

**KL University**  
**Department of Electronics & Computer Engineering**  
**M.Tech (ES) Elective – II**

**Course No.** : 11-EM-E42  
**Course Title** : Advanced Computer Networks  
**Course Structure** : 3-0-0

**SYLLABUS:**

**Unit -I:**

**Congestion and Quality of Service (QoS):** Data traffic, Congestion, Congestion Control, Open loop and Closed Loop Congestion Control in TCP and Frame Relay, Quality of Service, Flow Characterization, Flow Classes, Need For QoS, Resource Allocation, Best Effort Service Features, Techniques to Improve QoS.

**Queue Management:** Passive, Active (RED), and Fair (BRED, Choke) Queue Management Schemes, Scheduling, Traffic Shaping, Resource Reservation and Admission Control Scheduling, Integrated and Differential Services.

**Unit-II:**

**Wireless Local Area Networks:** Introduction, Wireless LAN Topologies, Wireless LAN Requirements, the Physical Layer, the Medium Access Control (MAC) Layer, Latest Developments.

**Wireless Personal Area Networks (WPANs):** Introduction to PAN Technology and Applications, Commercial Alternatives- Bluetooth, Home RF.

**Wireless Wide Area Networks and MANS:** The Cellular Concept, Cellular Architecture, The First-Generation Cellular Systems, The Second- Generation Cellular Systems, The Third-Generation Cellular Systems, Wireless in Local Loop, Wireless ATM, IEEE 802.16 Standard.

**Unit-III:**

**Cellular Systems and Infrastructure- Based Wireless Networks:** Cellular Systems Fundamentals, Channel Reuse, SIR and User Capacity, Interference Reduction Techniques, Dynamic Resource Allocation, Fundamental Rate Limits.

**Virtual Private Network (VPN):** Types of VPN, VPN General Architecture, Disadvantages, VPN Security Issues, VPN Standards.

**Unit-IV:**

**ATM Protocol Reference Model:** Introduction, Transmission Convergence (TC) Sub-layer, Physical Medium Dependent (PMD) Sub-layer, Physical Layer Standards for ATM.

**ATM Layer:** ATM Cell Header Structure at UNI, ATM Cell Header Structure at NNI, ATM Layer Functions.

**ATM Adaptation Layer:** Service Classes and ATM Adaptation Layer, ATM Adaptation Layer 1 (AAL1), ATM Adaptation Layer 2 (AAL2), ATM Adaptation Layer 3/4 (AAL3/4), ATM Adaptation Layer 5 (AAL5).

**ATM Traffic and Service Parameterization:** ATM Traffic Parameters, ATM Service Parameters, Factors Affecting QoS Parameters, ATM Service Categories, QoS and QoS Classes.

**Unit-V:**

**Interconnection Networks:** Introduction, Banyan Networks- Properties, Crossbar Switch, Three Stage Class Networks, Rearrangeable Networks, Folding Algorithm, Benes Networks, Looping Algorithm, Bit- Allocation Algorithm.

**SONET/SDH:** SONET/SDH Architecture, SONET Layers, SONET Frames, STS Multiplexing, SONET Networks.

**Text Books:**

1. Wireless Communications - Andrea Goldsmith, 2005, Cambridge University Press.
2. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.
3. Data Communication and Networking - B. A.Forouzan, 2nd updating, 2004,TMH

**References:**

1. Introduction to Broadband Communication Systems- Sadiku, Mathew N.O., Akujuobi, Cajetan.M, PHI
2. Wireless Networks- P. Nicopolitidis, A. S. Pomportsis, G. I. Papadimitriou, M. S. Obaidat, 2003, JohnWiley& Sons
3. High Performance TCP / IP Networking – Mahaboob Hassan, Jain Raj, PHI.
4. Telecommunication System Engineering – Roger L. Freeman, 4/ed., Wiley-Interscience, John Wiley & Sons, 2004.