3/4 B.Tech - FIRST SEMESTER

IT5T3 DATA COMMUNICATIONS AND COMPUTER NETWORKS Credits: 3
Lecture: 3 Periods/week Internal assessment: 30 marks
Practice/Interaction: 1Period/week Semester end examination: 70 marks

Objectives:

- To understand the fundamental concepts of data communication.
- Familiarize with the basic taxonomy and terminology of computer networking.
- To discuss advanced networking concepts like client server paradigm.

Outcomes:

Students will be able to

- Understand the various standard network models, types of networks and network topologies.
- Implement techniques include framing, error correction, error detection and flow control protocols.
- Understand various Internet Protocol Versions and classification of addressing.
- Implement various Routing algorithms.
- Understand Transport layer Services and Transfer protocols TCP, UDP and their use in Real Time Scenarios.

Syllabus:

UNIT – I

Introduction: Data Communication, components, data representation, data flow; Networks: physical structures, network models, categories of network, inter connection of networks, Network Models: Layered Tasks, sender, receiver, carrier, and hierarchy. The OSI models: layered architecture, peer to peer process, encapsulation, Layers in OSI model, TCP/IP protocol suite, Addressing: physical address, logical address, port address, specific address.

UNIT –II

Framing: fixed size framing, variable size framing, Flow control, Error control Error detections Error correction: block coding, linear block codes, cyclic codes: cyclic redundancy check, polynomials, cyclic code analysis, advantages, Checksum: idea, one's complement internet check sum, Elementary Data link Layer protocols: Noiseless Channels, Simplest protocol, Stop-and Wait protocol,

UNIT-III

Noisy Channels, Stop and Wait Automatic repeat request, Go Back N Automatic Repeat Request, Selective Repeat Automatic Repeat Request, and Piggybacking, Network Layer,IPV4 Addresses, Address space, Notations, Classful addressing, Classless Addressing, Internetworking,IPV4, Datagram, fragmentation,checksum,options,IPV6,advantages,packet format, Extension Headers.

UNIT –IV

Network Layer: Delivery, Forwarding: Forwarding Techniques, and, Forwarding Process, Routing Table routing, Unicast Routing Protocols: Optimization, Intra and Inter domain Routing distance vector routing algorithm, Link State Routing Algorithm, Multicast Routing Algorithms: Unicast ,Multicast, Broadcast, Multicast Routing, Routing Protocols

UNIT-V

Transport Layer: Process to process Delivery: Client/Server Paradigm,
Multiplexing and Demultiplexing, Connectionless Versus Connection-Oriented Service, Reliable Versus Unreliable, User datagram Protocol: Well known ports for UDP, User Datagram, Checksum,

UDP Operations, and Transmission Control Protocol (TCP): TCP Services, TCP Features, Segment, A TCP Connection, Flow Control, Congestion Control.

Text Books:

1) Data communications and networking 4th Edition Behrouz A Fourzan, TMH
2) Computer networks 4th Edition Andrew S Tanenbaum, Pearson

Reference Books:

1) Computer networks, A system Approach, 5th Edition, Larry L Peterson and Bruce S Davie, Elsevier

e-Learning Resources:

1) http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Computer%20networks/New_index1.html