

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MASTER OF COMPUTER APPLICATIONS (MCA)**  
**SEMESTER: V**

Subject Name: **Wireless Sensor Network (WSN) (Elective-II)**  
Subject Code: **650007**

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**Learning Objectives:**

- Learn the basics of Wireless Sensor Network
- Understand the applications of WSN
- Understand the enabling technology of WSN
- Get overview of various WSN protocol
- Look at performance issues of WSN

**Prerequisites:** Basic fundamentals of networking

**Contents:**

- 1. Overview of Wireless Sensor Network** [5%]  
Background of Sensor Network Technology, Sensor Network Architectural Elements, Historical Survey of Sensor Networks
- 2. Applications of Wireless Sensor Network** [5%]  
Range of Applications, Examples of Category 1 and 2 WSN Applications
- 3. Technologies for Wireless Sensor Network** [10%]  
Sensor Node Technology, Hardware and Software, Sensor Taxonomy, Wireless Network Operating Environment, Wireless Network Trends, Transmission Technology
- 4. Wireless Sensors Networks Protocols** [40%]  
Medium Access Control Protocols, Routing Protocols, Transport Control Protocols
- 5. Middleware for Sensor Networks & Network Management** [20%]  
Middleware Principles, Middleware Architecture, Existing Middleware, Network Management Requirements, Network Management Models, Design Issues
- 6. Operating Systems & Performance and Traffic Management Issues** [20%]  
Operating System Design Issues, Examples of Operating Systems, WSN Design Issues, Performance Modeling

**Text Book:**

1. Kazem Sohraby, Daniel Minoli, Taieb Znati., “Wireless Sensor Networks: Technology, Protocols, and Applications”, Wiley Student Edition

## Reference Books:

1. Feng Zhao & Leonidas Guibas, “Wireless Sensor Networks, An Information Processing Approach”, Morgan Kaufmann
2. Jun Zheng, Abbas Jamalipour, “Wireless Sensor Networks: A Networking Perspective”, Wiley
3. Ian F. Akyildiz, Mehmet Can Vuran, “Wireless Sensor Networks”, Wiley
4. Waltenequs Dargie, Christian Poellabauer, “Fundamentals of Wireless Sensor Networks: Theory and Practice”, Wiley

## Chapter wise Coverage from the Text Book:

Unit-1 (Chapter-1 – Topics 1.1 except (1.1.3), 1.2)

Unit-2 (Chapter-2 – Topics 2.1 to 2.5)

Unit-3 (Chapter-3 – Topics 3.1 to 3.5), (Chapter-4 – Topics 4.1 to 4.3)

Unit-4 (Chapter-5 - Topics 5.1 to 5.6), (Chapter-6 - Topics 6.1 to 6.5),  
(Chapter-7 - Topics 7.1 to 7.4)

Unit-5 (Chapter-8 - Topics 8.1 to 8.4), (Chapter-9 - Topics 9.1 to 9.6)

Unit-6 (Chapter-10 - Topics 10.1 to 10.3), (Chapter-11 - Topics 11.1 to 11.5)

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The CEC for this subject will include downloading of different open source simulators like:

1. Omnet++
2. NS2

The goal is to familiarize yourself with the OMNET++/NS2 network simulation environment, especially when it is used to simulate wireless sensor network.

1. Developing a simple Tic-Toc application using OMNET++/NS2
  2. Compare the features of NS2 & Omnet++
  3. Try to develop a small project that gives idea about a WSN node properties such as CPU usage, battery life, sleep time, power consumption.
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