GUJARAT TECHNOLOGICAL UNIVERSITY

SUBJECT: WIRELESS SENSORS NETWORKS FOR ROBOTICS

SUBJECT CODE:2174103

B.E. 7th Semester

Type of course: Professional Core Course

Prerequisite: Manufacturing Processes-I, Production Technology.

Rationale:- Wireless sensors networks for robotics deals with to sensors networks for robotics and wireless sensor networks.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	1	0	4	70	20	10	30	0	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Overview of wireless sensor networks:** Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks	6	15%
2	**Architectures:** Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts	11	25%
3	**Networking sensors:** Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.	11	24%
4	**Infrastructure establishment:** Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control	9	20%
5	**Sensor network platforms and tools:** Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.	7	16%

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
26%	**22%**	**22%**	**20%**	**10%**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

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. KazemSohraby, Daniel Minoli, &TaiebZnati, "Wireless Sensor Networks- Technology, Protocols, And Applications", John Wiley, 2007.
4. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003

Course Outcomes:

1. Ability to know about the different techniques used in networking
2. To expose basic knowledge about wireless sensor networks.
3. Ability to know about the tools in networking.
4. Understand the basic in wireless architecture.
5. Ability to know about the protocols used in networking.

Active Learning Assignments: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.