

COURSE CODE	COURSE TITLE	L	T	P	C
1151CS111	COMPUTER NETWORKS	3	0	0	3

**Course Category:** Program Core

**A. Preamble :**

This course is to provide students with an overview of the concepts and fundamentals of computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols.

**B. Prerequisite Courses:**

Sl. No	Course Code	Course Name
1	1151CS102	Data Structures

**C. Related Courses:**

Sl. No	Course Code	Course Name
1	1156CS601	Minor Project
2	1156CS701	Major Project

**D. 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	Discuss the basic fundamentals of networks for data communication and transmission.	K2
CO2	Describe the various techniques for both analog and digital data communication and its standards.	K2
CO3	Apply the various error detection and correction techniques to solve collisions problems.	K3
CO4	Identify and classify the various network layer protocols to apply in various networks.	K2
CO5	Discuss the various protocols and techniques used in transport layer and application layer.	K2

**E. Correlation of COs with POs :**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H	H	L				L		L			H	L		
CO2	H	H	L				L		L			L	L	L	M
CO3	H	H	L	L			L		L			M	M	L	M
CO4	H	H	L	L			L	L	L			M	L	L	M
CO5	H	H	L	L			L	L	L			M	L	L	M

H- High; M-Medium; L-Low

## **F. Course Content :**

### **UNIT I Introduction 9**

Data Communication: Data Communication system components - Network Models - OSI Model - TCP/IP Protocol Suite - Addressing - Data and Signals - Analog And Digital - Transmission Impairment - Data rate and Channel capacity – Performance.

### **UNIT II Physical Layer 9**

Digital Transmission - Digital-To-Digital Conversion - Analog Transmission - Digital-To-Analog Conversion - Transmission Media - Guided Media - Unguided Media: Wireless - Wired LANs: Ethernet - Token ring - Connecting Devices – Switching techniques.

### **UNIT III Data Link Layer 9**

Link Layer: Types of errors –Error detection- VRC, LRC, CRC techniques - Data Forward and backward error correction - Hamming code. Flow control: stop and wait- sliding window protocol, Error control: Stop and wait ARQ- Go-Back-N ARQ- Selective Repeat ARQ Protocols- Asynchronous and Synchronous Protocol - HDLC frames.

### **UNIT IV Network layer 9**

Logical Addressing - IPv4 Addresses - IPv6 Addresses - Address Mapping – ARP – RARP, BOOTP, and DHCP – ICMP - Unicast Routing Protocols - Intra- and Interdomain Routing - Distance Vector Routing - Link State Routing.

### **UNIT V Transport Layer and Application Layer 9**

Process-to-Process Delivery: UDP – TCP - Congestion Control - Quality of Service - Techniques to Improve QoS – Application layer protocols: REMOTE LOGGING - TELNET - ELECTRONIC MAIL – DNS – SMTP – FTP - HTTP.

**TOTAL: 45 Periods**

## **G. Learning Resources**

### **i.Text Books :**

1. BehrouzForouzan, “Data Communications and Networking”, Tata McGraw Hill, 5th Edition, 2015.
2. Stallings, “Data and Computer Communications”, PHI, 10th Edition, 2015.

### **ii.Reference:**

1. William Schewber, “Data Communication”, McGraw Hill, 1987.
2. Tanenbaum , “Computer Networks”, PHI, 5rd Edition, 2011

### **iii. Online Resources**

1. <http://www.cse.iitk.ac.in/users/dheeraj/cs425/>
2. [http://www.tcpipguide.com/free/t\\_OSISReferenceModelLayers.htm](http://www.tcpipguide.com/free/t_OSISReferenceModelLayers.htm)
3. <http://iit.qau.edu.pk/books/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf>
4. <http://www.networkdictionary.com/protocols/osimodel.php>