

**NIRMA UNIVERSITY**  
**SCHOOL OF TECHNOLOGY, INSTITUTE OF TECHNOLOGY**  
**M. Tech. in Electronics and Communication Engineering (Embedded System)**  
**M.Tech. Semester - II**  
**Department Elective I**

L	T	Practical component				C
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<b>Course Code</b>	<b>6EC264ME22</b>
<b>Course Title</b>	<b>Advanced Computer Networks</b>

**Course Learning Outcomes (CLOs):**

At the end of the course, students will be able to -

1. Evaluate the performance of ATM, TCP/IP protocol suite, IEEE 802.11, Bluetooth, ZigBee, WiMAX for a given computer network for reliability and delay.
2. Evaluate the performance of Internet Protocol Version 6 (IPv6), Integrated Services Architecture (ISA), Weighted Fair Queuing (WFQ), Random Early detection (RED), Differentiated Services for a given network for congestion control and reliability.
3. Analyze the performance of Dynamic Destination-Sequenced Distance-Vector Routing Protocol, Ad hoc On-demand Distance Vector Routing, Dynamic Source Routing Protocol for a given network for power consumption, scalability and latency parameters.
4. Evaluate the performance of Multicast Routing, Resource Reservation Protocol, and Traffic Rate control for a given network for power consumption, scalability and latency parameters.

**Syllabus:**

**Teaching Hours:45**

**UNIT I: Networking Concepts and Standards**

**06**

Layered operation, Protocol Suites and Standards, OSI Model and TCP/IP Protocol Suite, Cell Relay and Asynchronous Transfer Mode (ATM) : ATM features, Protocol Architecture, Introduction to Adhoc Networks - issues and applications, Mobile Adhoc Networks.

**UNIT II: Internet Protocol (IP) Networks**

**06**

Limitations of current IP Networks, Internet Protocol Version 6 (IPv6) features, IPv6 Extension Header, Quality of Service in IP, Integrated Services Architecture (ISA), Weighted Fair Queuing (WFQ), Random Early detection (RED), and Differentiated Services.

**UNIT III: Ad Hoc Routing Protocols**

**07**

Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Table-Driven Routing Protocols, Source-Initiated On-Demand Approaches for routing, Dynamic Destination-Sequenced Distance-Vector Routing Protocol, Ad hoc On-demand Distance Vector Routing, Dynamic Source Routing Protocol.

**UNIT IV: Multicast and Internetworking**

**06**

The Multicast Backbone (MBONE), Multicast Protocols - Link State, Distance Vector, Multiprotocol Label switching (MPLS), Virtual Private Networks (VPNs) and Tunnels.

**UNIT V: Multimedia Networking**

**06**

Requirements of Multimedia Networks, Real Time Streaming Protocol (RTSP), Voice over IP (VoIP), Real-Time Transport Protocol (RTP), Session Initiation Protocol (SIP).

**UNIT VI: End-to-End Protocols**

**04**

Transmission Control Protocol (TCP) and User Datagram Protocol (UDP), Issues and design goals of a Transport Layer Protocols for Wireless Networks.

**UNIT VII: Wired and Wireless Network Standards**

**07**

IEEE 802.11, Bluetooth, ZigBee, WiMAX, Mobile IP, Wireless Application Protocol.

**UNIT VIII: Real Time Communication**

**03**

Basic concepts, applications, Real Time communication in LANs, Bounded access protocols for LAN, QoS Models, Multicast Routing, Resource Reservation Protocol, Traffic Rate control

**Self-Study:**

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

**Suggested Readings:**

1. Stallings, High-Speed Networks and Internet, Pearson Education.
2. Peterson and Davie, Computer Networks-A Systems Approach, Elsevier.
3. Kurose and Ross, Computer Networking, Pearson Education.
4. C Sivaram Murthy, B. S. Manoj, Adhoc Wireless Networks, PHI.
5. Anurag Kumar, D. Manjunath, Joy Kuri, Wireless Networking, Elsevier.