CSE-xxxx: Wireless Sensor Networks

Programme: B.Tech (CSE, CCE, ECE) Year: 3 Semester: 6
Course: Program Elective Credits: 3 Hours: 40

Course Context and Overview (100 words):
This course will introduce to wireless, embedded, internetwork sensor and/or actuator systems. These networks / technologies has lots of applications including detection of enemy intrusion in the battlefield, object tracking, habitat monitoring, patient monitoring, fire detection and so on. However, implementation in these application area raise challenges across all area of system reacharch including sensor & actuator architecure, platform architecture, power system, operating systems, embedded systems, databases, communication & networking, data management, and data analytics..

Prerequisites Courses:
Computer Networks.

Course outcomes (COs):

On completion of this course, the students would be able to:
CO1 Understand common wireless sensor node and Network architectures.
CO2 Understand fundamentals protocols in different layes for WSN.
CO3 Be able to carry out simple analysis and planning of WSNs.

Course Topics:

Contents	Lecture Hours	
UNIT – 1: Introducation		3
1.1 Introduction, Challenges for WSNs, Characteristic requirements, Application areas	3	
UNIT-2: Single Node Architecture		5
2.1 Hardware components and Energy consumption of sensor nodes	2	
2.2 Operating system and Execution Environment	2	
2.3 Example of Sensor Nodes	1	
UNIT-3: Network Architecture		5
3.1 Sensor network scenarios	1	
3.2 Optimization goals	1	
3.3 Design principles and Service interfaces of WSN	2	
3.4 Gateway Concepts	1	
UNIT-4: Communication Protocols		16
4.1 Physical Layes	3	
4.2 MAC Layer Protocols	4	
4.3 Link Layer Protocols	3	
4.4 Routing Protocols	4	

4.5 Transport Layer Protocols and QoS	2	
UNIT-5: Advance Protocols		9
5.1 Naming and addressing	1	
5.2 Time synchronization	1	
5.3 Localization and positioning	2	
5.4 Topology control	2	
5.5 Data-centric and content-based networking	2	
5.6 Security	1	
UNIT-6: Application Senerios		2

Textbook references:

Reference books:

1. Holger Karl, Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks," Wiley, May 2005.
2. Jun Zheng and Abbas Jamalipour (Eds.),"Wireless Sensor Networks: A Networking Perspective," Institute of Electrical and Electronics Engineers 2009.

Additional Resources (Video Le1ctures, Web resources etc.): MOOC Video Lectures

1. Lecture Notes, White Papers and online tutorials.

Evaluation Methods:

Component	Weightage (%)
Quiz/Assignment	25%
Midterm	30%
Endterm	45%

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