

Study program: Environmental Protection			
Course title: Materials Science			
Professor/assistant: Aleksandra Boričić / Jelena Bijeljić			
Type of course: compulsory			
ECTS credits: 7			
Pre-requisites: -			
Aims of the course: 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.			
Learning outcomes: Student 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 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 production of different machine parts, which correspond to the required characteristics, monitor and propose new materials.			
Syllabus			
<u>Theoretical part</u> 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 metals 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. Dividing 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.			
<u>Practical part</u> Application of theoretical knowledge to solve specific practical examples with necessary instructions for the particular type of tasks. Testing of materials in laboratory. Safety in material research.			
Literature			
<ol style="list-style-type: none"> 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 			
Number of active classes			Other forms of teaching:
Lectures: 3	Practical classes: 1	Research work:1	
Teaching methods Combination of interactive approach with practical problem solving.			
Grading system (maximum 100 points), grading scale from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.			
Pre-exam obligations	points	Final exam	points
activity during theoretical lectures	10	written exam	40
practical training	10	oral exam	-
colloquium(s)/seminar papers	40		
Sum	60	Sum	40