

### EC414 WIRELESS SENSOR NETWORKS (Dept. Elective - V)

**Course Description & objectives:**

*This course will provide all students with the fundamental concepts associated with Sensor networks, Architectures and tools. The course will allow students to become expert in new and evolving areas of Wireless sensor networks engineering including Network platform Tools.*

**Course Outcomes:**

*Upon successful completion of this course, students should be able to:*

- a. Architect sensor networks for various application setups.*
- b. Devise appropriate data dissemination protocols and model links cost.*
- c. Determine suitable medium access protocols and radio hardware.*
- d. Prototype sensor networks using commercial components.*
- e. Provision quality of service, fault-tolerance, security and other dependability requirements while coping with resource constraints.*
- f. Evaluate the performance of sensor networks and identify bottlenecks.*

**UNIT I - Overview of Wireless Sensor Networks :**

Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks.

**UNIT II - 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 III - 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, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

**UNIT IV- Infrastructure Establishment :**

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

**UNIT V - Sensor Network Platforms and Tools :**

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

**TEXT BOOKS :**

1. Holger Karl & Andreas Willig, “ Protocols And Architectures for Wireless Sensor Networks” , John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach”, Elsevier, 2007.

**REFERENCES :**

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, And Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.