

Objectives:

Obtain a broad understanding of the technologies and applications for the emerging and exciting domain of wireless sensor networks. Get in-depth hands-on experience in designing and developing a real operational embedded network system, and design and develop foundational systems software, sensor-actuator-controller algorithms and network protocols.

Theory:**UNIT I Introduction to Wireless Ad Hoc Networks**

Background of Ad hoc wireless networks, Architecture of Ad Hoc Networks, Application of Ad Hoc sensor networks, Protocols of Ad Hoc Networks, Issues in Ad Hoc wireless networks
Comparison between Wireless Ad Hoc and Sensor Networks

UNIT II Basics of Wireless Sensor Network

Technology, MANETs, Sensor Network Architectural Elements, Applications of Wireless Sensor Network , Technologies for Wireless Sensor Network

UNIT III Wireless Sensors Networks Protocols

Medium Access Control Protocols, Routing Protocols, Transport Control Protocols
Dissemination protocol for Large sensor Networks, Reliable Transport for Sensor networks

UNIT IV Localization and Management of Sensor Networks

Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V Control Aspect in Sensor Networks

Congestion control, Distributed Power Control, Admission Controller Design for High Speed, Networks, Performance evaluation of the Architecture.

UNIT VI Security in WSN

Security Issues in WSN, Key Distribution Techniques in WSN, Watermarking techniques in Wireless Sensor Networks

Practical:

1. Getting in Touch : Basics of WSN programming using TinyOS.
2. Introduction to Simulator :
 1. Omnet++
 2. NS2
 3. Other Available Simulator
3. Gathering Data : Sensing data using WSN
4. Simulation : Simulating WSNs on simulation framework.
5. Encrypted Communication : Introduction to the use of cryptographically secured (private key) communication in WSNs.
6. Encrypted Communication : Using public key cryptography for communication in WSNs.
7. Dissemination and Collection : Collecting, disseminating and processing data in WSNs.
8. Sound detection : Sensing audio data and interpreting results.
9. Mini Project : Mini Project on selected application using wireless sensor networks.

Text Books:

1. Wireless Sensor Networks: Technology, Protocols, and Applications
Author(s): Kazem Sohraby, Daniel Minoli, Taieb Znati
Publisher: Wiley Student Edition
2. Sensor Network Operations
Author(s): Shashi Phoha, Thomas LaPorta, Christopher Griffin
Publisher: Wiley-Interscience, A John Wiley & Sons, Inc Publication

Reference Books:

1. Wireless Sensor Networks
Author(s): C.S. Raghavendra, Krishna M. Sivalingam and Taieb Znati
Publisher: Springer International Edition
2. Adhoc Wireless Sensor Networks: Architecture and Protocols
Author(s): C.Sivaramamurthy and B.S.Manoj
Publishers: Pearson Education
3. Title: Wireless Ad Hoc and Sensor Networks Protocols, Performances and Control
Author(s): Jagannathan Sarangapani, “
Publisher: CRC Press