

Specification for the book of courses

Study program		Electronics and Microsystems		
Module		Electronics and Microsystems		
Type and level of studies		Master studies		
The name of the course		Distributed Embedded Systems		
Lecturer (for lectures)		Đorđević Lj. Goran		
Lecturer/associate (for exercises)		Jovanović D. Milica		
Lecturer/associate (for OFE)		Stojanović Z. Igor		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives				
The goal of the course is for students to acquire knowledge about the role and importance of communications and networking in the field of embedded systems, with an emphasis on the study of basic concepts and methods inherent in wireless sensory networks.				
Course outcomes				
The outcome of this course is the adoption of theoretical knowledge necessary for: a) understanding the principles of design, analysis and realization of distributed embedded systems; b) designing and developing real embedded applications based on wireless sensor networks; c) understanding advantages and disadvantages of different technologies used in the design and realization of wireless sensor networks.				
Course outline				
Theoretical teaching				
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; MAC level: contention based protocols and time-based protocols, multi-channel protocols, 802.15.4 and ZigBee; routing protocols: flooding and gossiping, protocols for proactive, geographic and on-demand routing; time synchronization; localization: techniques for direct and indirect localization; programming wireless sensor networks: operating systems (TinyOS) and programming languages (nesC).				
Practical teaching (exercises, OFE, study and research)				
Several laboratory exercises and mini-projects will be assigned with focus on wireless sensor network programming, sensory data collection, data delivery and communication, and interfacing between the user and the deployed wireless sensor network.				
Textbooks/references				
1	H. Karl and A. Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley, 2007.			
2	Additional course materials, such as lecture notes and tutorial documents, will be available on the faculty website.			
3				
4				
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	1		
Teaching methods				
Lectures, exercises, laboratory exercises, homework, seminar work, consultations				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	35
Exercises		30	Oral exam	35
Colloquia				
Projects				

