

Course Code	Course Title	L	T	P	C
1151EC111	DATA COMMUNICATION NETWORKS	2	2	0	3

**a) Course category**

Program core

**b) Preamble**

The purpose of this course is to provide the knowledge of data communication over inter network based on OSI model and in depth knowledge about the layers and application protocols.

**c) Prerequisite**

Nil

**d) Related courses**

Network Security, Network Management, Internet of Things

**e) Course Outcomes**

Upon the successful completion of the course, students will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Interpret the concepts, components, standards and topologies. Explain layered architecture of OSI and TCP/IP model	K2
CO2	Outline the concepts of various protocols used in application Layer	K2
CO3	Illustrate about reliable and non-reliable data transfer protocols in transport layer for different applications	K2
CO4	Apply the knowledge of various network layer routing protocols to predict the shortest path between the nodes	K3
CO5	Infer about how error detection flow control and error control is done in data link layer. Explain about different multiple access techniques used in wired and wireless network	K2

f) Correlation of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	L	L	-	-	L	-	-	-	-	-	L	-	-
CO2	M	-	L	-	-	-	-	-	-	-	-	-	-	-
CO3	L	L	L	-	-	-	-	-	-	-	-	L	-	-
CO4	H	L	H	-	M	-	-	-	-	-	-	-	-	-
CO5	L	M	L	-	-	-	-	L	-	-	-	L	-	-

g) Course Content

**UNIT I INTRODUCTION TO NETWORKS 12**

Data Communication: Components - Protocols and Standards - Standard making organizations - data rate and Channel capacity, Line configuration, Topology of networks, Transmission modes, Digital Data Transmission, Categories of Networks, Inter-Networks, OSI model, TCP/IP Model, Networking and internetworking devices, Switching: Circuit switching - Packet switching - Message switching.

**UNIT II APPLICATION LAYER 12**

Web and HTTP: Overview of HTTP - Non Persistent and Persistent - HTTP Message format –Cookies - Web catching - Conditional GET, FTP, Electronic Mail in Internet: SMTP - Comparison with HTTP - Mail Message format - Mail Access Protocol – DNS - Peer to Peer Applications, Concept of Socket in TCP & UDP, Telnet.

**UNIT III TRANSPORT LAYER 12**

Introduction and Transport Layer Services, Multiplexing and De-multiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection Oriented TCP, Principles of Congestion Control: ATM ABR Congestion Control - TCP Congestion Control.

**UNIT IV NETWORK LAYER 12**

Inside a Router, Internet Protocol, IPV4 - IPV6 - ICMP, Routing protocols: Distance Vector Routing (RIP) and Link State (OSPF) Routing – BGP - Broadcast and Multicast Routing.

**UNIT V DATA LINK LAYER AND WIRELESS NETWORKS 12**

Introduction to Data link layer, Error detection: VRC - LRC – CRC - Checksum and Error correction: Hamming Code, Reliable transmission: Flow Control and Error Control - Token bus - Token ring - Medium Access control: TDMA, FDMA – CDMA – Aloha - CSMA/CA - CSMA/CD Wireless Networks: Introduction to Wi-fi – Wimax – MANET – VANET - WSN.

**Total 60 Hrs**

#### **h) Learning Resources**

##### **Text Books**

1. James F. Kurose, Keith W. Ross, “Computer Networking: A Top Down Approach”, 5th Edition, Pearson Publications, 2012.
2. Behrouz A. Forouzan, “Data Communication and Networking” 2nd Edition, McGraw- Hill, 2003.

##### **Reference Books**

1. William Stallings, “Data and Computer Communication”, Prentice Hall of India. Eighth edition.
2. Andrew S. Tanenbaum, Computer Networks, Prentice Hall.