COURSE HANDOUT

COMPUTER NETWORKS (MCA - 203)

MCA-IIND SEMESTER

ACADEMIC YEAR (2024-25)

Ms. Deepanshi

Assistant Professor

Department of Computer Applications

Department of Computer Applications

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

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Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
MCA-203	Computer Networks	PCC	4	4	0	0	40	60	100

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Understand the basic taxonomy and terminology of the computer networking model and architecture.
CO2	Articulate the fundamentals concepts of data communication and protocols.
CO3	Understand the network design and performance issues.
CO4	Understand the Importance and Applications of Internet Protocols
CO5	Explore the basic knowledge of cryptography and network security.

Syllabus

Unit-I: Fundamentals of Communication:
Fundamentals of Communication, Modulation, Data Encoding, OSI reference model, TCP/IP model, network standardization, Inter-networking. Physical layer, Switching Technique, Transmission media, Co-axial, Twisted Pair and Fiber Optic Cables, Transmission Impairments, Electromagnetic Spectrum, Radio waves, Microwaves, Satellites, Wireless Mobile Telecommunications Technology (12 Hours)

Unit-II: Data Transmission and Media access Methods:
Data Link layer, Design issues, Frame, Error detection and correction, Flow Control, Elementary Data link protocols, Character-oriented and Bit-oriented Protocols, Sliding window protocols.Channel allocation methods, TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision free protocols, IEEE standard 802 for LANS, Ethernet, Token Bus, Token ring. (8 Hours)

Unit-III: Network Establishment Concepts:
Network Layer, Store and Forward Packet Switching, Connectionless and Connection-oriented services, Virtual Circuit, Routing Algorithms, Shortest path, Flooding, Link State, Distant vector, Hierarchical, Broadcast and Multicast Routing. OSPF, BGP, Congestion, Congestion control algorithms. (10 Hours)

Unit- IV: Internet Protocols :
TCP/TP Protocol, IP Addresses, Classes of IP Addresses, Subnets, IPv6, Network layer in the Internet, Internet Control Protocols, ARP, RARP, BOOTP, DHCP, Transport Layer, Protocol Stack, TCP and UDP, Transport Services Primitives, Sockets, Socket Programming concept. (8 Hours)

Unit-V: Network Application and Network Security:
Application layer, Name service (DNS), Domain Hierarchy, Name servers, Name resolutions, Traditional applications, Telnet, FTP, SMTP, MIME, World wide web-HTTP, HTTP Methods. Cryptographic Algorithms, DES, AES, RSA, Key exchange methods, Authentication Protocol, Digital Signatures.

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	"Computer Networks"	Andrew S. Tanenbaum,	Pearson Education Asia	5 e, 2013
2.	"Data and Computer Communication"	William Stallings	Pearson Education Asia	10th (7e, 2016)

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
3	"Data Communications and Networking"	Behrouz A. Forouzan	Tata McGraw Hills.	2004

COURSE PLAN

Unit-I Fundamentals of Communication

S.No	Topics	Recommended Books
1	Fundamentals of Communication, Modulation, Data Encoding	Book 1, Ch.1
2	OSI reference model, TCP/IP model, network standardization	Book 1, Ch.1

3	Inter-networking. Physical layer, Switching Technique, Transmission media	Book 1, Ch.1
4	Transmission Impairment, Electromagnetic Spectrum, GSM, CDMA	Book 2, Ch.2
5	Data Link layer, Design issues, Frame	Book 2, Ch.2
6	Error detection and correction, Flow Control	Book 2, Ch.2
7	Elementary Data link protocols, Character-oriented and Bit-oriented Protocols	
8	Fundamentals of Communication, Modulation, Data Encoding	Book 2, Ch.2
Unit-II Data Transmission and Media Access Method		
9	Data Link layer, Design issues, Frame, Error detection and correction	Book 1, Ch.2
10	Flow Control, Elementary Data link protocols,	Book 1, Ch.2
11	Character-oriented and Bit-oriented Protocols, Sliding window protocols.	Book 1, Ch.1
12	Channel allocation methods, TDM, FDM, ALOHA	Book 2, Ch.2
13	Carrier sense Multiple access protocols.	Book 2, Ch.2
14	IEEE standard 802 for LANS, Ethernet,	Book 2, Ch.2
15	Token Bus, Token ring	Book 2, Ch.2
16	Collision free protocols	Book 2, Ch.2
Unit-III Network Establishment Concepts		
17	Network Layer, Store and Forward Packet Switching	Book 2, Ch.2
18	Connectionless and Connection-oriented services	Book 2, Ch.2
19	Virtual Circuit, Routing Algorithms	Book 2, Ch.2
	Shortest path, Flooding, Link State	
20	Distant vector, Hierarchical	Book 2, Ch.2
21	Broadcast and Multicast Routing. OSPF, BGP,	Book 2, Ch.2
22	Congestion, Congestion control algorithms.	Book 2, Ch.2
Unit-IV Internet Protocols		
23	TCP/TP Protocol, IP Addresses, Classes of IP Addresses	Book 2, Ch.3
24	Subnets, IPv6, Network layer in the Internet	Book 1, Ch.4
25	Internet Control Protocols	Book 1, Ch.4
26	ARP, RARP, BOOTP, DHCP	Book 2, Ch.3
27	Layer, Protocol Stack, TCP and	Book 1, Ch.3
28	UDP, Transport Services Primitives,	Book 1, Ch.3
29	Sockets, Socket Programming concept.	Book 2, Ch.3
Unit-V Network Application and Network Security		
30	Application layer,	Book 2, Ch.8
31	Name service DNS, Name resolutions,	Book 1, Ch.8
32	Domain Hierarchy, Telnet,	Book 2, Ch.8
33	FTP, SMTP	Book 2, Ch.8
34	MIME, World wide web-HTTP	Book 1, Ch.8
35	HTTP Methods. Cryptographic Algorithms,	Book 2, Ch.8
36	DES, AES, RSA,	Book2, Ch. 8
37	Key exchange methods, Authentication Protocol,	Book2, Ch. 8
38	Digital Signatures.	Book2, Ch. 8

ADDITIONAL WEB RESOURCES

1.	**MOOC:** The Bits and Bytes of Computer Networking https://www.coursera.org/learn/computer-networking
2.	**NPTEL:** Video lectures on Introduction to Computer Network Lecture series by Prof. Hema A Murthy , IIT Madras https://nptel.ac.in/courses/106106091

GRADING AND ASSESSMENT

- **Sessional Test**: 20 marks
- **Assignment**: 10 marks
- **Attendance**: 10 marks
- **Final Examination**: 60 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**
  Deepanshi.cse@mietjammu.in