

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Common		
Type and level of studies		Doctoral studies		
The name of the course		Antennas and Electromagnetic Waves Propagation		
Lecturer (for lectures)		Raičević B. Nebojša, Perić T. Mirjana		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS	10	Course status (obligatory/elective)	Elective	
Prerequisites	None			
Course objectives	The aim of the subject is that the student learns to apply the most commonly used analytical and numerical methods for calculation of the electromagnetic field of different antenna structures.			
Course outcomes	Student is trained to calculate electromagnetic field of radiating structures and measure field in the surroundings of transmitting and receiving antennas. The candidate is capable of improving performances of antenna structures and systems, and possesses knowledge about antenna application in electromagnetic compatibility.			
Course outline				
Theoretical teaching	Electromagnetic properties of media. Spherical, cylindrical and plane electromagnetic waves (in the free space, dielectrics, and stratified media). Wave polarization. Propagation of electromagnetic waves. Fresnel coefficients. TEM, TE and TM guided waves. Electromagnetic radiation and antennas. Current distribution. Hallén's integral equation. Pocklington's integral equation. Radiation pattern. Antenna gain. Radiation resistance. Transmitting and receiving antenna. Antenna arrays.			
Practical teaching (exercises, OFE, study and research)	Electromagnetic properties of media. Spherical, cylindrical and plane electromagnetic waves (in the free space, dielectrics, and stratified media). Wave polarization. Propagation of electromagnetic waves. Fresnel coefficients. TEM, TE and TM guided waves. Electromagnetic radiation and antennas. Current distribution. Hallén's integral equation. Pocklington's integral equation. Radiation pattern. Antenna gain. Radiation resistance. Transmitting and receiving antenna. Antenna arrays.			
Textbooks/references				
1	D. M. Veličković: Elektromagnetics (in Serbian) - the first book, Faculty of Electronic Engineering, Niš, 2004.			
2	D. M. Veličković and others: The Electromagnetics Problem Solver (in Serbian), Faculty of Electronic Engineering, Niš, 2000.			
3	D. M. Veličković, F. H. Uhlmann, K. Brandisky, R. D. Stancheva, H. Brauer: Fundamentals of Modern Electromagnetics for Engineering, TU Ilmenau, Germany, 2005.			
4	J. V. Surutka: Electromagnetics (in Serbian), Građevinska knjiga, Beograd, 1966.			
5	Fawwaz T. Ulaby: Fundamentals Applied Electromagnetics, Pearson, Prentice Hall, New York, ISBN-13: 978-0132139311, 2010.			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
3	0	0	0	0
Teaching methods	Lectures and auditive practice classes. Besides board work, multimedial presentations, photographs and video clips are presented. Obligatory consultations with lecturers help successful course material adoption.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam		Points
Activity during lectures		Written exam		
Exercises	20	Oral exam		40
Colloquia				
Projects	40			