

COURSE	Name	: Wireless Sensor Networks
	Code	: EE185630
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

Since the rapid growth of MEMS, nano technology and wireless communication systems, sensor devices and transceivers are becoming smaller, cheaper and can be deployed in large quantities for a variety of diverse applications: health, agriculture, structural monitoring, smart grids, etc. In this course students will learn the basic principles and related techniques of wireless sensor networks (WSN), namely: node architecture, physical layer, MAC protocol, routing protocols and networks, security, distributed estimation and energy management. In addition, in the lecture the WSN model and application will be implemented with simulation and the real platform.

Learning Outcomes

Knowledge

(P01) Mastering the concepts and principles of science in a comprehensive manner, and to develop procedures and strategies needed for the analysis and design of systems related to the field of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics as a preparation for further education or professional career.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

Course Learning Outcomes

Knowledge

Mastering the concepts and techniques of wireless sensor networks: device architecture, MAC and network protocols, the concept of spatial sensing, aggregation and computation of distributed data, and examples of applications.

Specific Skill

Able to explain the working principle of WSN devices, protocols for ad hoc wireless networks and able to analyze WSN performance in terms of capacity, throughput, energy use, and computing and signal processing in the network.

General Skill

Able to use softwares and tools for WSN simulation and development, for example: Matlab, TinyOS, ns-3.

Attitude

Demonstrating attitude of responsibility for work in his/her area of expertise independently.

Main Subjects

1. Introduction to developments, examples and applications of wireless sensor networks
2. Important factors in WSN design
3. WSN node architecture
4. Physical layer
5. Medium Access Control (MAC) Layer
6. Network layer
7. Energy-saving algorithms
8. Localization techniques
9. Distributed estimate
10. Signal processing in the network
11. Security at WSN

Reference(s)

- [1] Waltenegus Dargie & Christian Poellabuer, "Fundamentals of Wireless Sensor Networks: Theory and Practice," 2nd ed., Wiley, 2010.
- [2] Ian F. Akyildiz & Mehmet Can Vuran, "Wireless Sensor Networks," Wiley, 2010.

Prerequisite(s)

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