ADVANCED COMPUTER NETWORKS

UNIT I   Review

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet - **Foundation of Networking Protocols:** 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **Networking Devices:** Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure.

UNIT II

The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error- Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization - **Routing and Internetworking:** Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer

UNIT III

Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **Multicasting Techniques and Protocols:** Basic Definitions and Techniques, Intradomain Multicast Protocols, Interdomain Multicast Protocols, Node-Level Multicast algorithms - **Transport and End-to-End Protocols:** Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **Application Layer:** Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, Building a Simple Web Server

UNIT IV

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Optical Networks and WDM Systems:** Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocation in Networks, Case Study: An All-Optical Switch

UNIT V

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony, VoIP Signaling Protocols, Real-Time Media Transport Protocols, Distributed Multimedia Networking, Stream Control Transmission Protocol - **Mobile A-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks – **Wireless Sensor Networks:** Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose,Keith W.Ross*, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007.

REFERENCES:

1. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, TataMcGraw Hill, 2007
2. Guide to Networking Essentials, *Greg Tomsho,Ed Tittel, David Johnson,*Fifth Edition,Thomson.
3. An Engineering Approach to Computer Networking *, S.Keshav,* Pearson Education.
4. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet,* PearsonEducation (CISCO Press)
5. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
6. The Internet and Its Protocols, A. Farrel, Elsevier.

ADVANCED COMPUTER NETWORKS

Time: 3 hours   **Max.Marks:100**

Answer any FIVE questions All questions carry equal marks

1.a)Distinguish between connectionless and connection oriented service.

  b)   Compare circuit switching and packet switching techniques.
  c)   Briefly explain the functioning of Internet Access devices, switching and routing
       devices.   [5+5+10]

2.a)   Explain and compare the performance of Multiple access protocols.
  b)   Discuss point to point protocol.   [10+10]

3.a)   What are the services provided by the link layer? Explain.
  b)   Compare Intradomain and Interdomain routing protocols.   [10+10]

4.a)   Compare and contrast the IPv4 and the IPv6 header fields.
  b)   Give the features and services of TCP protocol. Explain TCP congestion control
       mechanisms.

                                                     [10+10

     ]

5.a)   Discuss the protocol architecture of wireless LAN standard IEEE 802.11.
  b)   Explain the functioning of Mobile IP.   [10+10]

6.a)   List out the various optical networking devices and explain its operations.
  b)   Describe procedure for wave length allocation in networks.   [10+10]

7.a)   List out the issues in designing a routing protocol for Ad-Hoc wireless networks.
  b)   What are the characteristics of an Ideal routing protocol for Ad-Hoc networks?
  c)   Explain hidden and exposed terminal problems.   [6+6+8]

8.   Write a brief note on:
       a) Multiprotocol label switching
       b) VoIP
       c) DNS