GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Integrated MSc, 7th Semester
Branch: Computer Science
Subject Name: Wireless Sensor Network
Subject Code: 1370308

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Content:

Sr. No.	Content	Teaching Hours	Module Weightage
1.	**Overview of Wireless Sensor Network:** Introduction to WSN, Understanding Single Node Architecture, Basics of Hardware Components, Energy consumption of Sensor Nodes, Operating Systems and execution environments, Examples of Sensor Nodes	07	10%
2.	**Network Architecture:** Sensor network scenarios, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts	06	15%
3.	**Communication Protocols:** Communication fundamentals, Transceiver design considerations in WSNs, Basics of Wireless MAC Protocols, Low duty cycle protocols and wakeup concepts, Contention-based protocols: CSMA protocols, Schedule-based protocols: LEACH and SMACS, Causes and characteristics of transmission errors, Mechanisms for Error control: ARQ techniques	11	30%
4.	**Naming, addressing and Time synchronization:** Naming and addressing: Basics of addresses and names in WSN, Assignment of MAC addresses, Distributed assignment of locally unique addresses, Content-based and geographic addressing Time synchronization: Introduction to the time synchronization problem, Protocols based on sender/receiver synchronization, Protocols based on receiver/receiver synchronization	10	25%
5.	**Routing protocols:** Gossiping and agent-based unicast forwarding, Energy-efficient unicast, Broadcast and multicast, Geographic routing, Mobile nodes	08	20%

Reference Books:

1. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005
2. Feng Zhao & Leonidas J.Guibas, “Wireless Sensor Networks¬ An Information Processing Approach", Elsevier, 2007.
3. Waltenegus Dargie , Christian Poellabauer, “Fundamentals of Wireless Sensor Networks ¬ Theory and Practice”, John Wiley & Sons Publications, 2011
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks¬Technology, Protocols, and Applications”, John Wiley, 2007

MOOCs:

1. https://nptel.ac.in/courses/106/105/106105160/
2. https://onlinecourses.swayam2.ac.in/arp19_ap52/preview

Course Outcome:

CO-1	Students will understand challenges and technologies for wireless networks.
CO-2	Students will develop an understanding of various sensor network scenarios and the design principles for creating efficient WSNs.
CO-3	Students will gain expertise in the communication protocols used in WSNs.
CO-4	Students will acquire knowledge of naming, addressing, and Time synchronization mechanisms in WSNs.
CO-5	Students will develop skills in implementing and analyzing various routing protocols for WSNs.