EMBEDDED WIRELESS SENSOR NETWORKS

II Semester: **ES**

Course code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BESB14	Elective	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

I. COURSE OVERVIEW:

This course introducing basic ideas of wireless, embedded, internetworked sensor/actuator systems, anemerging technology that can provide visibility into and control over complex physical processes. This course covers the overview of WSN, Architecture of wireless networks, sensor programming techniques, programming models and wireless sensor networks for different applications. Wireless sensor networks are a becoming an important application of embedded systems, giving scope for unique designs and applications.

II.COURSE OBJECTIVES:

The students will try to learn:

I. The concepts of sensor networks to use in embedded wireless sensor networks.
II. Use sensor programming in wireless sensor networks
III. The wireless sensor networks for different applications.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Relate** the concept of wireless sensor networks with characteristic requirements involved in demonstrating of sensor nodes.	Understand
CO 2	**Make use of** energy consumption of sensor nodes to improvethe life span of wireless sensor networks.	Apply
CO 3	**Contrast** sensor network scenarios for designing of large scale wireless sensor networks.	Analyze
CO 4	**Identify** the optimisation and figure of merit to measure the performance characteristics of sensor networks.	Apply
CO 5	**Categorize** tiny os programming for providing interfaces among sensor nodes.	Analyze
CO 6	**Utilize** inter vehicle communication networks to enhance the safety of moving vehicles.	Apply

IV. SYLLABUS:

UNIT-I	INTRODUCTION TO WSN	Classes: 09

Introduction to WSN, challenges for WSNs, characteristic requirements, required mechanisms, single node architecture, hardware components, energy consumption of sensor nodes, operating systems and execution environments, some examples of sensor nodes.

UNIT-II	NETWORK ARCHITECTURE	Classes: 09
Sensor network scenarios, optimization goals and figures of merit, design principles for WSNs, service interfaces of WSNs, gateway concepts.		
UNIT-III	**SENSOR NETWORK IMPLEMENTATION**	**Classes: 09**
Sensor programming, introduction to tiny OS programming and fundamentals of programming sensors using nes C. Algorithms for WSN: Techniques for protocol programming.		
UNIT-IV	**PROGRAMMING MODELS**	**Classes: 09**
An introduction to the concept of cooperating objects and sensor networks, system architectures and programming models.		
UNIT-V	**CASE STUDIES**	**Classes: 09**
Wireless sensor networks for environmental monitoring, wireless sensor networks with mobile nodes, autonomous robotic teams for surveillance and monitoring, Inter-vehicle communication networks.		

Text Books:

1. Holger karl, Andreas Willig, "Protocols and architectures for wireless sensor networks", John Wiley, 1st Edition, 2005.
2. Liljana Gavrilovska, Srdjan Krco, Veljko Milutinovic, Ivan Stojmenovic, Roman Trobec, "Application and Multidisciplinary Aspects of Wireless Sensor Networks", Springer, London Limited, 1st Edition, 2011.

Reference Books:

1. Michel Banatre, Pedro Jose Marron, Anibal Ollero, A. Dam Wolisz, "Cooperating Embedded Systems and Wireless Sensor Networks", John Wiley & Sons, 1st Edition, 2008.
2. Seetharaman Iyengar, Nandhan, "Fundamentals of Sensor Network Programming Applications and Technology", John Wiley & Sons, 1st Edition, 2008.

Web References:

1. https://www.youtube.com/watch?v=e_Db58EEeAI
2. https://www.youtube.com/watch?v=LSRMmXCMlbQ

E-Text Books:

1. www.nptel.ac.in/courses/108105057/Pdf/Lesson-27.pdf
2. users.uom.gr/~kpsannis/Book2.pdf