

Wireless Sensor Networks

- 1.1 Course Number: CS372
- 1.2 Contact Hours: 3-0-0 Credits: 09
- 1.3 Semester-offered: 3rd Year-Even
- 1.4 Prerequisite: NA
- 1.5 Syllabus Committee Member: Dr. Sushum Biswas, Dr. Daya Sagar Gupta & Dr. Gargi Srivastava

2. **Objective:** - Recent advances in electronics and wireless communications have enabled the development of low cost, low power, small scale, and multi-functional sensor nodes (called motes) that can communicate unmetered in short distances. These motes can be connected together to form wireless sensor networks (WSNs). The constraints of motes make the design and operation of WSNs different than traditional wireless networks and require the development of resource-conscious protocols and management. This course aims at discussing the state-of-the-art in WSNs, including the architecture and protocols involving them and their (potential) application scenarios.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction	Overview of the course; overview of sensor network protocols, architecture, and applications; simulation and experimental platforms; main features of WSNs; research issues and trends.	8
2	Enabling technologies	Fundamentals of 802.15.4, Bluetooth, and UWB; Physical and MAC layers. Sensor node hardware and software-	7
3	Localization, connectivity, and topology	Sensor deployment mechanisms; coverage issues; node discovery protocols.	8
4	Network layer protocols	Data dissemination and processing; multi-hop and cluster based protocols; routing.	8
5	Middleware and application layers	Data dissemination; data storage; query processing; sensor Web; sensorGrid, Open issues for future research	9
		Total	40

4. **Readings**

4.1 Textbook:

1. *Sensor Networks and Configuration*; Nitaigour P. Mahalik (Ed.) Springer -2007

4.2 Reference books:

1. *Protocols and Architectures for Wireless Sensor Networks*. H. Karl and A. Willig. John Wiley & Sons, June 2005.

2. *Wireless Sensor Networks: Technology, Protocols, and Applications*. K. Sohraby, D. Minoli, and T. Znati. John Wiley & Sons, March 2007

- 5 **Outcome of the Course:** This course considers the challenges of developing operating systems, wireless networking protocols, power-management, and middle-ware to support this new type of systems. As part of this course, students will design and implement a wireless sensor network system using motes (small devices that integrate a microcontroller and an 802.15.4 radio) or mobile phones.