

Faculty of Electrical Engineering / ELECTRONICS, TELECOMMUNICATIONS AND COMPUTERS / PROPAGATION IN MOBILE COMMUNICATIONS

Course:	PROPAGATION IN MOBILE COMMUNICATIONS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
8644	Mandatory	2	6	3+0+0
Programs	ELECTRONICS, TELECOMMUNICATIONS AND COMPUTERS			
Prerequisites	No prerequisites required.			
Aims	Students will be introduced with basic elements of mobile communication systems. The features of mobile radio channel, prediction of propagation losses, multi access techniques for mobile radio systems, techniques for quality improvement of implemented mobile communication are studied. Multiple antenna systems as solutions for performance improvement are studied.			
Learning outcomes	After passing the exam student will be able to: 1. Describe the specifics of mobile radio channel. 2. Specify the propagation mechanisms in mobile radio channel. 3. Define the parameters of frequency and time selectivity of the mobile radio channel. 4. Describe combining techniques for reducing the influence of fading on mobile radio connection quality. 5. Understand the OFDM concept.			
Lecturer / Teaching assistant	Prof. dr Zoran Veljović			
Methodology	Lectures, exercises, and consultations.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Developement of mobile radiocommunications. Classification of mobile radio systems.			
I week exercises				
II week lectures	Specific features of mobile radio channel.			
II week exercises				
III week lectures	Mechanism of signal propagation in mobile radio channel.			
III week exercises				
IV week lectures	Prediction of propagation losses.			
IV week exercises				
V week lectures	Statistical aparature for describing the mobile radio channel.			
V week exercises				
VI week lectures	I colloquium.			
VI week exercises				
VII week lectures	Multipath feding. Delay spread.			
VII week exercises				
VIII week lectures	Doppler shift. Frequency and time selective fading.			
VIII week exercises				
IX week lectures	Log-normal fading. Features of satellite mobile radio channel.			
IX week exercises				
X week lectures	Techniques of mobile radio connection quality improvement. Macroscopic diversity.			
X week exercises				
XI week lectures	Features of aeronautic radio link.			
XI week exercises				
XII week lectures	II colloquium.			
XII week exercises				
XIII week lectures	Microscopic diversity. Princples of the combining signals.			
XIII week exercises				

XIV week lectures	OFDM.					
XIV week exercises						
XV week lectures	MIMO systems concept.					
XV week exercises						
Student workload	Per week: Working hours: 5 credits x 40/30 = 6h 40', Working hours: 3 hours for teaching, 3h 40' hours for individual work, including consultations					
Per week			Per semester			
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 0 sat(a) practical classes 0 excercises 5 hour(s) i 0 minuts of independent work, including consultations			Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)			
Student obligations			Lessons attendance is mandatory for students, as well as doing control tests and both colloquiums.			
Consultations						
Literature			[1] M.K. Simon, M.S. Alouni, Digital Communications over Fading Channels,Wiley, 2000. [2] A. Goldsmith, Wireless Communications, Cambridge University Press, 2005. [3] Z. Nikolić, Collection of solved problems in mobile communications, Akademska misao, B			
Examination methods			Activitie during lectures 10 points, Each colloquiums 20 points (40 points in total), Final exam 50 points, Student gets the passing grade by collecting 50 points at least.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points