Computer Networks

Course Code: **MCA-103**   **L T C**

Course Name: **Computer Networks**   **3 1 4**

 INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.

3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
 In this course, the learners will be able to develop expertise related to the following:-

1. Understand basics, topologies and working mechanism of wired and wireless computer networks.

2. Analyze the features and operations of protocols of OSI reference model & TCP/IP protocol suite.

3. Design, calculate, and apply routing mechanisms for IPv4 & IPv6

4. Identify the networking requirements for an organization and select & propose appropriate
   Architecture and technologies.

5. Work on Network addressing, design and implementation.

PRE-REQUISITES:

1. Basic Networking concepts

2. Basic Operating System Concepts

COURSE OUTCOMES (COs): After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Explain the functions of each layer in the OSI reference model and TCP/IP protocol suite while illustrating the process of data encoding and multiplexing	BTL2	PO1, PO2, PO3, PO7
CO2	Utilize the fundamentals of data communication and networking to identify the topologies and connecting devices of networks.	BTL3	PO1, PO2, PO3, PO7, PO10

CO3	Identify and discuss the underlying concepts of IPv4 & IPv6 protocols, along with their characteristics and functionality	BTL3	PO1, PO2, PO3, PO4
CO4	Discover the appropriate MAC layer/ data link layer protocols for the given network.	BTL4	PO1, PO2, PO3, PO4, PO7
CO5	Evaluate and implement routing algorithms and multicasting.	BTL5	PO1, PO2, PO3, PO4, PO11
CO6	Adapt transport and application layer protocols along with concepts of mobility and security in networks	BTL6	PO1, PO2, PO3, PO4, PO6, PO7, PO8

UNIT – I

No. of Hours: 11   Chapter/Book Reference: TB1 [Chapters 3, 4, 5, 6, 7, 8]; TB2 [Chapters 2, 3]; TB3 [Chapters 1, 2]

Introductory Concepts: Goals and Applications of Computer Networks, OSI reference model, TCP/IP protocol suite, networks topology & design. Networking Devices (Hub, Bridge, Switch & router). Physical Layer: The functions of Physical Layer, Guided Transmission Media, Wireless Transmission media, Communication Satellites, Digital Signal Encoding Formats, Digital to analog Modulation, Digitization – Sampling Theorem, PCM, DM, Analog to digital Modulation, The Mobile Telephone System, Multiplexing.

UNIT – II

No. of Hours: 11   Chapter / Book Reference: TB1 [Chapters 9, 10, 11, 12, 13, 14, 15, 16, 17]; TB3 [Chapter 3]

The Data Link Layer: Data Link Layer introduction, Error Detection and Correction, Flow Control Protocols, Error Control protocols. Medium access sub-layer: Channel allocation problem, ALOHA Protocols, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free protocols, Ethernet, wireless LANs, Blue Tooth, Wi-Fi.

UNIT – III

No. of Hours: 12   Chapter / Book Reference: TB1 [Chapters 18-22]; TB2 [Chapters [4-7]; TB3 [Chapter 5]

Network Layer: Functions of network layer, IPv4: Classful & classless addressing, Routing algorithms, IP packet format, IPv6: addressing, neighbor discovery, address auto configuration Mobile IP: Mobility in networks, IP Multicasting (Source based tree & Group shared tree).

UNIT – IV

No. of Hours: 10   Chapter/ Book Reference: TB1 [Chapters 23- 26, 30-32]; TB2 [Chapters 13- 15]; TB3 [Chapters 6-7]

Transport Layer: Transport layer functions, Transport layer protocols, UDP, TCP, connection management, flow control, error control and congestion control. Application Layer: DNS, Electronic Mail, www, firewalls, Concept of public & private keys.

TEXT BOOKS:

TB1. Herbert Schildt, "Java - The Complete Reference", Oracle Press, 9th Edition, 2014.

TB2. Kathy Sierra and BertBates, "Head First Java", O'Reilly Publications, 2nd Edition, 2005.

TB3. A. S. Tanenbaum, "Computer Networks", Pearson, 5th Edition, 2013.

REFERENCE BOOKS:

RB1. E. Balaguruswamy, "Programming with Java", Tata McGraw Hill, 4th Edition, 2009.

RB2. Cay Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley & Sons, 2nd Edition, 1999.

RB3. Decker and Hirshfield, "Programming Java: An Introduction to Programming using JAVA", Vikas Publication, 2nd Edition, 2000.

RB4. N. P. Gopalan and J. Akilandeswari, "Web Technology - A Developers' Perspective", PHI, 2nd Edition, 2014.

RB5. Eric Jendrock, Jennfer Ball and Debbei Carson, "The Java #EE5 Tutorial", Pearson, 3rd Edition, 2007.

RB6. Daniel Liang, "Introduction to Java Programming", Pearson, 7th Edition, 2010.

RB7. Bill Vanners, "Inside Java Virtual Machine", Tata McGraw Hill, 2nd Edition, 2000.

RB8. Shelley Powers, "Dynamic Web Publishing", Techmedia, 2nd Edition, 1997.