

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Electron Devices and Microsystems		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Materials Characterization		
Lecturer (for lectures)		Mitić V. Vojislav		
Lecturer/associate (for exercises)		Mitić V. Vojislav		
Lecturer/associate (for OFE)		Mitić V. Vojislav		
Number of ECTS	6	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Gaining basic knowledge on materials characterization methods. Interlinking theoretical knowledge and its practical application in materials characterization. Gaining knowledge about the latest methods and devices for materials characterization.			
Course outcomes	Students develop the capacity to understand the relationship between the structure and properties of materials and the ability to combine various methods and devices for a detailed, precise and inventive materials characterization.			
Course outline				
Theoretical teaching	Modern materials analysis methods. Structural properties of materials. Technology (synthesis) – structural properties – materials correlation. Symmetry and crystallography in the structural hierarchy of materials. Modern characterization methods: SEM, TEM, EDS, XRD, SPM, laser spectroscopy, NMR spectroscopy. Stereological methods (quantitative metallography). Application of fractals in the structural analysis of materials. Materials structure in the function of high integration of electronic components and parameters within electronic devices. New measurement technologies of materials' electrical and electronic properties at the microstructural and nanoscale levels. New characterization methods for nanomaterials. Pushing the limits of scientific knowledge in the field of structural hierarchy and analysis of advanced materials.			
Practical teaching (exercises, OFE, study and research)	Computational and laboratory exercises in SEM and EDS analyses; electrical characterization of materials.			
Textbooks/references				
1	Vojislav V. Mitić, Momčilo M. Ristić, Electrical materials, (in the process of publishing, in Serbian)			
2	M. Wilson, K. Kannangara, G. Smith, M. Simmons, B. Raguse, Nanotechnology-basic science and emerging technologies, Chapman&Hall, 2004			
3	M. L. Frame, B.B. Mandelbort, Fractals, Graphics and Mathematics Education, The Mathematical Association of America Inc., 2002, Washington DC			
4	M.T. Dove, Structure and Dynamics, Oxford master series, 2005			
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	2	1	0	0
Teaching methods	Lectures including video presentations, laboratory exercises, consultations, seminar papers.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	10	Written exam	15	
Exercises	20	Oral exam	15	
Colloquia	30			
Projects	10			