SARDAR RAJA COLLEGES
SARDAR RAJA COLLEGE OF ENGINEERING
ALANGULAM

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MICRO LESSON PLAN

SUBJECT : WIRELESS SENSOR NETWORK

CODE : EC 805

CLASS : IV Year / VIII SEM

STAFF: Mr. ARUN.V.S.PRADEEP, AP

DEPARTMENT OF ECE.

EC805 WIRELESS SENSOR NETWORKS

L T P C
3 0 0 3

1. OVERVIEW OF WIRELESS SENSOR NETWORKS **8**

Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks.

2. ARCHITECTURES **9**

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.

3. NETWORKING SENSORS **10**

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.

4. INFRASTRUCTURE ESTABLISHMENT **9**

Topology Control , Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

5. SENSOR NETWORK PLATFORMS AND TOOLS **9**

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

TOTAL : 45

TEXT 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.

REFERENCES :

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, And Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

SUBJECT DESCRIPTION AND OBJECTIVES

DESCRIPTION:

This course discusses protocols and architectures for wireless sensor network design. It covers wireless sensor node and network architectures, and communication protocols in data-link, network, and transport layers. The course will discusses focused topics for wireless sensor networks such as time synchronization, localization, and topology management. Wireless sensor network (WSN) consists of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on.

The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from a few to hundreds of dollars, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and communications bandwidth. The topology of the WSNs can vary from a simple star network to an advanced multi-hop wireless mesh network. The propagation technique between the hops of the network can be routing or flooding.

OBJECTIVE:

1. To introduce the basic concepts and applications of wireless sensor networks

2. To provide the students insight of fundamental wireless communication knowledge used in wireless sensing network

3. To study the relevant protocols and design issues of wireless sensor network

MICRO LESSON PLAN

Hours	LECTURE TOPICS	READING
	UNIT I - OVERVIEW OF WIRELESS SENSOR NETWORKS	
1	Challenges for Wireless Sensor Networks	T1
2		T1
3		T1
4		T1
5	Enabling Technologies For Wireless Sensor Networks.	T1
6		T1
7		T1
8		T1
9		T1
	UNIT II - ARCHITECTURES	
10	Single-Node Architecture (AV CLASS)	T1
11	Hardware Components	T1
12	Energy Consumption of Sensor Nodes	T1
13	Operating Systems	T1
14	Execution Environments	T1
15	Network Architecture (AV CLASS)	T1
16	Sensor Network Scenarios	T1
17	Optimization Goals	T1
18	Figures of Merit	T1
19	Gateway Concepts (AV CLASS)	
	UNIT III - NETWORKING SENSORS	
20	Physical Layer and Transceiver Design Considerations	T1
21	MAC Protocols for Wireless Sensor Networks	T1
22	Low Duty Cycle Protocols	T1
23	Wakeup Concepts and S-MAC	T1
24	The Mediation Device Protocol	T1
25	Wakeup Radio Concepts (AV CLASS)	T1
26	Address and Name Management	T1
27	Assignment of MAC Addresses	T1
28	Routing Protocols- Energy-Efficient Routing	T1
29	Geographic Routing (AV CLASS)	
	UNIT IV - INFRASTRUCTURE ESTABLISHMENT	
30	Topology Control	T1
31		T1
32	Clustering, Time Synchronization	T1
33		T1
34	Localization (AV CLASS)	T1
35	Positioning, (AV CLASS)	T1
36		T1
37	Sensor Tasking and Control	T1
38		T1

Hours	LECTURE TOPICS	READING
UNIT V - SENSOR NETWORK PLATFORMS AND TOOLS		
39	Sensor Node Hardware	T2
40		T2
41	Berkeley Motes (AV CLASS)	T2
42		T2
43	Programming Challenges	T2
44	Node-level software platforms	T2
45	Node-level Simulators (AV CLASS)	T2
46	State-centric programming.	T2
47		T2