

<b>Study program: Industrial Engineering</b>			
<b>Course title: Materials Science</b>			
<b>Professor/assistant:</b> Aleksandra Boricic / JelenaBijelic			
<b>Type of course:</b> compulsory			
<b>ECTS credits:</b> 7			
<b>Pre-requisites:</b> -			
<b>Aims of the course:</b> Prepare students to: -integrate concepts such as elastic modulus, tensile strength, toughness of the material, the elastic and plastic deformation - study the structural changes in curing - learn procedures to improve the mechanical properties of materials - learn to solve practical problems in the field of material application			
<b>Learning outcomes:</b> After taking the course, students will be able to: - determine the basic material properties, tensile strength, elastic modulus, hardness, toughness, - recognize the advantages and disadvantages of different types of materials in the application, - define the heat treatment in relation to the required characteristics of the material, - define the proper selection of materials whose properties meet the required mechanical structures or certain parts of the structure, - list the types of materials that can be used in the production of different machine parts, which correspond to the required characteristics, - monitor and propose new materials.			
<b>Syllabus</b> <i>Theoretical part</i> Purpose and classification of materials. Historical development of materials. General properties of materials. Properties of metals. Structure of metals and the periodic table of elements. Crystal lattice structure. Behavior of metal by the action of external forces. Elastic and plastic deformation. Fundamentals of crystallization of metals and alloys. Binary (two-component) equilibrium diagrams. Iron alloy. Fundamentals of phase change in metal systems. Stable and metastable equilibrium diagrams. Phase changes in the solid state for steel. Heat treatment of steel. Classification of steel. Production of pig iron, steel and cast iron. Iron alloy casting. Non-ferrous metals and their alloys. Non-metals. Tires. Timber. Polymer materials. Composite materials. Solid fuel. Liquid fuels, lubricants. Hazardous materials. Safety in handling hazardous materials. <i>Practical part :</i> Application of theoretical knowledge to solve specific practical examples with necessary instructions for the particular types of tasks. Testing of materials in laboratory. Research in safety of materials.			
<b>Literature</b> 1 Stojadinovic S., Ljevar, A., Knowledge of materials(in Serbian), Zrenjanin, 2001. 2 Vlahovic, M., Knowledge of goods(in Serbian), Belgrade, 2001. 3 Vukicevic, D, Engineering materials(in Serbian), Niš, 1988. 4 Vukicevic, D, Practicum in mechanical materials(in Serbian), Niš, 1988.			
<b>Number of active classes</b>			Other forms of teaching:
Lectures: 3	Practical classes: 4	Research work:	
<b>Teaching methods</b> Combined, interactive approach with practical problem solving.			
<b>Grading system</b> (maximum 100 points), <b>grading scale</b> from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade7 from 61-70 points, grade8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.			
<b>Pre-exam obligations</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
activity during theoretical lectures	<b>10</b>	written exam	<b>40</b>
practical training	<b>10</b>	oral exam	
colloquium(s)/seminar papers	<b>40</b>		
<b>Sum</b>	<b>60</b>	<b>Sum</b>	<b>40</b>