

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 Microelectronics			
Lecturer (for lectures)	Prijic D. Zoran, Dankovic M. Danijel			
Lecturer/associate (for exercises)	Dankovic M. Danijel, Prijic D. Zoran			
Lecturer/associate (for OFE)	Dankovic M. Danijel, Prijic D. Zoran			
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Acquiring the knowledge needed for understanding the principles of operations and applications of RF microelectronics circuits			
Course outcomes	Student training for capacity to successfully design the functional blocks of RF microelectronic circuits using the dedicated state-of-art software packages.			
Course outline				
Theoretical teaching	Introduction to RF and wireless technology. Basic concepts of RF design: effects of non-linearity, noise, sensitivity and dynamic range, transformation of passive impedance, scattering parameters. Communication concepts: analog and digital modulations, mobile RF communications, standards of wireless transmission. Architectures of transmitters and receivers, Low-noise amplifiers (LNAs). Frequency mixers. Integrated passive components. Oscillators. Phase detectors. Phase-Lock-Looped oscillators (PLL). Frequency oscillators. RF power amplifiers.			
Practical teaching (exercises, OFE, study and research)	Laboratory exercises include the use of dedicated software package for designing RF integrated circuits. Each student obtains a final project assignment that aims to verify that the student can design and check the functionality of some practical RF circuit block.			
Textbooks/references				
1	Behzad Razavi, "RF Microelectronics", 2nd Edition, Prentice Hall PTR, 2011, ISBN: 978-0-13-713473-1.			
2	Sorin Voinigescu, "High-Frequency Integrated Circuits", Cambridge University Press, 2013, ISBN: 978-0-521-87302-4.			
3	John W. M. Rogers, Calvin Plett, "Radio Frequency Integrated Circuit Design", 2nd Edition, Artech House, 2010, ISBN: 978-1-60783-979-8.			
4	Behzad Razavi, "Fundamentals of Microelectronics", 2nd Edition, Wiley, 2014, ISBN: 978-1118156322.			
5	"RF Basic Technology Guide", Rigol Technologies, 2016.			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	2	1		
Teaching methods	Auditorial teaching. Laboratory exercise. Consultations.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures		Written exam		
Exercises	20	Oral exam	50	
Colloquia				
Projects	30			