



MARRI LAXMAN REDDY

INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

AD-HOC AND SENSOR NETWORKS								
II Semester: CSE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
2525817	Foundation	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisites: Computer Networks								

Course Overview:

This course introduces the fundamentals of Mobile Ad Hoc Networks (MANETs) and Wireless Sensor Networks (WSNs), focusing on architecture, protocols, and communication models. It covers routing algorithms, MAC protocols, energy-efficient design, security issues, and quality of service in infrastructure-less networks.

Course Objectives:

1. To understand the architecture, characteristics, and applications of MANETs and Wireless Sensor Networks.
2. To study routing protocols and communication techniques used in mobile ad hoc networks.
3. To analyze broadcasting, multicasting, and geocasting protocols for efficient wireless communication.
4. To understand lower-layer and upper-layer issues in wireless sensor networks, including MAC, routing, and transport protocols.
5. To develop energy-efficient, reliable, and adaptive communication solutions for real-time wireless network applications.

Course Outcomes: After Completion of the Course, Students should be able to

1. Design efficient data communication systems in mobile ad hoc networks with routing algorithms.
2. Analyze rebroadcasting and multicasting schemes to minimize broadcast storms and improve transmission efficiency in dynamic MANET environments.
3. Evaluate geocasting protocols and TCP enhancements to ensure reliable end-to-end communication in mobile and location-aware ad hoc networks.
4. Distinguish wireless sensor network architectures and lower-layer protocols to optimize communication in environmental monitoring and smart cities.
5. Create adaptive transport and application layer mechanisms to support real-time data collection and decision.

UNIT - I:

Introduction to Ad Hoc Networks

Characteristics of MANETs, Applications of MANETs and Challenges of MANETs. Routing in MANETs, Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-Proactive: DSDV, WRP; Reactive: DSR, AODV, TORA; Hybrid: ZRP; Position-based routing algorithms-Location Services- DREAM, Quorum-based, GLS; Forwarding Strategies, Greedy Packet, Restricted Directional Flooding-DREAM, LAR; Other routing algorithms-QoS Routing, CEDAR.

UNIT - II:

Data Transmission

Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbour Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT - III:

Geocasting

Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR.
TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT - IV:

Basics of Wireless Sensors and Lower Layer Issues

Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT - V:

Upper Layer Issues of WSN

Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kaufman)
- 3.

REFERENCE BOOKS:

1. C. Siva Ram Murthy, B.S. Manoj Ad Hoc Wireless Networks: Architectures and Protocols
2. Taieb Znati Kazem Sohraby, Daniel Minoli, Wireless Sensor Networks: Technology, Protocols and Applications, Wiley.

ELECTRONIC RESOURCES:

1. <https://www.geeksforgeeks.org/ad-hoc-networks/>
2. https://www.tutorialspoint.com/wireless_sensor_networks/index.htm
3. <https://nptel.ac.in/courses/106/105/106105160/>
4. <https://ieeexplore.ieee.org/browse/conferences/title/ad-hoc-sensor-wireless-networks>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)

