	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 **NAAC Accredited (A+ Grade)**	

Second Year (Semester-III) B. Tech. Information Technology

BIT32325 :-Computer Networks and Internet Protocol

Teaching Scheme		Examination Scheme	
Theory	**3 Hrs/week**	CT-I	15 Marks
Tutorial	**-**	CT-II	15 Marks
Total Credits	**3**	CA	10 Marks
		ESE	60 Marks
		Total	100 Marks
		Duration of ESE: 3 Hrs	

Course Objectives:

1.	To provide foundational knowledge of computer networks, architectures, models, and switching techniques.
2.	To classify the functionalities of application and transport layer protocols.
3.	To explain IP addressing schemes, applications used in modern networks.
4.	To examine data link layer services including framing
5.	To analyze MAC layer protocols

Course Contents

Unit I	**Introduction to Computer Networks:** Overview and history of computer networks, Types of networks: LAN, WAN, MAN, PAN, Network topologies and architectures Switching Techniques: Circuit switching vs Packet switching, TCP/IP protocol stack and OSI model – Basic overview and comparison, Layered architecture and encapsulation
Unit II	**Application and Transport Layer Protocols:** Application Layer Protocols: HTTP/HTTPS, FTP, Email protocols, DNS Transport Layer Concepts: Transport primitives and services, Connection establishment and termination (3-way handshake), Flow control and congestion control, UDP and TCP, TCP features: reliability, error detection, segmentation
Unit III	**IP Addressing and Routing:** IP Addressing: IPv4 and IPv6 basics, Subnetting, Supernetting, CIDR, DHCP and NAT Internet Control Message Protocol (ICMP), IP Routing: Intra-domain routing protocols: RIP, OSPF Inter-domain routing protocol: BGP, Distance vector and link state algorithms, Routing tables and forwarding

Unit IV	Network Services and Data Link Layer: Address Resolution Protocol (ARP), SNMP, Framing techniques: bit stuffing, byte stuffing Error control: CRC, checksum, Hamming code Flow control: Stop-and-Wait, Sliding Window Protocols, Forwarding and switching at the data link layer
Unit V	**MAC Layer and End-to-End Network Principles:** MAC protocols: ALOHA, CSMA/CD, CSMA/CA, Token passing, Ethernet and IEEE 802.3, Wireless LANs: IEEE 802.11 overview, Virtual LANs (VLANs) and switching techniques, End-to-end principles in network communication, Overview of SDN (Software Defined Networking) and emerging trends
Text Books	
T.1	Computer Networking: A Top-Down Approach – James Kurose & Keith Ross
Reference Books	
R.1	Computer Networks Fifth edition by Andrew S. Tanebaum , and David J. Wetherall
R.2	The All-New Switch Book (2nd Edition)by Rich Seifert and James Edwards
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc22_cs19/preview

	Course Outcomes	CL	Class Sessions
BIT32325.1	**Discuss** the fundamentals, evolution, and need for computer networks	2	9
BIT32325 .2	**Illustrate** the working of application layer protocols in networking.	2	9
BIT32325.3	**Classify** routing algorithms and the structure of routing tables.	2	9
BIT32325.4	**Explain** the functions of protocols in network management	2	9
BIT32325.5	**Demonstrate** the functioning and applications of MAC layer protocols and end-to-end networking principles	3	9