CA527 COMPUTER NETWORKS

Pre-requisites: CA520 Computer Organisation and Architecture, CA522 Data Structures (CA523 Operating Systems – would be beneficial)

Aims and Objectives: This is a first course in computer networks introducing all the essential concepts and builds a basis for further courses such as Internet Technologies, Electronic Commerce and Multimedia. This course should be (ideally) run with a course on Network Programming where the programming and systems aspects of the network concepts are consolidated in a practical sense. (The network programming course could also follow this in a subsequent semester.)

Syllabus:

Communications Model: Communications model, data communications tasks; networking, layering and design issues, ISO-OSI model, protocols, services, standards, network goals and applications.

- Data Communication: Physical layer; transmission media, encoding, interfaces, switching and signaling methods, multiplexing and medium access control.
- Data Link Layer: Framing, error control, flow control, data link protocols, retransmission strategies and their performance.
- Network Layer: Routing and congestion control algorithms, inter-networking principles, Internet Protocol, bridges etc. devices.
- Transport Layer: Transport services, connection management, TCP, UDP, quality of service parameters, TCP/IP over ATM networks.
- Network Security: Data encryption strategies, authentication protocols, firewalls.
- Basic applications: telnet, rlogin, FTP. TFTP, NFS, DNS, SMTP, MIME, SNMP, HTTP etc.
- Network Infrastructure for advanced applications: E-commerce, multimedia, mobile and wireless computing.

Books and References:

1. Bertsekas, D and Gallager, B.: Data Networks, Prentice Hall of India 1992. (2nd Edition)
2. Black, U.D.: TCP/IP and Related Protocols, MacGraw Hill New York 1995.
3. Black, U.D.: Computer Networks, Protocols Standards and Interfaces, Prentice Hall International
4. Comer (includes Comer and Stevens, D.L. three Volumes): Internetworking with TCP/IP Principles
protocols and architecture, Prentice Hall of India, 1995.
5. Goralski, W.J.: Introduction to ATM networking, McGraw Hill New York, 1995.
6. Keshav, S.: Computer Networks: an Engineering Approach, Addison-Wesley, Reading, 1997.
7. Stallings, W.: Network and Internetwork security, Prentice Hall International 1995.
8. Stallings, W. Data and Computer Communication 5th Edition, Prentice Hall of India, 1997.
9. Stevens, W.R: TCP/IP Illustrated (Three Volumes), Addison-Wesley, Reading, Mass. 1995
10. Tanenbaum, A.S.: Computer Networks Third Edition, Prentice Hall of India, 1997.