

Faculty of Mechanical Engineering / MECHATRONICS /

Course:				
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
13875	Mandatory	2	5	3+0+2
Programs	MECHATRONICS			
Prerequisites	No conditionality.			
Aims	On completion of this course, students should be able to based on knowledge about the structure and properties of materials made the correct choice and the practical application of engineering materials.			
Learning outcomes	After passing the exam, the student will be able to: Knows basic characteristics and properties of the most commonly used alloys (steel, iron, aluminium, copper and nickel), polymer, ceramic and composite materials. Applies methods of materials mechanical properties determination at the action of static, impact and fatigue loads. Knows the work of the microscope and recognizes characteristic structure of the investigated alloys. Execute selection of appropriate materials for mechanical construction and parts.			
Lecturer / Teaching assistant	Prof. dr Darko Bajić, Prof. dr Milena Đukanović, MSc Marko Mumović			
Methodology	Lectures, laboratory exercises, Making of laboratory reports, consultations.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction to Electrical Engineering Materials. Application of materials in electrical engineering.			
I week exercises	Laboratory exercises.			
II week lectures	Structure, organization and movement of matter.			
II week exercises	Laboratory exercises.			
III week lectures	Atomic structure and chemical bonds.			
III week exercises	Laboratory exercises.			
IV week lectures	Crystals, crystal lattice.			
IV week exercises	Laboratory exercises.			
V week lectures	Miller indices. Crystal structure defects.			
V week exercises	Laboratory exercises.			
VI week lectures	Superconductors. Conductors. Semiconductors. Insulators.			
VI week exercises	Laboratory exercises.			
VII week lectures	I COLLOQUIUM			
VII week exercises	I COLLOQUIUM			
VIII week lectures	Dielectrics. Magnets.			
VIII week exercises	Tradition and evaluating reports. II COLLOQUIUM - supplementary			
IX week lectures	Introduction. Material selection - quantitative methods of choice. The mechanical, physical and technological properties of materials. Static tests to tension and pressure.			
IX week exercises	Classification and types of materials testing.			
X week lectures	Static tests to hardness. Impact test: Charpy test and Izod test.			
X week exercises	Tensile test.			
XI week lectures	Technological tests. Bend tests, deep drawing test (the Erichsen cup test).			
XI week exercises	Compression test.			
XII week lectures	Fatigue tests. Vellers fatigue curves. Smiths diagrams.			
XII week exercises	Hardness test.			
XIII week lectures	Polymer materials. Ceramic and hard materials, glass, natural materials.			
XIII week exercises	Charpy impact test.			

XIV week lectures	Composite materials.					
XIV week exercises	II COLLOQUIUM					
XV week lectures	Corrosion of metals. Wear of materials.					
XV week exercises	Tradition and evaluating reports. II COLLOQUIUM - supplementary					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 3 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 1 hour(s) i 40 minuts of independent work, including consultations			Classes and final exam: 6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts Total workload for the subject: 5 x 30=150 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 30 hour(s) i 0 minuts Workload structure: 106 hour(s) i 40 minuts (courses), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)			
Student obligations			Students are required to attending lectures and exercises, making homework and colloquiums.			
Consultations			2 times per week			
Literature			P. Osmokrović, „Elektrotehnički materijali“, Akademska misao, Beograd, 2003 D. Bajić: Mašinski materijali (pripremljeni materijal za predavanja i vježbe), 2023. V. Đorđević, M. Vukićević: Mašinski materijali - praktikum za laboratorijske vježbe, Mašinski fakultet u Beogradu, 1998. T. Filetin: Izbor materijala pri razvoju proizvoda, Fakultet strojarstva i brodogradnje, Zagreb, 2000.			
Examination methods			Attendance (lecture+exercises): 1+1=2 points Submitted and defended exercises: 8+8=16 points Colloquiums: 16+16= 32 points Final exam: 25+25=50 points. The second part of the exam - mechanical testing of materials, the final exam is written/oral. A passing grade is obtained if at least 50 points are accumulated cumulatively (min. 25 points per test segment).			
Special remarks			Students when handing over the report laboratories actively participates in analysising of the results.			
Comment			Additional information in the room 418 or darko@ucg.ac.me			
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points