

Faculty of Mechanical Engineering / ROAD TRAFFIC / TECHNICAL AND PROPULSION MATERIALS

Course:	TECHNICAL AND PROPULSION MATERIALS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
10781	Mandatory	3	5	2+2+0
Programs	ROAD TRAFFIC			
Prerequisites	No conditionality			
Aims	Acquiring basic knowledge about the structure and properties of materials, fuel, lubricants, and industrial water; correct selection and practical application of engineering materials, fuel, lubricants, and industrial water.			
Learning outcomes	After the student finishes with this course, he will be able to: 1. Perform the classification of materials used in the technique. 2. Select materials using the quantitative selection method. 3. Experimentally determine the mechanical properties of the material. 4. Perform the classification of fuels used in the technique. 5. Classify lubricants used in the technique. 6. Analytical determine the amount and composition of combustion products.			
Lecturer / Teaching assistant	Prof. dr Darko Bajić, Prof. dr Danilo Nikolić, MSc Marko Mumović, MSc Marko Lučić			
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. Science of materials. Material selection - quantitative methods of choice.			
I week exercises	Classification and types of materials testing.			
II week lectures	The mechanical, physical, and technological properties of materials. Mechanical testing of materials. Tensile test. Compression test.			
II week exercises	Tensile test.			
III week lectures	Impact test: Charpy and Izod test. Hardness test: Brinell, Vickers, Rockwell. Technological testing.			
III week exercises	Compression test.			
IV week lectures	Metallic materials: iron alloys, steels, cast irons			
IV week exercises	Impact test: Charpy test.			
V week lectures	Light and non-ferrous metals and their alloys: aluminum, copper, nickel, titanium and magnesium.			
V week exercises	Hardness testing			
VI week lectures	Ceramic and hard metals, glass, and natural materials.			
VI week exercises	Evaluating reports.			
VII week lectures	Polymer materials.			
VII week exercises	Test I			
VIII week lectures	Composite materials			
VIII week exercises	Evaluating reports.			
IX week lectures	Types of fuel and the basis of combustion.			
IX week exercises	Types of fuel and the basis of combustion.			
X week lectures	Stoichiometric equations of combustion.			
X week exercises	Stoichiometric equations of combustion.			
XI week lectures	Solid fuels, origin, production, application.			
XI week exercises	Solid fuels, origin, production, application.			
XII week lectures	Liquid fuels, origin, production, application.			
XII week exercises	Liquid fuels, origin, production, application.			
XIII week lectures	Gaseous fuels, origin, production, application.			

XIII week exercises	Gaseous fuels, origin, production, application.					
XIV week lectures	Lubricants, types and basic characteristics, application.					
XIV week exercises	Lubricants, types and basic characteristics, application.					
XV week lectures	Industrial water, types and properties.					
XV week exercises	Industrial water, types and properties.					
Student workload						
Per week			Per semester			
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises 2 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 excercises, making homework and colloquiums			
Consultations			2 times per week			
Literature			D. Bajić: Mašinski materijali (II dio) (materijal predavanja), 2023. V. Đorđević, M. Vukićević: Mašinski materijali- praktikum za laboratorijske vježbe, Mašinski fakultet Beograd V. Đorđević: Mašinski materijali, prvi dio, Mašinski fakultet, Beograd, 2000. T. Filetin: Izbor materijala pri razvoju proizvoda, Fakultet strojarstva i brodogradnje, Zagreb, 2000. M. Radovanović: Goriva, Mašinski fakultet u Beogradu, 1997. A. Rac: Maziva i podmazivanje mašina, Mašinski fakultet u Beogradu, 2007. M. Radovanović: Industrijska voda, Mašinski fakultet u Beogradu, 1997.			
Examination methods			Attendance (lecture+exercises): 2x1=2 points Submitted and defended exercises: 2x8=16 points Tests: 2x16 = 32 points Final exam: 2x25=50 points; The first part (Technical materials) final exam is taken in writing (eliminatoriy) and orally. A passing grade is obtained if at least 50 points are accumulated cumulatively, a minimum of 25 points per part of the exam (two parts).			
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