Study program: Study program: Multimedia Communication Technologies

Course title: Wireless Sensing Networks

Professor/assistant: Mirko Kosanovic, Ph. D

Type of course: compulsory

ECTS credits: 7

Pre-requisites:

Aims of the course:

The aim of this course is to acquire knowledge about the role and importance of communication and networking in the field of embedded systems, with an emphasis on the study of basic concepts and methods inherent in wireless sensory networks.

Learning outcomes:

Explain the role and importance of the application of security measures in communication links, recognize and explain the various ways of compromising the security of communication networks, applying appropriate protection, and neutralizing possible attacks on the security of the system.

Syllabus

Theoretical part

Introduction to distributed embedded systems: common characteristics, classification, typical fields of application. Wireless sensor networks: application areas and application examples, common features and challenges; sensor node architecture: sensor, processor, communication and power supply subsystem; network architecture: classification, optimization goals and design principles; communication protocols: physical level: characteristics of the wireless communication channel and low-power transmitters; MAS level: bidding based protocols and time-based protocols, multi-channel protocols, 802.15.4 and ZigBee, protocols for routing: floating and gossiping, protocols for proactive, geographic and on-demand routing; time synchronization; localization: techniques for direct and indirect localization; programming of wireless sensor networks: operating systems (TinyOS) and programming languages (nesC).

Practical part

Practical part is organized within several laboratory exercises and mini-projects focused on: programming wireless sensor network, data acquisition, communication and data transfer, user interface and wireless sensor network.

Literature

1. Ian F. Akyildiz, Mehmet Can Vuran, Wireless Sensor Networks, A John Wiley and Sons, Ltd, Publication, 2010.
2. Anna Hać, Wireless Sensor Network Designs, A John Wiley and Sons, Ltd, Publication, 2003.
3. H. Karl and A. Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley, 2007.
4. Mirko Kosanović, Skripta sa predavanja u elektronskom obliku i PowerPoint prezentacije svih predavanja.

Number of active classes 75			Other forms of teaching:
Lectures: 45	Practical classes: 30	Research work:	

Teaching methods

Combined, interactive approach with practical problem solving.

Grading system (maximum 100 points), **grading scale** from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.

Pre-exam obligations	**points**	**Final exam**	**points**
activity during theoretical lectures	**10**	written exam	30
practical training	20	oral exam	
colloquium(s)/seminar papers	**40**		
Sum	**70**	**Sum**	**30**