

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		Advanced Electronic Ceramic Materials			
Lecturer (for lectures)		Mitić V. Vojislav			
Lecturer/associate (for exercises)					
Lecturer/associate (for OFE)					
Number of ECTS	10	Course status (obligatory/elective)	Elective		
Prerequisites					
The subject offers academic knowledge on electronic ceramic materials and enables to interlink knowledge from different areas of research. It offers an insight into the most recent achievements in the research and application of advanced ceramic materials. It also focuses on the study of the structure-properties-application relationship.					
Course objectives					
Students develop the capacity to deal with scientific, development an technological problems either alone or as members of a team, as well as to organize and implement scientific research. They should also be able to take part in international research projects owing to the experience gained through the research during studies.					
Course outcomes					
Students develop the capacity to deal with scientific, development an technological problems either alone or as members of a team, as well as to organize and implement scientific research. They should also be able to take part in international research projects owing to the experience gained through the research during studies.					
Course outline					
New ceramic civilization. Global strategy of research and development of electronic ceramic materials. Correlation between the structure hierarchy (micro- and nanostructural properties) and phase composition on electric, semiconducting, dielectric and magnetic properties of ceramic materials. Modern characterization methods for ceramic materials. Stereological methods. Fractals and electronic ceramics. Computer technologies in the research, characterization and simulation of novel structures and properties of ceramic materials. Nanostructure and nanotechnology in electronic ceramics. Ceramic materials synthesis technology. Electrically conductive ceramics. Ceramic materials for various components, functions and properties: condensers, sensors, ferroelectrics and PTCR and NTCR effects. Optoelectronic ceramics. Optical fibers. Ceramic materials for microwave components of varying frequency ranges. Ferroelectric materials and other ceramic materials in medicine and robotics. Electronic ceramic materials for new energy sources, telecommunications and information technologies. Ceramic materials for space technologies. Ceramic materials and high integration and packaging of electronic components and parameters within microelectronic devices. International trends in manufacturing and recycling of ceramics materials, and global security considerations related to advanced ceramic materials and technologies.					
Theoretical teaching					
Part of the exercises and lectures are performed at institutes, laboratories, companies and the Center for Electronic Microscopy.					
Practical teaching (exercises, OFE, study and research)					
Part of the exercises and lectures are performed at institutes, laboratories, companies and the Center for Electronic Microscopy.					
Textbooks/references					
1	M. M. Ristic, Principles of Material Science, SANU Special Edition, DCXVII, (1993). (in Serbian)				
2	D.Raković, Physical basics and characteristics of electrical materials, Belgrade, (1997) (in Serbian)				
3	Vojislav V. Mitić, Structure and electrical properties of BaTiO ₃ ceramics, Belgrade, Endowment Andrejević, 2001. (in Serbian)				
4	W.D.Callister, "Materials Science And Engineering an introduction, John Wiley&Sons Ltd, 2003				
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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, consultations, computing and laboratory training					
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			