

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		Electrical Machines and Energy Efficiency		
Lecturer (for lectures)		Stajić P. Zoran		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS		10	Course status (obligatory/elective)	Elective
Prerequisites				
Course objectives		Main topic of this course is to introduce students with the role that electrical machines have in the process of increasing energy efficiency of different industry systems, with strategy of developed countries for energy efficiency increasing, with measurement of electrical machines characteristics, with electrical machines energy efficiency assessment techniques, and methods for increasing energy efficiency with best practice examples.		
Course outcomes		Students capable to perform measurements of electrical machine characteristics and to analyze and determine electrical machines energy efficiency. Also, students will be familiar with new solutions applied in developed countries for increasing energy efficiency and will be able to select and implement energy efficiency optimization in practice.		
Course outline				
Theoretical teaching		Operating characteristics of electrical machines. Application of electrical machines (pump station, compressor station, fans, heating and cooling systems, transport and logistics systems, renewable energy sources and other). Electrical machines energy efficiency throughout the life cycle. Energy efficient electrical machines. European Union strategy for increasing energy efficiency of electrical machines and drives. Interdisciplinary approach to energy efficiency solutions in industry. Measurement of energy efficiency of electrical machines. Barriers for energy efficiency increasing. Theoretical and methodological approach for energy efficiency increasing. Energy efficiency management: theory and best practice examples.		
Practical teaching (exercises, OFE, study and research)		Part of the course is conducted through mentoring and part through individual research and study work in the field of electrical machines and transformer. Through mentoring, students are introduced with the subject content. The study and research work is based on active study of primary scientific sources, analysis of electrical machine systems energy efficiency with the aim to increase efficiency, performing of experiments in systems with electrical machines and proposing and implementing measures for energy efficiency increasing.		
Textbooks/references				
1	P. Tolander, J. Palm "Improving Energy Efficiency in Industrial Energy Systems", Springer-Verlag, London, 2013.			
2	A. Emadi, J.C. Andreas "Energy-Efficient Electric Motors", Marcel-Dekker, New York, 2005.			
3	F. Parasiliti, P. Bertoldi "Energy efficiency in motor driven systems", Springer-Verlag, Berlin, 2003.			
4	D. R. Wulfinghoff "Energy Efficiency Manual", Energy Institute Press, Maryland, U.S.A. 1999.			
5	A. de Almeida, P. Bertoldi, W. Leonhard "Energy Efficiency Improvements in Electric Motors and Drives", Springer-Verlag, Berlin Heidelberg, 1997.			
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 via the presentation, discussions and consultations. Assistance in performing experiments and prepare students for independent research and scientific papers publishing.		
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		

