

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Material sciences & elements of chemistry		Code 1011101231010232795
Field of study Logistics - Full-time studies - First-cycle studies	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: 15 Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art the sciences		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: dr hab. inż. Michał Kulka, prof. nadzw. PP email: michal.kulka@put.poznan.pl tel. 061 6653573 Wydział Budowy Maszyn i Zarządzania . Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	basic knowledge of chemistry
2	Skills	logical thinking skills, use of the information obtained from the library and the Internet
3	Social competencies	understanding the needs of learning and acquiring new knowledge
Assumptions and objectives of the course: Getting acquainted with the basic types of materials, properties of materials and methods of influencing material properties.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has knowledge of chemistry and materials science necessary to understand chemical transformations and their importance for industrial processes and logistics - [K1A_W03]		
2. Student has a basic knowledge about the life cycle of industrial products, knows the basic causes of wear parts of machines and tools used in the construction and operation of machines - [K1A_W22]		
Skills:		
1. The student is able independently to develop the set problem, being located in a studied subject - [K1A_U05]		
2. Student can (in formulating and solving engineering task) to see their system and non-technical aspects, as well as technical, organisational and economic and social - [K1A_U10]		
Social competencies:		
1. Student is sensitive to non-technical aspects and effects of engineering activities related to the use of different materials, including its impact on the environment and the associated responsibility for decisions - [K1A_K02]		
2. Student is able to detect cause-and-effect dependencies in the implementation of the objectives and to classify the significance of the tasks - [K1A_K04]		
Assessment methods of study outcomes		

<p>-Forming rating: a) Lecture: ranking based on an oral answer from the scope of contents of the previous lecture b) Laboratory: ranking based on an oral answer from the scope of contents of the performed laboratory exercise and report on every laboratory exercise according to indications of the leading the laboratory exercises. Summarizing rating: a) Lecture: ranking based on the test consisting of general and test questions (ranking in case of getting at least 51% of points: <51% 2 - ndst, 51%-62% 3 - dst, 63%-72% 3,5 - dst+, 73%-83% 4 - db, 84%-94% 4,5 - db+, > 94% 5 - A) conducted for the end of the semester. b) Laboratory: The average score of all the laboratory exercises. All the exercises have to be accepted in respect of oral answer and report.</p>		
Course description		
<p>Lecture: 1. Engineering Materials, types, selection. 2. Bonds, crystal structure. 3. Defects of crystalline structure, deformation. 4. Mechanical properties of materials. 5. Hardening, recrystallization. 6. Cracking, fatigue, creep. 7. Corrosion and friction. 8. Crystallization and equilibrium systems. 9. Iron-cementite system. 10. Carbon steels, cast iron, cast steel. 11. Alloy steels. 12. Heat treatment. 13. Surface treatment. Laboratory: 1. Steels in the state of the delivery 2. Heat treated structural steels. 3. The structure and properties of thermo-chemical treated steel 4. Tool steels. 5. Cast iron and cast steel. 6. Copper and its alloys. 7. Light metal alloys. 8. Surface layers with special properties. 9. Composite materials. 12. Causes of premature wear of machine parts and tools. Note: a student performs 5 from the above exercises chosen by leading the laboratory exercises in consultation with the leading the lecture</p>		
Basic bibliography:		
1. Blicharski M., Wstęp do inżynierii materiałowej, WNT, wyd.III, 2006 2. Skrypt pod red. A. Barbackiego, Materiały w budowie maszyn: przewodnik do ćwiczeń laboratoryjnych, wyd. IV, Wydawnictwo PP, 2006		
Additional bibliography:		
1. Dobrzański L.A., Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, Wydawnictwo Politechniki Śląskiej, 2006		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	30	
2. Laboratory	15	
Student's workload		
Source of workload	hours	ECTS
Total workload	45	2
Contact hours	30	1
Practical activities	15	1