

Course Unit Descriptor

Study Programme: Materials Engineering		
Course Unit Title: Introduction to materials		
Course Unit Code:		
Name of Lecturer(s): Ass. Prof. Marija Milanovic, PhD		
Type and Level of Studies: Undergraduate Academic Studies		
Course Status (compulsory/elective): Compulsory		
Semester (winter/summer): Summer		
Language of instruction: English		
Mode of course unit delivery (face-to-face/distance learning): Face-to-face		
Number of ECTS Allocated: 7		
Prerequisites: None		
<p>Course Aims:</p> <p>Acquiring the basic academic knowledge necessary for understanding the structure of the material, the relationship that exists between the structure and the properties of the material, the influence of the processing of the materials on its properties as well as the understanding of the basic principles necessary for the selection of materials for a particular application.</p>		
<p>Learning Outcomes:</p> <p>Students should apply acquired knowledge to understand the processing-structure-properties-performance principles. With regard to the relationship of these four components, the structure of material will depend on how it is processed. Furthermore, a material`s performance will be a function of its properties.</p>		
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Introduction and basic concept of type of bonding/structure relationship. Structure of material, packaging and crystal structure, defects, structure of non-crystalline materials, metals, ceramics, polymers. The concept of phase in solid material, phase diagrams. Basic principles of the kinetics of the process in solid phase, diffusion, phase transformation - nucleation and crystal growth. Solid solutions, steel as a solid solution and the effect of processing on its structure and properties. The dependence of the properties (mechanical) of the structure. Basic principles of material selection from the aspect of application.</p> <p><i>Practice</i></p> <p>Exercises that include calculations in order to better understand the packaging of atoms, the crystalline structure of the material, the kinetics of the solid phase process, the diffusion, the crystallization, the phase transitions, the effects of processing on the structure-properties relationship of the material.</p>		
<p>Required Reading:</p> <p>W. D. Callister, D. G. Rethwisch, Materials Science and Engineering, John Wiley & Sons, Inc., 2011</p> <p>J. F. Shackelford, Introduction to Materials Science for Engineers, Macmillan Publishing Company, 1985</p>		
Weekly Contact Hours: 6	Lectures: 4	Practical work: 2
<p>Teaching Methods:</p> <p>Lectures and students group work</p>		
Knowledge Assessment (maximum of 100 points):		

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	
Test I and Test II	60	oral exam	30