

Study program: Industrial Engineering – Mechanical Engineering			
Course title: Materials			
Professor/assistant: Sonja Kostić			
Type of course: Compulsory			
ECTS credits: 6			
Prerequisites: none			
Aims of the course: Students acquire knowledge about materials used for building mechanical constructions and parts; mechanical and technological properties of materials and possibilities of their application. Students get familiar with the latest equipment for mechanical and technological testing of materials, and are trained to independently use the mentioned equipment.			
Learning outcomes: The student chooses, in the optimal manner, the most suitable and the most economical materials for making certain machine constructions and parts and independently carries out testing of mechanical and technological characteristics of the material.			
Syllabus: <i>Theoretical part:</i> Properties of metals. Crystal structure of metals and process of crystallization. Polymorphic transformations of iron. Alloys, steels and cast iron. Mechanical characteristics of metal materials, and test methods. Tensile testing. Fatigue testing. Hardness testing using static methods. Hardness testing using dynamic methods. Impact testing. Technological testing of materials. Basics of heat treatment of steel: hardening, annealing, tempering, chemical-heat treatment. Microstructure of steel, determining/measuring carbon content in steel. Microstructure of gray, ductile and malleable cast iron. Non-ferrous and light metals: properties, methods of obtaining and application. Ferrous metals obtained by sintering and their application. Industrial polymers, ceramic materials, composite materials, glass, wood, paper, leather, textiles. <i>Practical part:</i> Auditory and laboratory exercises.			
Literature: 1. Jovanović M., i dr.: Mašinski materijali. Mašinski fakultet. Kragujevac, 2003. 2. Đorđević.V. Mašinski materijali, Mašinski fakultet. Beograd, 1999. 3. Majstorović, A. Đukić. V., Ispitivanje mašinskih materijala, Naučna knjiga, 1988.			
Total number of active classes: 45		Lectures: 30	Practical classes: 15
Teaching methods: Lectures, auditory and laboratory exercises			
Grading system (maximum 100 points) grading scale from 5 to 10: below 51 points – student fails the exam, 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 lectures	max 5	Oral exam	50
Practical training	max 5		
Written test(s)	max 20		
Term papers	max 20		
Minimum requirement for the final exam	30		