



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	Data Science & Computer Applications			
Course Name & code	:	Computer Networks & MCA 5151			
Semester & branch	:	III & MCA			
Name of the faculty	:	Dr. Ramakrishna M and Mr. Vinayak M.			
No of contact hours/week:		L	T	P	C
		4	0	0	4

Course Outcomes (COs)

At the end of this course, the student should be able to:		No. of Contact Hours	Marks
CO1:	Understand the organization of the computer network topology and OSI reference model	3	6
CO2:	Discuss the significances of MAC protocols and various inter-connecting devices of the network	4	8
CO3:	Design a network topology by configuring the routers with suitable IP addresses and routing mechanisms to enable the seamless communication between the devices	17	38
CO4:	Identify a effective protocol for an end-to-end communication and explain the significance and purpose of different type of protocols	19	40
CO5:	Configure the network based on the application layer requirements and protocols	5	8
Total		48	100

Assessment Plan

Components	Assignments	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding; Applying; Analyzing; Evaluating; Creating	Remembering; Understanding; Applying	Understanding; Applying; Analyzing; Evaluating; Creating
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ (10 marks): 10 questions of 0.5 marks each Short Answers (10 marks): questions of 2 or 3 marks	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	As notified by Associate Director (Academics) at the start of each semester	Calendared activity	Calendared activity
Topics Covered	Assignment 1 (L ₀₋₁₂ & T _{y1-y2}) (CO x)	Test 1 (L _{a1-a2} & T _{b1-b2}) (CO x)	Comprehensive examination covering full syllabus. Students are expected to answer all questions (CO1-5)
	Assignment 2 (L _{x3-x4} & T _{y3-y4}) (CO x)		
	Assignment 3 (L _{x5-x6} & T _{y5-y6}) (CO x)	Test 2 (L _{a3-a4} & T _{b3-b4}) (CO x)	
	Assignment 4 (L _{x7-x8} & T _{y7-y8}) (CO x)		

Lesson Plan

L. No.	Topics	Course Outcome Addressed
L0	Introduction to the Course Computer Network	CO
L1	Networks-Definition, classification & topology	CO1
L2	Network Models- layered architecture, Layer-to-Layer communication	CO1
L3	ISO/OSI, TCP/IP layered models and comparison	CO1
L4	LAN-Ethernet LAN Technology-IEEE 802.3	CO 2
L5	Data Link Layer- Access method	CO 2
L6	Addresses, Connecting devices and Switching Concepts	CO 2
L7	Introduction to Network Layer- Network Service provided and issues	CO 2
L8	Classful Addressing- binary,decimal, 256 base number representation and operations	CO 3

L9	Address Blocks and 2-level addressing, Extracting Block Information.	CO 3
L10	Network Address, Network mask, Subnetting	CO 3
L11	Classless addresses and Address Block allocation.	CO 3
L12	Classless Address Block allocation.	CO 3
L13	Supernetting, examples	CO 3
L14	Special address and Network Address Translation	CO 3
L15	Different delivery and forwarding methods	CO 3
L16	Examples on forwarding classful addresses with subnetting	CO 3
L17	Examples on Forwarding with Classless Addressing, Structure of a Router	CO 3
L18	Introduction to Internet Protocol, Datagram, packet format, examples	CO 4
L19	IP fragmentation issues and examples	CO 4
L20	IP Options and some examples	CO 4
L21	Checksum calculation, verification and Security.	CO 4
L22	Need for address resolution, methods, ARP working	CO 4
L23	ARP packet format and operation	CO 4
L24	Introduction to ICMP, packet format, error messages	CO 4
L25	ICMP query messages	CO 4
L26	Unicasting, Multicasting and its uses, Multicast Addresses in IPv4	CO 4
L27	Delivery of Multicast Packets at Data Link Layer	CO 4
L28	IGMP format and messages	CO 4
L29	Introduction to routing, inter and intra domain routing	CO 3
L30	distance vector routing (DVR), Bellman-Ford algorithm	CO 3
L31	DVR example and problems with DVR	CO 3
L32	Routing Information Protocol (RIP)	CO 3
L33	Link State Routing, Building Routing Tables	CO 3
L34	Formation of Shortest Path Tree using Dijkstra Algorithm	CO 3
L35	Example-Calculation of Routing Table from Shortest Path Tree	CO 3
L36	Introduction-Transport Layer Service, UDP packet.	CO 4
L37	UDP example, checksum, UDP Applications	CO 4

L38	TCP services, TCP features, Segment format	CO 4
L39	TCP Connection establishment , Syn flooding, Data transfer, Termination	CO 4
L40	Flow Control-Sender window, Receiver window, Example	CO 4
L41	Error control- Cumulative Acknowledgment (ACK).Generating Acknowledgments	CO 4
L42	Congestion Control-Slow Start,Congestion Avoidance,Congestion Detection	CO 4
L43	TCP Timers-Retransmission Timer	CO 4
L44	IPv6 Notation & address block allocations	CO 5
L45	IPv6 packet format and Transition from IPv4 to IPv6	CO 5
L46	Client-Server paradigm,Connectionless Iterative Server,Connection-Oriented Concurrent Server	CO 5
L47	Host Configuration, previous protocols, DHCP-Operations, same network, different network	CO 5
L48	UDP ports, Error message Packet format, Static Address Allocation,Dynamic Address Allocation	CO 5
L/T	Click or tap here to enter text.	

References:

- Behrouz A. Forouzan, TCP/IP Protocol Suite, 4th Edition, Tata McGraw Hill, 2010
- Tannenbaum, A.S, Computer Networks, 5th Edition, Prentice Hall of India EE Edition, 2011.
- Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, Tata McGraw Hill, 2013
- Leon Garcia and Widjaja, Communication Networks, 5th Edition, Tata McGraw Hill, 2017.
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Submitted by: DR. RAMAKRISHNA M. & MR. VINAYAK M.

(Signature of the faculty)

Date: 25-07-2022

Approved by: DR. KARUNAKAR A. K.

(Signature of HOD)

Date: 25-07-2022

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
Mr. Vinayak M.	A	Dr. Ramakrishna M.	B
