

PhD Course

Instructor: Dr. Gokuldev S, Chairperson – Dept. of CS, ASAS, Mysuru

Course Objective: The objective of the course is to provide a foundation for research in wireless networks and communication practices by giving an insight on design and implementation issues considering energy efficiency, reliability, Security and optimization technique.

Unit 1: Wireless Framework Basic: Introduction to wireless network, sensor network, Topology, Node Architecture, types of node, node properties, Network Architecture, Radio propagation, Antenna, communication between Antennas, Types of communication signal, Sensor network Architecture-CSMA/CD, CSMA/CA, ALOHA and comparison of models.

Unit 2: Introduction Cellular and Ad Hoc Wireless Networks: Application of Ad Hoc Wireless Networks, Issues in Ad Hoc Wireless Networks: Medium Access Scheme-Routing-Multicasting-Transport Layer Protocols-Pricing Scheme-Quality of Service Provisioning-Self Organization-Security-Addressing and Service Discovery Energy management-Scalability-Deployment Considerations, Ad Hoc Wireless Internet.

Unit 3: Sensor Networks Comparison with Adhoc Wireless Networks: Challenges for WSNs - Difference between sensor networks and Traditional sensor networks –Types of Applications – Enabling Technologies for Wireless Sensor Networks –Single Node Architectures –Hardware Components – Energy Consumption of Sensor Nodes, Issues in Designing a Multicast Routing Protocol.

Unit 4: Wireless Network Applications and Design Issues: Sensor Network Architecture Data Dissemination - Flooding and Gossiping-Data gathering Sensor Network Scenarios – Optimization Goals and Figures of Merit – Design Principles for WSNs, deployment, operation, indoor/outdoor signal propagation characteristics, lifetime, energy efficiency, reliability, security, self-stabilization with the system models.

Unit 5: Gateway Concepts: Need for gateway – WSN to Internet Communication – Internet to WSN Communication –WSN Tunneling. **Security:** Application Specific Support - Target detection and tracking - Contour/ edge detection - Field Sampling.

Case Study: Network design and optimization.

Text Books:

1. Holger Karl and Andreas Wiilig, “Protocols and Architectures for Wireless Sensor Networks” John Wiley & Sons Limited 2008.
2. I.F .Akyildiz and Weillian, “A Survey on Sensor Networks”, IEEE Communication Magazine, August 2007.

Reference Books:

1. Wilson , "Sensor Technology hand book," Elsevier publications 2005.
2. Anna Hac "Wireless Sensor Networks Design," John Wiley& Sons Limited Publications 2003.
3. C.Siva Ram Murthy and B.S.Manoj "Ad Hoc Wireless Networks," Pearson Edition 2005.