

Course code	Course Name	L-T-P - Credits	Year of Introduction
IT307	Computer Networks	3-0-0-3	2016

**Prerequisite:** Nil

**Course Objectives**

- To understand the concepts of Computer networks, its applications, types and Network Software & Hardware.
- To know the various Data Link Layer protocols.
- To study the congestion control algorithms in Network Layer
- To understand the application layer protocols HTTP, FTP, SMTP, P2P, DNS

**Syllabus**

Computer Networks, Types of Networks, Reference Models, Transmission Media, Network Hardware, Error Detection and Correction methods, Elementary Data Link Layer Protocols, Medium Access Control protocols, Ethernet, Network routing algorithms, Congestion control mechanisms in network layer, Transport layer services, Socket, UDP, TCP – Connection management, Congestion Control, Application layer protocols – HTTP, FTP, SMTP, DNS, P2P.

**Expected outcome .**

- The students will be able to use different types of computer networks to interconnect a distributed community of computers and various interfacing standards and protocols.

**Text Book:**

1. Andrew S. Tanenbaum, “Computer Networks”, Prentice Hall, 4th Edition, 2003 (Module 1 to 5)
2. James F Kurose, Keith W Ross, Computer Networking: A top Down Approach featuring the Internet, Pearson Education, 3<sup>rd</sup> Edition. (Module 6)

**References:**

1. Behrouz A. Forouzan, TCP/IP Protocol Suite, Fourth Edition, Mc Graw Hill
2. Behrouz A. Forouzan, Data Communication and Networking, Fourth Edition, Mc Graw Hill

**Course Plan**

Module	Contents	Hours	Sem. Exam Marks
I	<p><b>Introduction:</b> - Types of Computer Networks, Network Software - Protocol Hierarchies, Connection oriented and Connection less hierarchies, Reference Models - ISO-OSI Reference Model, TCP/IP Reference Model – Comparison of OSI and TCP/IP reference models.</p> <p><b>Physical Layer:</b> - Guided Transmission Media– Twisted Pair, Coaxial and Fiber Optics, Wireless Transmission- Radio and Microwave transmission, Communication Satellites – GEO, MEO, LEO.</p> <p>Comparison of Network hardware - Repeaters, Routers, Bridges, Gateways, Hub and Cable Modem.</p>	6	15%
II	<p><b>Data Link Layer:</b> - Data link Layer design issues-Error Detection and correction – Elementary Data link protocols-Sliding window protocols- Basic Concept, One Bit Sliding window protocol, Concept of Go Back n and Selective repeat.</p>	6	15%

<b>FIRST INTERNAL EXAMINATION</b>			
<b>III</b>	<b>Medium Access Control:-</b> Static & Dynamic channel allocation in LAN, Multiple access protocols – ALOHA – Pure ALOHA – Slotted ALOHA – Carrier Sense Multiple Access protocols – persistent and non-persistent CSMA – CSMA with collision detection – Ethernet- Ethernet Cabling, Encoding, Frame Format, Binary Exponential Back Off Algorithm, Comparison of Fast and Gigabit Ethernet.	8	15%
<b>IV</b>	<b>Network layer:</b> -Network Layer Design Issues, Routing Algorithm – Optimality principle - Flooding - Distance vector routing – Link state routing –Multicast Routing - Congestion Control Algorithms – General principles – Congestion prevention policies – Choke packets – Random Early Detection- Quality of Service requirements- Buffering, Traffic shaping – Leaky bucket algorithm.	8	15%
<b>SECOND INTERNAL EXAMINATION</b>			
<b>V</b>	<b>Transport Layer:</b> - Transport Service – The services provided to upper layers, Transport Service primitives, Berkley Sockets. Elements of transport protocols, UDP- Segment Structure, Remote Procedure Call. TCP – Service model, TCP Protocol, TCP Segment Header, Connection establishment and Release, Transmission Policy, Congestion Control	7	20%
<b>VI</b>	<b>Application Layer:</b> - <b>HTTP</b> - Overview, Persistent and non persistent Connections, Message formats, Concept of Cookies and Web Cache - <b>FTP</b> - <b>Electronic Mail</b> – SMTP, Mail message formats, POP3, IMAP – <b>DNS</b> - Services provided by DNS, Overview of how DNS works, DNS Caching, Message format - <b>P2P File sharing</b>	7	20%
<b>END SEMESTER EXAM</b>			

### QUESTION PAPER PATTERN

Maximum Marks: 100

Exam Duration: 3 hours

The question paper shall consist of Part A, Part B and Part C.

**Part A** shall consist of three questions of 15 marks each uniformly covering Modules I and II. The student has to answer any two questions (15×2=30 marks).

**Part B** shall consist of three questions of 15 marks each uniformly covering Modules III and IV. The student has to answer any two questions (15×2=30 marks).

**Part C** shall consist of three questions of 20 marks each uniformly covering Modules V and VI. The student has to answer any two questions (20×2=40 marks).

**Note :** Each question can have a maximum of 4 subparts, if needed