



Course: BTech

Semester: 4

Prerequisite: knowledge of Computer and Information system

**Rationale:** This course is design to provide the basic knowledge about the data & signals. It also provides basic concepts of computer network and firm foundation for understanding how data communication occurs in the Transmission Medium. It will help to develop logical abilities and practically setup the network .

**Teaching and Examination Scheme**

Teaching Scheme					Examination Scheme					Total
Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	0	0	0	3	20	20	-	60	-	100

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

**Course Content**

W - Weightage (%) , T - Teaching hours

Sr.	Topics	W	T
1	<b>DATA COMMUNICATION COMPONENTS:</b> Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN:Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum	25	11
2	<b>DATA LINK LAYER AND MEDIUM ACCESS SUB LAYER:</b> Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Goback 'N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA	25	11
3	<b>Network Layer:</b> Switching, Logical addressing 'IPV4, IPV6; Address mapping 'ARP, RARP, BOOTP and DHCP' Delivery, Forwarding and Unicast Routing protocols	20	8
4	<b>Transport Layer:</b> Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.	15	6
5	<b>Application Layer:</b> Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography	15	6

**Reference Books**

1.	<b>Computer Networks (TextBook)</b> By Andrew S. Tanenbaum and David J. Wetherall   PEARSON Edition
2.	<b>Internetworking with TCP/IP Principles, Protocols and Architecture</b> By Douglas E Comer
3.	<b>TCP/IP Illustrated</b> By Richard Stevens
4.	<b>Data Communication and Networking</b> By Behrouz A. Forouzan
5.	<b>"Data and computer communications",</b> By William Stallings   Prentice Hall



## Course Outcome

### After Learning the Course the students shall be able to:

After Learning the course the students shall be able to:

1. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
2. Understand the functions of the different layers of the OSI Protocol
3. Understand and Design For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component
4. Learn on the given problem-related TCP/IP protocol developed for the network programming.
5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, and Firewalls using open-source available software and tools.



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**Teaching and Examination Scheme**

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Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
0	0	2	0	1	-	-	20	-	30	50

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**Course Outcome**

**After Learning the Course the students shall be able to:**

After Learning the Course the students shall be able to:

1. Configure and set up different types of networks, including local area networks (LANs) and wide area networks (WANs).
2. Configure routers and switches, and implement routing protocols to understand how data is directed through a network.
3. Use network monitoring tools to analyze network.
4. Apply security measures, such as firewalls, encryption, and intrusion detection systems, to secure network communication.
5. Implement and analyze various network protocols, such as TCP/IP, UDP, and ICMP, through practical exercises.

**List of Practical**

1.	Experiments on Simulation Tools: (CISCO PACKET TRACER).
2.	Experiments of Packet capture tool: Wireshark.
3.	To study behavior of generic devices used for networking: (CISCO PACKET TRACER).
4.	Data Link Layer (Error Correction).
5.	Virtual LAN
6.	Wireless LAN
7.	Inter networking with routers: 1: Experiment on same subnet 2: Perform Experiment across the subnet and observe functioning of Router via selecting suitable pair of Source and destination.
8.	Implementation of SUBNETTING.
9.	Routing at Network Layer.
10.	Experiment on Transport Layer.

**Miscellaneous****Exam Requirement**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.