Course Number	CS 440	Course Title	Computer Networks
Semester Hours	3	Course Coordinator	Bidyut Gupta
Catalog Description	Design and analysis of computer communication networks. Topics to be covered include queuing systems, data transmission, data link protocols, topological design, routing, flow control, security and privacy, and network performance evaluation.		

Textbooks

SP20

Tanenbaum, A. S. & Wetherall, D. J. (2021). *Computer Networks.* Prentice-Hall, 6th Edition.

ISBN: 9780136764052.

References

- Comer, D. E. *Internetworking with TCP/IP Vol. I and II: Principles, Protocols Architecture*. Prentice Hall, 3rd Edition.
- Hallsall, F. *Data Communications, Computer Networks and Open Systems*. Addison Wesley.

Course Learning Outcomes

- To learn the design and analysis of computer communication networks based on the OSI reference model.
- Understand both hardware and software design problems associated with interconnecting geographically dispersed systems.
- To learn to evaluate various network components, design strategies, and network improvement approaches.

Assessment of the Contribution to Student Outcomes

Outcome →	1	2	3	4	5	6
Assessed →	X	X			X	X

Prerequisites by Topic

CS 330 with a grade of C or better or graduate standing; CS 306 recommended.

Major Topics Covered in the Course

SP17

1. Physical Layer: Fourier analysis; bandwidth-limited signals, Maximum data rate.{3 classes}
2. Data Link Layer: framing, error detection and error correction codes, Sliding window protocols. {7 classes}
3. Network Layer: flooding, link state routing protocol, distance vector routing protocol, multicast routing, congestion control algorithms - choke packet, leaky bucket, token bucket algorithms, quality of service, IP addresses, Internet control protocols – OSPF, BGP. {3 classes}
4. Transport Layer: elements of transport protocols – addressing, connection establishment and release, flow control and buffering etc., Internet transport protocols – UDP, TCP/IP. {7 classes}
5. Medium Access Control Sub layer: pure and slotted ALOHA, classical Ethernet, gigabit Ethernet, wireless LAN protocol – IEEE 802.11 (Wi-Fi) {7 classes}
6. Introduction to Queueing Theory: M/M/1 finite and infinite queues {3 classes}