

WIRELESS SENSOR NETWORKS

22ECMC2T5D

Credits: 4

Lecture: 4 periods/week

Internal assessment: 40 marks
Semester end examination: 60 marks

Course Outcomes

Upon successful completion of the course, the student will be able to

- Describe the overview of wireless sensor networks and enabling technologies for wireless sensor networks (L2)
- Apply the design parameters for the execution environments, with the help of working architectures and operating systems (L3)
- Explore the MAC Protocols for Wireless Sensor networks using various concepts for assignment of MAC addresses (L3)
- Select the appropriate infrastructure, topology, joint routing and information aggregation for wireless sensor networks (L3)
- Analyse the sensor network platform and tools state-centric programming (L4)

UNIT-I

Overview of wireless sensor networks: Challenges for wireless sensor networks, characteristic requirements of wireless sensor networks, enabling technologies for wireless sensor networks, advantages of sensor networks, sensor network applications

Architectures

Single-node architecture, hardware components, energy consumption of sensor nodes, operating systems and execution environments, network architecture, sensor network scenarios, optimization goals and figures of merit, gateway concepts

UNIT-II

Networking sensors: Physical layer and transceiver design considerations, MAC protocols for wireless sensor networks, low duty cycle protocols and wakeup concepts-S-MAC, the mediation device protocol, wakeup radio concepts, address and name management

Assignment of MAC addresses, naming and addressing, routing protocols, energy-efficient routing, geographic routing

UNIT-III

Infrastructure establishment: Topology control, clustering, hierarchical networks by clustering time synchronization, localization and positioning, sensor tasking and control, joint routing and information aggregation

UNIT-IV

Sensor network platform and tools: Sensor node hardware, Berkeley notes, programming challenges, node-level software platforms, node-level simulators, state-centric programming.

Learning Resources

Text Books

3. Holger Karl & Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley, 2005
4. Sudhakar, Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 1st Edition 2007
5. Jun Zheng, Abbas Jamalipour, "Wireless Sensor Networks- A Networking Perspective", John Wiley & Sons, 1st Edition, 2009

Reference Books

1. KazemSohraby, Daniel Minoli, & TaiebZnati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007
2. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003
3. Waltenequs Dargie , Christian Poellabauer, —Fundamentals of Wireless Sensor Networks, John Wiley & Sons, 1st Edition, 2010

e- Resources & other digital material

1. <http://pages.di.unipi.it/bonuccelli/sensori.pdf>
