

Specification for the book of courses

Study program		Communications and Information Technologies		
Module		System Engineering and Radio-Communications		
Type and level of studies		Master studies		
The name of the course		Artificial Intelligence and Machine Learning for Communication Systems		
Lecturer (for lectures)		Stanković Ž. Zoran, Marinković D. Zlatica, Marković V. Vera		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)		Milijić R. Marija		
Number of ECTS	4	Course status (obligatory/elective)	Elective	
Prerequisites				
Acquiring theoretical and practical knowledge about the principles of artificial intelligence and machine learning as well as the possibilities of their application in communication systems. Training students to independently solve given problems using the methods of artificial intelligence and machine learning.				
Course objectives				
Knowledge of basic methods and techniques of artificial intelligence and machine learning that can be applied to solve communication problems. Knowledge of the architecture of models based on artificial intelligence. Knowledge of basic evolutionary algorithms. Ability to solve specific problems related to communication systems using artificial intelligence and machine learning methods..				
Course outcomes				
Course outline				
Theoretical teaching				
Basic principles of artificial intelligence and machine learning. Machine learning methods. Artificial neural networks (types, architectures and learning methods). Principles and phases of development of artificial neural network based models. Incorporating knowledge from the problem domain into neural models. Examples of the applications of artificial neural networks in communication systems. SVM (Support Vector Machine) -based models. Evolutionary algorithms. Development of individual projects related to the application of artificial intelligence and machine learning in solving specific problems in communication systems..				
Practical teaching (exercises, OFE, study and research)				
Practical work: Application of artificial intelligence and machine learning methods. Project: Analysis of a specific problem related to communication systems, selection of suitable machine learning method and an appropriate model for problem solving, model development and implementation.				
Textbooks/references				
1	Q. J. Zhang, K. C. Gupta, Neural Networks for RF and Microwave Design, Artech House, 2000.			
2	C. Christodoulou, M. Gerogiopoulos, Applications of Neural Networks in Electromagnetics, Artech House, 2001.			
3	Shai Shalev-Shwartz, Shai Ben-David, Understanding Machine Learning - From Theory to Algorithms, Cambridge University Press, 2014.			
4	Advances in Evolutionary Algorithms, Edited by Witold Kosinski, IntechOpen, November 2008.			
5	Selected scientific papers.			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	0	1	0	0
Teaching methods				
Lectures; Practical work; Project development; Consultations				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	
Exercises			Oral exam	50
Colloquia				
Projects		50		