

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	RF Systems			
Lecturer (for lectures)	Jovanović S. Goran			
Lecturer/associate (for exercises)	Jovanović S. Goran			
Lecturer/associate (for OFE)	Jovanović S. Goran			
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Analysis of modern radio systems, operating principles and characteristics. Design of radio links. Principle of antenna design. Usage of electromagnetic simulation in a design procedure.			
Course outcomes	Introducing students with the process of planning and designing radio links. Training for practical application of electromagnetic simulation.			
Course outline				
Theoretical teaching	Radio waves propagation. Antennas, properties and basic types. Electromagnetic simulation. Compact planar antennas. Software and cognitive radio. Radio Frequency Identification RFID. Readers and tags. Global positioning systems and systems for ground / sea navigation. Ultra wide band (UWB) radio transmission. Radars. Metal detectors. 4G networks.			
Practical teaching (exercises, OFE, study and research)	Radio links design. The impact of terrain's topology to signal attenuation. □ Tools for electromagnetic simulation. Antenna design. Example of compact planar antenna. Basic building blocks in RFID systems. Implementation of RFID readers for frequency ranges 125 kHz and 13.56 MHz. Metal detectors. Doppler radar.			
Textbooks/references				
1	David Parsons, The Mobile Radio Propagation Channel, Pentech Press, 1992.			
2	Constantine A. Balanis, Antenna Theory Analysis and Design, John Wiley & Sons, 2005.			
3	G. Jovanović, Manuals, textual and video tutorials for laboratory exercises and individual projects (available on the website of the course).			
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, consultations.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	10	Written exam		
Exercises	10	Oral exam	50	
Colloquia				
Projects	30			