Course Title : Wireless Sensor Networks			
Course Code : P18CS644	Semester : 6	L :T:P : 2:2:0	Credits: 3
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		Weightage: CIE:50%, SEE:50%	

Course Content

Unit–1

Introduction: The vision of Ambient Intelligence, Application Examples, Types of applications, Challenges for WSNs, Enabling Technologies for wireless sensor networks. **Single-node architecture:** Hardware components, Operating systems: and execution environments: Embedded OS, Programming paradigms and application programming interfaces. **Network Architecture:** Sensor network scenarios, Optimization goals and figures of merit, Design principles for WSNs: Distributed organization, data centricity Gateway concepts.

Self Study Component**:** In-network processing

11 Hours

Unit-2

Physical Layer: Introduction, Spread spectrum communications:, Packet transmissions and synchronization, quality of wireless channels and measures for improvement. **MAC protocols:** Fundamentals of MAC protocols: Requirements and design constraints for wireless MAC protocols, important classes of MAC protocols. MAC Protocols for WSNs: LEACH. IEEE802.15.4 MAC protocol

Self Study Component**:** SMAC protocol

10 Hours

Unit-3

Routing protocols: The many faces of forwarding and routing, Gossiping and agent based unicast forwarding – Basic idea, Randomized forwarding, Random walks, Energy efficient Unicast : Multipath Unicast routing, Broadcast and Multicast : Overview, Mesh-based Protocols, Mobile nodes.

Self Study Component**:** Geographic routing

11 Hours

Unit-4

Data Aggregation in WSN: Challenges in data aggregation, data aggregation techniques, **Localization and Positioning:** Properties of localization and positioning procedures, Possible approaches, Mathematical basics for the lateration problem, Single hop localization

Self Study Component**:** Positioning in multihop environments

10 Hours

Unit-5

Naming and addressing: Fundamentals, Address and name management in wireless sensor networks, Assignment of MAC addresses, Distributed assignment of locally unique addresses: Address assignment algorithm. **Time Synchronization**: Introduction to time synchronization problem, Protocols based on sender/receiver synchronization: Light weight time synchronization protocol

Self Study Component**:** Timing –Sync protocol

10 Hours

Text Book:
1. Holger Karl, Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", 2013, Wiley Publications

Reference Books:

1. Wireless Sensor Network by KazemSohraby, Daniel Minoli, and TaiebZnati P,Wiley
2. Wireless sensor networks Edited by C. S. Raghavendra Pub: Springer
3. C. Siva Ram Murthy & B. S. Manoj, "Ad hoc Wireless, Networks – Architecture and Protocols", Prentice Hall, 2004, ISBN – 013-147-023x

Course Outcomes:
1. Explain Fundamental Concepts, applications and network architectures of WSN.
2. Describe the physical layer and MAC protocol concepts for communication in WSN
3. Discuss the different routing protocols and issues
4. Discuss the different data aggregation techniques and different positioning and localization algorithms
5. Describe the naming, addressing and time synchronization in WSN

CO-PO Mapping

Semester: 6		Course code : P18CS644				Title : Wireless Sensor Networks								
CO	**Statement**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS 01	PS 02
CO1	Explain Fundamental Concepts, applications& network architectures of WSN.	1											1	1	
CO2	Explain the physical layer and MAC protocol concepts for communication in WSN	1	1										1	1	
CO3	Analyze the different routing protocols and issues	1	1										1	`1	
CO4	Analyze the different data aggregation techniques and different positioning and localization algorithms	1	1	1									1	1	
CO5	Explain the naming, addressing and time synchronization in WSN	1	1										1	1	
		1	0.8	0.2									1	1	