

<b>INSTITUTE</b>	<b>FACULTY OF TECHNOLOGY</b>
<b>PROGRAM</b>	<b>BACHELOR OF TECHNOLOGY (COMPUTER ENGINEERING)</b>
<b>SEMESTER</b>	<b>4</b>
<b>COURSE TITLE</b>	<b>COMPUTER NETWORK</b>
<b>COURSE CODE</b>	<b>01CE0410</b>
<b>COURSE CREDITS</b>	<b>4</b>

**Objective:**

- 1 Students are expected to learn basics of Computer Network which will help them to build LAN, MAN and WAN. The course is designed to let students demonstrate an understanding of the protocols, Ip address and Routing algorithms. Additionally, to demonstrate a basic understanding of various internetworking devices.
- 2 Students are expected to learn basics of Computer Network which will help them to build LAN, MAN and WAN. The course is designed to let students demonstrate an understanding of the protocols, Ip address and Routing algorithms. Additionally, to demonstrate a basic understanding of various internetworking devices

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Understand the basic terminologies used in networking, various networking topologies, switching techniques and layered architecture of computer network. (Understand)
- 2 Understand various networking protocols of application layer. (Understand)
- 3 Distinguish connection oriented and connection less protocols used for reliable data transfer and relate with flow control and congestion control. (Analyse)
- 4 Apply the concept of IP addressing and subnetting for IP based networks also demonstrate routing protocols. (Apply)
- 5 Demonstrate error correction and error detection techniques in data link layer, use of random access and CSMA protocol. (Apply)

**Pre-requisite of course:**NA

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
3	0	2	50	30	20	25	25

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Introduction</b> Internet today, Data communication,, Categories of Network,, Layered approach,, Understanding of Delay and its types, TCP/IP Reference model,, Transmission Mode,, Transmission Media, Network Topologies: Star, Bus, Ring, Mesh, Hybrid,, Types of Network: LAN, WAN, MAN, PAN,, Switching Techniques: Circuit Switching,, Packet Switching.	10
2	<b>Application Layer</b> Web and HTTP,, File Transfer: FTP,, Electronic mail in the internet,, Domain name server,, SMTP,, SNMP,, FTP,, DHCP: Request and Response.	8
3	<b>Transport Layer</b> Introduction to Transport layer and its services,, Transport layer Protocol:, TCP , UDP, Principles of Reliable data transfer:, Go-BACK-N, and Selective Repeat,, Flow Control,, Congestion Control.	9
4	<b>Network Layer</b> Network Layer functionalities,, Network Layer design Issues,, Unicast routing, Multicast Routing,, Inter domain and intra domain routing,, Distance Vector Routing,, Link State routing,, OSPF,, EIGRP.	9
5	<b>Data Link Layer</b> Data link layer services,, Data link layer design issues,, Error correction and Error Detection techniques,, Parity,Checksum, Framing,, Flow Control,, Error Control,, Multiple access protocols,, Random Access Protocols,, CSMA , CSMA/CD, CSMA/CA, VLAN.	9
<b>Total Hours</b>		<b>45</b>

#### **Suggested List of Experiments:**

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>practical 1</b> Demonstrate different network devices using Cisco packet tracer.	2
2	<b>practical 2</b> Demonstrate different types of network cables and practically implement the cross-wired cable and straight through cable.	2
3	<b>practical 3</b> Demonstrate basic networking commands and Network configuration commands.	2
4	<b>practical 4</b> Implement different LAN topologies using Network Simulator.	2
5	<b>practical 5</b> Implement the concept of VLAN using Network Simulator.	2
6	<b>practical 6</b> Demonstrate various Network devices configuration commands.	2

### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
7	<b>practical 7</b> Implement the following concept in routing. i. Static Routing ii. Dynamic routing using RIP	2
8	<b>practical 8</b> Configure Following Link State Vector Routing in Packet Tracer Software. i. OSPF using command line interface ii. BGP using command line interface	2
9	<b>practical 9</b> Configuration of DHCP Server in Packet Tracer Software and analysis of DHCP messages.	2
10	<b>practical 10</b> Configuration of HTTP Server in Packet Tracer Software and analysis of HTTP request & response messages.	2
11	<b>practical 11</b> Configuration of DNS Server with Recursive & Interactive approach in Packet Tracer Software.	2
12	<b>practical 12</b> Configuration of E-mail Server in Packet Tracer Software.	2
13	<b>practical 13</b> Configure Distance Vector Routing (e.g. RIP) in Packet Tracer Software.	2
14	<b>practical 14</b> Write a program in C/C++/ JAVA/ Python for socket programming and share your file from one system to another system.	2
<b>Total Hours</b>		<b>28</b>

### Textbook :

- 1 Computer Networks, Andrew S. Tanenbaum, PEARSON, 2011

### References:

- 1 Data Communications and Networking, Data Communications and Networking, Behrouz A. Forouzan,, McGraw-Hill, 2012
- 2 Computer Networking, Computer Networking, Kurose and Ross, PEARSON, 2020
- 3 Data and computer Communication, Data and computer Communication, William Stallings, PEARSON, 2014

### Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation
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<b>Remember / Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Higher order Thinking / Creative</b>
10.00	35.00	10.00	35.00	5.00	5.00

#### **Instructional Method:**

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses and Virtual Laboratory.

#### **Supplementary Resources:**

- 1 <https://www.netacad.com/about-networking-academy/packet-tracer/>
- 2 <http://vlssit.iitkgp.ernet.in/ant/ant/>
- 3 <http://www.nptelvideos.in/2012/11/computer-networks.html>
- 4 <http://www.networkworld.com/blogs>
- 5 <https://www.tutorialspoint.com/ipv6/>