5 years Integrated M.Sc. (IT) – Semester 7th/1st
060010715/040250115: – Wireless Networks

Objectives: To understand fundamental concept of wireless networks and wireless sensor networks, WSN protocols.

Course Outcomes: Upon completion of the course, students shall be able to
CO1: Understand the basic fundamentals of wireless communications.
CO2: Describe the depth technical aspects of WPAN, WLAN and WMAN.
CO3: Understand basic concepts of WSN
CO4: Understand MAC layer strategy for WSN.
CO5: Understand routing strategy, issues of routing in WSN, SPIN, Directed Diffusion, Leach, and Teen Protocols
CO6: Analyze issues of clock synchronization in WSN.

Lesson Plan

Unit	Unit Name	Sub Unit	Topics	No. of Lectures	Reference Chapter/Additional Reading	Teaching Methodology	Evaluation Parameters
1	Introduction, WPAN & WLAN	1.1	Introduction -- Digital Communications, Wireless Communication System, Frequency Spectrum, Types of Wireless Networks Wireless Personal Area Network: Network Architecture, Component	2	**#RF** Chapter 1.1: page no. 2-13	Topic Slides, Discussion	Quiz-1
		1.2	WPAN Applications	1	**#RF** Chapter 4.1,4.2,4.3: page no. 111-128	Chalk and Talk	
		1.3	Wireless Local Area Network: Network architecture, Components	1	**#RF** Chapter 5.1: page no. 137-142	Chalk and Talk	
		1.4	WLAN design requirements, Standards	1	**#RF** Chapter 5.2: page no. 140, 144-147	Chalk and Talk	
		1.5	WLAN Applications	2	**#RF** Chapter 1.1: page no. 2-13	Topic Slides, Discussion	
2	Wireless Metropolitan area Networks	2.1	Wireless Metropolitan Area Networks	2	**#RF** Chapter 6.1: page no. 197-201	Topic Slides, Discussion	Unit Test-1
		2.2	WMAN Network Architecture	2	**#RF** Chapter 6.2: page no. 201-206	Topic Slides, Discussion	

		2.3	Broadband Wireless Networks	1	**#RF** Chapter 6.3: page no. 207-218	
		2.4	WMAN Applications	1	**#RF** Chapter 6.4: page no. 219-227	
3.	Wireless Sensor Networks	3.1	Wireless Sensor Networks	2	**#RF1** chapter 2: 2.1 pages 18-21	Chalk and Talk
		3.2	Wireless Sensor Networks (WSNs) & its Characteristics	2	**#RF2** chapter 1: 1.1 pages 3-9	Chalk and Talk
		3.3	Types of WSN ,WSN Applications	2	**#RF2** chapter 1: 1.8 pages 14-18, **#RF1** chapter 1: 1.2 pages 03-05	Topic Slides, Discussion
		3.4	Hardware Components	2	**#RF1** chapter 2: 2.1 pages 18-24	Topic Slides, Discussion
4.	WSN MAC layer strategies	4.1	Introduction to MAC Layer Protocols	2	**#RF2** chapter 3: 3.1, 3.2 pages 67-76	Chalk and Talk
		4.2	Contention Based Protocols, Scheduled Based Protocols	2	**#RF2** chapter 3: 3.3, pages 77-94	Topic Slides, Discussion
		4.3	802.15.4 Standard	2	**#RF1** chapter 7 7.1 pages 181-183	Chalk and Talk
		4.4	WSN Naming & Addressing: Types of Addresses, Address Management Task	2	**#RF2** chapter 3: 3.1, 3.2 pages 67-76	
5.	WSN Routing Protocols	5.1	Data-Centric Protocols, Hierarchical Protocols, Location Based Protocols	2	**#RF2** chapter 4: 4.1, pages 109-113	Topic Slides, Discussion
		5.2	Proactive Routing & Reactive routing (On Demand), Hybrid Routing, Power Aware Routing	2	**#RF1** chapter 11: 11.2, 11.4 pages 292-294 ,305-306	Topic Slides, Discussion
		5.3	Agent Based Routing, Random Walk, Trace, Routing	1	**#RF2** chapter 4: 4.4, pages 114-144	Chalk and Talk
		5.4	SPIN, Directed diffusion, Leach, Teen Protocols	1	**#RF2** chapter 4: 4.1, pages 109-113	Chalk and Talk
6.	WSN Clock Synchronization	6.1	Clustering for Synchronization	2	**#RF1** chapter 8: 8.1 pages 201-207	Chalk and Talk
		6.2	Sender-Receiver and	2	**#RF1** chapter 8:	Topic Slides,

			Receiver-Receiver Synchronization		8.2.8.3 pages 207-223	Discussion	
		6.3	Error Analysis	3	**#RF1** chapter 9: 9.1,9.2 pages 231-237	Topic Slides, Discussion	
		6.4	WSN Node Localization: Absolute & Relative Localization, Triangulation, Multi-Hop Localization and Error Analysis, Anchoring, Geographic Localization.	2		Topic Slides, Discussion	

Text Book:

1.Dr. Sunil Kumar S. Manvi, M. S. Kakkasageri - Wireless & Mobile Networks - Wiley Publications[SK]
2.Fei Hu & Xiaojun Cao, Wireless Sensor Network, CRC Press[FHX]

Reference Book:

1. Holger Karl and Andreas Willing, Protocols & Architecture for Wireless Sensor Networks.
2. Ivan Stojmenovic - Handbook of Wireless network & Mobile computing - Wiley Publications
3. Adrea Goldsmith – Wireless Communications – Cambridge Press
4. Ivan Stojmenovic, Handbook of Wireless Network & Mobile Computing, Wiley Publications.

Course Objectives and Course Outcomes Mapping:

- Understanding fundamental concept of wireless networks and wireless sensor networks: CO1, CO2, CO3.
- Understanding of wireless sensor networks and routing protocols and MAC layer strategies : CO4, CO5, CO6

Course Units and Course Outcomes Mapping:

Unit No	Unit	Course Outcome					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction, WPAN & WLAN	✓	✓				
2	Wireless Metropolitan area Networks	✓	✓				
3	Wireless Sensor Networks	✓		✓			
4	WSN MAC layer strategies	✓			✓		✓
5	WSN Routing Protocols					✓	
6	WSN Clock Synchronization						✓