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

L	T	P	C
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Course Code	3EC32D104
Course Title	**Advanced Computer Networks**

Course Outcomes (COs):
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:**

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.

L = Lecture, T = Tutorial, P = Practical, C = Credit