**Course Code: 25CS5815** | **R25**

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR**

**(AUTONOMOUS)**

**Siddharth Nagar, Narayanavanam Road – 517583**

**Subject with Code: ADVANCED COMPUTER NETWORKS (25CS5815)**

**Course & Branch**: M. TECH CSE

**Year &Sem:** I-M. TECH & II-Sem

**Regulation:** R25

## UNIT – I

### Data-link protocols, Wireless Networks & Routing

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|---|---|---|---|
| **1** | Define Ethernet and Token Ring protocols and explain their frame formats. | **[L1] [CO1]** | **[10M]** |
| **2** | Discuss the architecture of IEEE 802.11 Wireless LANs and its physical layer. | **[L2] [CO1]** | **[10M]** |
| **3** | Explain the working of Mobile IP and its role in supporting mobility. | **[L2] [CO2]** | **[10M]** |
| **4** | Illustrate Least-Cost-Path algorithms with a suitable network graph. | **[L3] [CO3]** | **[10M]** |
| **5** | Analyze the infrastructure and characteristics of Wireless Mesh Networks (WMNs). | **[L4] [CO2]** | **[10M]** |
| **6** | Compare Intra-domain and Inter-domain routing protocols (e.g., OSPF vs BGP). | **[L4] [CO2]** | **[10M]** |
| **7** | **a)** Define multiple access schemes used in wireless networks. | **[L1] [CO1]** | **[5M]** |
| | **b)** Explain the concept of Non-Least-Cost-Path routing algorithms. | **[L2] [CO3]** | **[5M]** |
| **8** | **a)** Describe the infrastructure of cellular networks. | **[L2] [CO5]** | **[5M]** |
| | **b)** Discuss the significance of congestion control at the Network Layer. | **[L2] [CO4]** | **[5M]** |
| **9** | Evaluate the performance of different routing techniques in internetworking. | **[L5] [CO4]** | **[10M]** |
| **10** | Design a network topology that utilizes Wireless LAN technologies for a small campus. | **[L6] [CO6]** | **[10M]** |

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## UNIT – II

### Transport and Application Layer Protocols

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|---|---|---|---|
| **1** | Define the Transport Layer and explain its primary responsibilities. | **[L1] [CO1]** | **[10M]** |
| **2** | Discuss the communication differences between Client-Server and Peer-To-Peer models. | **[L2] [CO2]** | **[10M]** |
| **3** | Explain the principles of reliable communication over an unreliable channel. | **[L2] [CO2]** | **[10M]** |
| **4** | Illustrate the TCP congestion control mechanism, including slow start and avoidance. | **[L3] [CO4]** | **[10M]** |
| **5** | Analyze the differences between Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). | **[L4] [CO2]** | **[10M]** |
| **6** | Compare standard TCP with Mobile Transport Protocols in wireless environments. | **[L4] [CO2]** | **[10M]** |
| **7** | **a)** Define the principles of Network Applications. | **[L1] [CO1]** | **[5M]** |
| | **b)** Explain how packets are routed through a LAN and WAN. | **[L2] [CO3]** | **[5M]** |
| **8** | **a)** Describe the segments/header format of the UDP protocol. | **[L2] [CO2]** | **[5M]** |
| | **b)** Explain the "Three-way Handshake" in TCP connection establishment. | **[L2] [CO2]** | **[5M]** |
| **9** | Evaluate the impact of network delay on transport layer reliability. | **[L5] [CO4]** | **[10M]** |
| **10** | Design a transport protocol strategy for a high-latency satellite link. | **[L6] [CO6]** | **[10M]** |

## UNIT – III

### Internet Services and Network Simulation

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|---|---|---|---|
| **1** | Explain the working of the Web and the HTTP protocol. | **[L2] [CO1]** | **[10M]** |
| **2** | Discuss the Domain Name System (DNS) hierarchy and resolution process. | **[L2] [CO2]** | **[10M]** |

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|---|---|---|---|
| **3** | Describe the File Transfer Protocol (FTP) and its dual-connection approach. | **[L2] [CO2]** | **[10M]** |
| **4** | Illustrate the architecture of Electronic Mail in the Internet (SMTP, POP3, IMAP). | **[L3] [CO2]** | **[10M]** |
| **5** | Analyze the implementation of P2P File Sharing networks. | **[L4] [CO2]** | **[10M]** |
| **6** | Compare Socket Programming using TCP versus UDP. | **[L4] [CO6]** | **[10M]** |
| **7** | **a)** Define the role of network monitoring tools. | **[L1] [CO4]** | **[5M]** |
| | **b)** Explain the process of creating simulated networks for packet passing. | **[L2] [CO3]** | **[5M]** |
| **8** | **a)** Describe the steps to build a simple Web Server. | **[L2] [CO6]** | **[5M]** |
| | **b)** Explain how different routing techniques are tested in simulation. | **[L2] [CO3]** | **[5M]** |
| **9** | Evaluate the efficiency of iterative vs recursive DNS queries. | **[L5] [CO4]** | **[10M]** |
| **10** | Design a simulation model to analyze packet loss in a simulated WAN. | **[L6] [CO3]** | **[10M]** |

## UNIT – IV

## Wireless and Mobile Network Characteristics

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|---|---|---|---|
| **1** | Define Wireless links and explain their unique network characteristics. | **[L1] [CO1]** | **[10M]** |
| **2** | Discuss the principles of Code Division Multiple Access (CDMA). | **[L2] [CO2]** | **[10M]** |
| **3** | Explain the management of mobility in wireless networks. | **[L2] [CO2]** | **[10M]** |
| **4** | Illustrate the architecture of Cellular Internet Access. | **[L3] [CO5]** | **[10M]** |
| **5** | Analyze the handoff process in cellular and mobile networks. | **[L4] [CO2]** | **[10M]** |
| **6** | Compare the performance of 802.11 LANs under different traffic loads. | **[L4] [CO4]** | **[10M]** |
| **7** | **a)** Define "Hidden Terminal Problem" in wireless networks. | **[L1] [CO1]** | **[5M]** |
| | **b)** Explain the function of a Base Station in cellular architecture. | **[L2] [CO5]** | **[5M]** |
| **8** | **a)** Describe the frame structure of 802.11. | **[L2] [CO2]** | **[5M]** |
| | **b)** Explain indirect vs direct routing in mobility management. | **[L2] [CO2]** | **[5M]** |

| | | | |
|---|---|---|---|
| **9** | Evaluate the security challenges in wireless and mobile network environments. | **[L5] [CO6]** | **[10M]** |
| **10** | Design a mobility management scheme for a fast-moving vehicle network. | **[L6] [CO6]** | **[10M]** |

## UNIT – V

## Multimedia Networking

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|---|---|---|---|
| **1** | Define Multimedia networking and list its major applications. | **[L1] [CO1]** | **[10M]** |
| **2** | Discuss the mechanisms for streaming stored video over the internet. | **[L2] [CO2]** | **[10M]** |
| **3** | Explain the protocols used for Voice-over-IP (VoIP) communication. | **[L2] [CO2]** | **[10M]** |
| **4** | Illustrate the functioning of real-time conversational protocols like RTP/RTCP. | **[L3] [CO2]** | **[10M]** |
| **5** | Analyze the Quality of Service (QoS) requirements for multimedia traffic. | **[L4] [CO4]** | **[10M]** |
| **6** | Compare DASH (Dynamic Adaptive Streaming over HTTP) with traditional streaming. | **[L4] [CO2]** | **[10M]** |
| **7** | **a)** Define jitter and latency in the context of multimedia. | **[L1] [CO4]** | **[5M]** |
| | **b)** Explain the concept of "buffering" in streaming stored video. | **[L2] [CO2]** | **[5M]** |
| **8** | **a)** Describe the SIP (Session Initiation Protocol) for VoIP. | **[L2] [CO2]** | **[5M]** |
| | **b)** Explain content distribution networks (CDNs) for multimedia delivery. | **[L2] [CO2]** | **[5M]** |
| **9** | Evaluate the impact of packet loss on voice and video quality. | **[L5] [CO4]** | **[10M]** |
| **10** | Design a network configuration optimized for low-latency video conferencing. | **[L6] [CO6]** | **[10M]** |

**Prepared By:**

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