**M.Sc. Computer Science Semester - III**

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| **Course Code** | **CSC501** | **Course Title** | **Advance Computer Networks** |
| **Number of Credits** | **3 Credits** (TH)  **2 Credits** (PR) | **Internal** | **20** |
| **Total Contact Hours** | **3 HRS** (TH/Week)  **4 HRS** (PR/Week) | **External** (Semester/Term Exam) | **80** |

**Course Objective:**

This course aims to understand the main abstract concepts related to the layered communication architecture. Also, how does this global network infrastructure work and what are the design principles on which it is based; by learning advanced routing and congestion control algorithms. The focus is to understand basics and principles of new generation of computer networks (VPN, wireless networks, and mobile networks).

[Topics](file:///C:\Users\CSIT-M%7E1\AppData\Local\Temp\Rar$EX96.272\6-829-fall-2002\contents\calendar\index.htm) include internetworking philosophies, unicast and multicast routing, congestion control, network quality of service, mobile networking, router architectures, etc.

The focus is on both: the existing technologies as well as the current and emerging research topics in computer networking.

**Prerequisite:**

Basic knowledge of Computer network.

**At Course Completion:**

The student will be well acquainted with how computer network works, what are the architectures and protocols required for It., as well as some special topics.

**Course Outline**

**Unit-1:**

**Introduction:** Background and overview of the layered architecture: Layered communication architecture: layers, services, protocols, layer entities, service access points, modes of communication, etc. DLL Protocols, Frame Relay, X.25 protocol, IEEE Standards for LAN, error detection and correction at DLL.

**Unit-2:**

**Internetworking and Routing:** Advanced Routing algorithms, Advanced Network Congestion Control algorithms, Packet Switching, IP Addressing & DNS.

**Unit-3:**

**Overview on Wireless Networks and Mobile Networks:** LAN, PAN, Sensor Networks, Ad\_hoc Networks, Mobile IP, Mobile TCP, VPN, MAC Protocols.

Wireless Protocols: Data Transport and Sensor Data Dissemination, Group Communication: Multicast Routing and Transport, Multicast (cont.); Scalability and Robustness in Networks.

**Unit-4:**

**Process to Process delivery:** client/server paradigm, multiplexing and demultiplexing, connectionless versus connection oriented services, reliable versus unreliable

**Network Security:** Cryptography Techniques, Algorithms: Secret key and Public key, DES, RSA. Digital Signature, Firewalls, Proxy server.

**Unit-5:**

**Special Topics:** current and emerging trends: Next Generation Networks, Data Centers, Cloud Computing, GSM, GIS, Queuing models, ASN (abstract syntax Notation), distributed Networks.

**Books:**

1. Computer Networks – A. Tanenbaum, (PHI pub.)

2. Data and Computer Communication – Willam Stallings, PHI pub.

**Reference Books:**

1. Data Communication & Network – Forouzan (TMH)

2. Internetworking with TCP/IP Vol‐I – Comer (PHI pub.)

3. Data Communications and distributed Networks‐V.B, Black, (Prentice Hall pub.)

4. William Stallings, Wireless Communications & Networks, 2nd edition, Prentice-Hall Pearson, 2005

**E-books:**

1. <http://newwayofengineering.blogspot.in/2014/12/computer-networks-tanenbaum-5th-edition.html>
2. <http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html>
3. <http://nptel.iitm.ac.in/video.php?subjectId=1061050813> .
4. <http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php>

**Lab Exercise:**

**CSC552 Practical based on CSC501:** At least two experiments should be carried out on each unit.