

MC5005 AD-HOC AND SENSOR NETWORKS

DETAILED SYLLABUS

UNIT I ADHOC NETWORKS FUNDAMENTALS & COMMUNICATION PROTOCOLS

Fundamentals Of WLANs – IEEE 802.11 Architecture - Self Configuration and Auto Configuration-issues in Ad-Hoc Wireless Networks – MAC Protocols for Ad-Hoc Wireless Networks – Contention Based Protocols - TCP Over Ad-Hoc Networks-TCP Protocol Overview - TCP and MANETs – Solutions for TCP Over Ad-Hoc Networks

UNIT II ADHOC NETWORK ROUTING AND MANAGEMENT

Routing in Ad-Hoc Networks- Introduction -Topology based versus Position based Approaches – Proactive Routing - DSDV, WRP, TBRPF Reactive Routing – DSR,AODV, Hybrid Routing Approach ZRP, CBRP- Location services - DREAM – Quorums based Location Service – Forwarding Strategies – Greedy Packet Forwarding, LAR.

UNIT III SENSOR NETWORK COMMUNICATION PROTOCOLS

Introduction – Architecture - Single Node Architecture – Sensor Network Design Considerations – Energy Efficient Design Principles for WSN"s – Protocols for WSN – Physical Layer - Transceiver Design Considerations – MAC Protocols for wireless sensor network – IEEE 802.15.4 Zigbee – Link Layer and Error Control Issues - Routing Protocols – Gossiping and agent based unicast forwarding, Energy efficient unicast –Transport Protocols & QoS – Congestion Control Issues – Application specific Support – Target detection and tracking.

UNIT IV SENSOR NETWORK MANAGEMENT AND PROGRAMMING

Sensor Management - Topology Control Protocols and Sensing Mode Selection Protocols - Time Synchronization - Localization and Positioning – Operating Systems and Sensor Network Programming – Sensor Network Simulators- Case study: Industrial automation and tsunami early warning system with wireless sensor networks.

UNIT V ADHOC AND SENSOR NETWORK SECURITY

Security in Ad-Hoc and Sensor Networks – Key Distribution and Management – Software based Anti-tamper Techniques – Water Marking techniques – Defense against Routing Attacks - Secure Adhoc Routing Protocols – Broadcast Authentication WSN Protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS.

REFERENCES

1. Adrian Perrig, J. D. Tygar, "Secure Broadcast Communication: In Wired and Wireless Networks", Springer, 2006.
2. Amiya Nayak, Ivan Stojmenovic, : Wireless Sensor and Actuator Networks : Algorithm and Protocols for Scalable Coordination and Data communication John Wiley & Sons 2010
3. Carlos De Morais Cordeiro, Dharma Prakash Agrawal, "Ad Hoc and Sensor Networks: Theory and Applications", Second Edition, World Scientific Publishing, 2011.
4. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2011.
5. C.K.Toth, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2007
6. Erdal Çayırıcı , Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009
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OBJECTIVES

- To understand the basics of Ad-hoc & Sensor Networks
- To learn various fundamental and emerging protocols of all layers in ad-hoc network
- To study about the issues pertaining to major obstacles in establishment and efficient management of ad-hoc and sensor networks
- To understand the nature and applications of ad-hoc and sensor networks
- To understand various security practices and protocols of Ad-hoc and Sensor Networks