University of Technology

Computer Engineering Department

Academic Year 2023 - 2024

Fourth Year – First Semester – (IE/NE) Branch

Code	Wireless Sensor Networks	2 Hours/Week	2 Units

Contents of Syllabus	Hours
Introduction to sensor networks: WSN Nodes and Their Characteristics, Characteristics of WSNs,	**2**
WSN Applications: Military Applications, Environmental Applications, Health Applications, Home Applications, Industrial Applications	**2**
Factors Influencing WSN Design: Hardware Constraints, Fault Tolerance, Scalability Production Costs, WSN Topology, Transmission Media, Power Consumption	**2**
WSN Architecture and Protocol Stack: Physical Layer, Data Link Layer, Network Layer, Transport Layer, Application Layer	**4**
Physical Layer: Physical Layer Technologies, Overview of RF Wireless Communication, Channel Coding (Error Control Coding), Modulation, Wireless Channel Effects, PHY Layer Standards	**4**
Medium Access Control: Challenges for MAC, CSMA Mechanism, Contention-Based Medium Access, Reservation-Based Medium Access, Hybrid Medium Access	**4**
Network Layer: Data-centric and Flat-Architecture Protocols, Hierarchical Protocols, Geographical Routing Protocols	**4**
Time Synchronization: Challenges for Time Synchronization, Network Time Protocol, Timing-Sync Protocol for Sensor Networks (TPSN)	**4**
Wireless Multimedia Sensor Networks	**2**
Wireless Underwater Sensor Networks	**2**

Textbook:

1. **Wireless Sensor Networks Concepts, Applications, Experimentation and Analysis, Hossam Mahmoud Ahmad Fahmy, 2016**
2. **Wireless Sensor Networks A Networking Perspective, Jun Zheng, Abbas Jamalipour 2009**