Course Code	Course Title	Credits	Lectures /Week
USCS402	**Computer Networks**	**2**	**3**

About the Course:
This course introduces computer networks, with a special focus on the Internet architecture and protocols. The course includes topics such as network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, web, email and other application layer protocols.

Course Objectives:

- To Understand Basic Concepts of Networking.
- To Understand Working of Network Layer Architecture.
- To Learn Practical Implementation of Basic Routing Algorithms.
- To Learn Different Networking Protocols.

Learning Outcomes:
After successful completion of this course, students would be able to

- Learn basic networking concepts and layered architecture.
- Understand the concepts of networking, which are important for them to be known as a 'networking professionals'.

Unit	Topics	No of Lectures
I	**Introduction:** Networking standards and Administrations, networks, network types – LAN, MAN, WAN. **Network Models:** The OSI model, TCP/IP protocol suite, **Introduction to Physical layer:** Data and signals, periodic analog signals, digital signals, transmission impairment, data rate limits, performance. **Digital transmissions:** Digital-to-digital conversion, analog-to-digital conversion, transmission modes **Analog transmissions:** digital-to-analog conversion, analog-to-analog conversion. **Bandwidth Utilization – Multiplexing and Spectrum spreading:** Multiplexing, Spread Spectrum **Transmission media:** Guided Media, Unguided Media **Switching:** Introduction, Circuit Switched Network, Packet Switching.	**15**
II	**Introduction to Data Link Layer:** Link layer addressing, Data Link Layer Design Issues. **Error detection and correction**: -Block coding, cyclic codes, checksum, forward error correction, error correcting codes, error detecting codes.	**15**

	Data Link Control: DLC services, data link layer protocols, HDLC, Point-to-point protocol. **Media Access Control:** Random access, controlled access, channelization, **Wired LANs – Ethernet:** Ethernet Protocol, standard Ethernet, fast Ethernet, gigabit Ethernet, 10 gigabit Ethernet **Wired Network:** Telephone Network, Cable Network, SONET, ATM **Wireless LANs:** Introduction, IEEE 802.11 project, Bluetooth, WiMAX, Cellular telephony, Satellite networks. **Introduction to Network Layer:** Network layer services, packet switching, network layer performance, IPv4 addressing, forwarding of IP packets, **Network Layer Protocols** : Internet Protocol, ICMPv4, Mobile IP	
III	**Unicast Routing:** Introduction, routing algorithms, unicast routing protocols. **Next generation IP:** IPv6 addressing, IPv6 protocol, ICMPv6 protocol, transition from IPv4 to IPv6. **Introduction to the Transport Layer:** Transport Layer Protocol, User Datagram Protocol, Transmission Control Protocol, SCTP. **Introduction to Application Layer:** Client Server Programming, Iterative Programming. **Standard Client-Server Protocols:** WWW, HTTP, FTP, Electronic Mail, TELNET, Secure Cell, DNS, SNMP **Quality of Service:** Data Flow to improve QoS, Flow control to improve QoS, Integrated service (Intserv), Differentiated Service(Diffserv).	**15**

Textbooks:

1. Data Communications and Networking, Behrouz A. Forouzan, Fifth Edition, TMH, 2018.
2. Computer Network, Andrew S. Tanenbaum, David J. Wetherall, Fifth Edition, Pearson Education, 2018.

Additional References:

1. Computer Network, Bhushan Trivedi, Oxford University Press, 2016
2. Data and Computer Communication, William Stallings, PHI, 2017