, Congestion Control- principles prevention policies, congestion control in virtual circuit subnet and datagram subnets, Traffic shaping algorithm - leaky bucket algorithm, token bucket algorithm, QOS, IP protocol, IP addresses, Internet Multicasting, Introduction to IPV6, IPV4 vs. IPV6, Internetworking devices –concept of Internetworking, Repeaters, Hub, Bridges, Switches, Routers, Gateways.

(8 Hrs)

Unit 5: Transport, Session, Presentation and Application Layer: Transport Layer Services, Primitives, Issues, elements of transport protocol, Introduction to TCP and UDP, Design Issues, FTP, DNS, E-Mail, Introduction to WWW, Firewalls.

(8 Hrs)

Text Books

S.No.	Name of the Books	Author	Publisher Name	Edition (Pub. yr.)
1	Data and Computer Communications	W. Stallings	Pearson Education	10th (2017)
2	Computer Networks: A System Approach	L. L. Peterson	Morgan Kauffman	5th (2011)

Reference Books

S.No.	Name of the Books	Author	Publisher Name	Edition (Pub. Yr.)
1	Computer Networking: A Top-Down Approach Featuring the Internet	Kurose & Ross	Pearson Education	8th (2021)
2	Computer Networks and Internets with Internet Applications	Coumar & Douglas	Prentice Hall	4th (2004)

COURSE PLAN		
Unit-I Introduction		
S.No	**Topics**	**Recommended Books**
1	Data communication system	Book 1, Ch.1
2	Synchronous and asynchronous systems	Book 1, Ch.1
3	Serial and parallel systems	Book 1, Ch.1
4	Categories of computer networks	Book 1, Ch.1
5	Reference Model-OSI and TCP/IP reference model	Book 1, Ch.2
6	Network Topologies	Book 1, Ch.1
Unit-II Physical Layer		
7	Introduction	Book 1, Ch.3
8	Data Transmission-Digital to Digital conversion	Book 1, Ch.3
9	Line Coding Scheme	Book 1, Ch.4
10	Transmission Media	Book 1, Ch.4
11	Switching mechanisms and Comparison	Book 2, Ch.3
12	Modem and its types	Book 2, Ch.3
Unit- III Data Link Layer		
13	Error detection and correction	Book 1, Ch.6
14	Flow Control-Elements of data link protocol	Book 1, Ch.7
15	Sliding window protocol	Book 2, Ch.2
16	Example of Data Link Protocol (HDLC)	Book 1, Ch.7
17	Channel Allocation Problems	Book 1, Ch.8
18	Multiple Access Protocol-ALOHA	Book 1, Ch.8
19	Carrier Sense Multiple Access Protocols	Book 1, Ch.8
20	Collision Free Protocols	Book 1, Ch.8
21	IEEE standards-802.3, 802.4, 802.5.	Book 1, Ch.13
Unit-IV Network Layer		
22	Introduction: Design Issues	Book 3, Ch.5
23	Routing Algorithms	Book 3, Ch.5
24	Congestion Control- principles prevention policies	Book 2, Ch.6
25	Traffic shaping algorithm	Book 3, Ch.5
26	Introduction to IPV6, IPV4 vs. IPV6	Book 3, Ch.4
27	Internetworking devices	Book 1, Ch.21
Unit-V Transport, Session, Presentation and Application Layer		
28	Transport Layer Services	Book 3, Ch.3
29	Elements of transport protocol	Book 3, Ch.3
30	Introduction to TCP and UDP	Book 3, Ch.3
31	FTP and DNS	Book 3, Ch.2
32	E-Mail and Introduction to WWW	Book 1, Ch.24
33	Firewalls	Book 1, Ch.23

ADDITIONAL WEB RESOURCES

1.	**MOOC:** The Bits and Bytes of Computer Networking https://www.coursera.org/programs/b-e-faculty-learning-path-julcd/learn/computer-networking?source=search
2.	**NPTEL:** Video lectures on Computer Networks and Internet Protocol Lecture series by Prof. Soumya Kanti Ghosh and Prof. Sandip Chakraborty, Department of Computer Science and Engineering, IIT Kharagpur https://archive.nptel.ac.in/courses/106/105/106105183/

GRADING AND ASSESSMENT

- **MST-1**: 10 marks
- **MST-2**: 10 marks
- **Assignment**: 20 marks
- **Attendance**: 10 marks
- **Final Examination**: 100 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Monday (12:05 PM - 12:55 PM)
  Friday (12:05 PM - 12:55 PM)

- **Contact Information**
  vishalika.it@mietjammu.in