

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Electronics - Electronic Circuits and Embedded Systems		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		RF Electronics		
Lecturer (for lectures)		Jovanović S. Goran		
Lecturer/associate (for exercises)		Jovanović S. Goran		
Lecturer/associate (for OFE)		Jovanović S. Goran		
Number of ECTS	6	Course status (obligatory/elective)	Obligatory	
Prerequisites				
Introduce students to the basic principles of wireless communications. Studying the architectures of transmitters and receivers, basic building blocks, and high-frequency circuits as constituent of the radio equipment. Acquiring knowledge about procedure of RF circuits design.				
Course objectives				
Students should gain knowledge about the functioning and characteristics of RF circuits and systems. The students also need to overcome the process of designing RF circuits. During the design process, usage of specialized software tools are planned.				
Course outcomes				
Students should gain knowledge about the functioning and characteristics of RF circuits and systems. The students also need to overcome the process of designing RF circuits. During the design process, usage of specialized software tools are planned.				
Course outline				
Theoretical teaching				
Principles of wireless communication, architectures of radio transmitters and receivers, resonant circuits, passive and active elements in RF circuits, transmission lines, Smith chart, S parameters, design of low-noise amplifiers, matching circuits, design of RF filters, oscillators and PLL, frequency mixers, RF power amplifiers, amplitude modulation, frequency modulation.				
Practical teaching (exercises, OFE, study and research)				
1. Low-noise amplifier. 1.1. Non-linear models of transistors, the choice of optimal DC operating point, bias circuit. 1.2. S-parameters of the active element. Stability testing. Selection and design of circuits for stabilization. Modified S-parameters 1.3. Bilateral amplifier. Matching circuits for input and output stages. Transduced, available, operating, and maximum power gain amplification. 2. Filters with discrete elements and microstrip lines. 3. PLL synthesizer. 4. Circuit for frequency conversion – frequency mixers.				
Textbooks/references				
1	G. Jovanović, "RF electronics", University of Niš, Faculty of Electronics Engineering, 2016 (in Serbian).			
2	G. Jovanović, M. Ilić, "RF electronics – Solution manual", University of Niš, Faculty of Electronics Engineering, 2011 (in Serbian).			
3	R. Ludwig, P. Bretchko, „RF Circuit Design: Theory and Applications“, Prentice Hall, 2000.			
4	G. Jovanović, Manuals, textual and video tutorials for laboratory exercises and individual projects (available on the website of the course).			
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	2	0	0
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	20
Exercises			Oral exam	50
Colloquia				
Projects		20		