



Name od module/subject	Code
Materials science	

COURSE DESCRIPTION CARD

Field of study Transport		Training profile (general academic/practical) practical	Year / Semester I/1
Specialization Transport logistics and technology		Subject offered in: Polish	Course (obligatory/optional) obligatory
No. of lecture hours: 45 No. of self-studying hours: 40		ECTS 3	
Cycle of studies: first	Form of studies (full time/weekends) Full time	Field of studies Management and Transport	
Status of subject in curriculum (basic, specialized, other) Basic sciences		(general academic, from other department) general academic	
Unit providing the training: Institute of Management and Transport			
Lecturer in charge of the subject: Dr inż. Tomasz Kachlicki tel. 61 665 3775 e-mail: tomasz.kachlicki@pwsz-gniezno.edu.pl Instytut Zarządzania i Transportu ul. Ks. S. Wyszyńskiego 38, 62-200 Gniezno			
Initial requirements in knowledge, skills, social competences:			
1	Knowledge:	basic in physics, chemistry	
2	Skills:	logical thinking, using information from the library and the Internet	
3	Social competences	understanding the need to learn and acquire new knowledge	
The aim of the subject:			
1. Provide students with basic knowledge in materials science, within the scope determined by the curriculum content appropriate for the field of study			
2. Develop students' ability to solve simple problems related to different groups of materials, distinguishing between materials and analysis of the results of microscopic observation on the basis of acquired knowledge			
3. Shaping students' teamwork skills			
Training outcomes			
Knowledge As a result of the training course a student is able to:			Reference to field-related training outcomes
1	Basic knowledge of the structure of matter and its components, construction crystallographic solids		

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2	Knowledge of basic engineering materials: steel and foundry alloys iron, non-ferrous metals and their alloys, sintered and ceramic materials, glass and composites		
3	Knowledge of methods of forming properties and microstructure of metals and alloys (plastic working, heat treatment, heat treatment, coatings)		
Skills As a result of the training course a student is able to:			Reference to field-related training outcomes
1	Student can select the right engineering material for the projected component.		
2	Student can apply appropriate manufacturing technology to shape the structure and properties of engineering materials		
3	Using understanding of the identified sources of knowledge (list of basic literature) and gaining knowledge from other sources		
Competences As a result of the training course a student is able to:			Reference to field-related training outcomes
1	Student understands the need for lifelong learning, can inspire and organize the learning process of others		
2	Student is aware of the role of engineering materials in the contemporary economy and their importance to society and the environment		
3	The student is able to work in a group		
Accepted grading criteria			
Local grade	Local definition	ECTS grade	ECTS definition
5	Bardzo dobry [very good] – perfect knowledge, skills, competences	A	Celujący [exemplary] – extraordinary achievements
4,5	Dobry plus [good plus] – very good knowledge, skills, competences	B	Bardzo dobry [very good] – above average standards with some mistakes
4	Dobry [good] – good knowledge, skills, competences	C	Dobry [good] – general good work with some noticeable mistakes
3,5	Dostateczny plus [satisfactory plus] – satisfactory knowledge, skills, competences but with significant shortcomings	D	Zadowalający [satisfactory] – satisfactory but with significant mistakes
3	Dostateczny [satisfactory] – satisfactory knowledge, skills, competences but with numerous shortcomings (threshold 60% of the requirements)	E	Dostateczny [satisfactory] – outcomes meet minimal criteria
2	Niedostateczny [insufficient] – insufficient knowledge, skills and competences (below 60% of the requirements)	FX, F	Niedostateczny [insufficient] – basic shortcomings in material



Assumed grading methods

Diagnosing assessment:

Formative assessment:

Summative assessment:

Lecture:

The credit of lecture on basis of exam consists of 6 ÷ 10 questions which enclose the subject matter of heat treatment and welding technology.

Evaluation criteria: dst ⇒ 50.1 ÷ 60%; dst plus ⇒ 60.1 ÷ 70%; db ⇒ 70.1 ÷ 80%; db plus ⇒ 80.1 ÷ 90%; bdb ⇒ 90.1 ÷ 100%

Laboratory:

Credit on the basis of the correct performance of the exercises and the report of each laboratory exercise as instructed by the laboratory instructor. Before the exercise short tests, oral or written input. For credit laboratories all the exercises must be classified (positive assessment of the responses and report).

Curriculum content

Materials and their significance for techniques and civilization. Sorts of materials and their chemical, physical, and mechanical properties. Transformations in solid state, chemical bonds. Structure of materials, crystalline and amorphous materials. Defects in crystals, plastic deformation and recrystallization. Alloys, their crystallization and transformation in solid state. Equilibrium diagrams, iron - cementite diagram. Iron - carbon alloys. Basis of heat treatment and thermo-mechanical treatment. Thermo-chemical treatment (chemical reactions and transformations). The coatings. Iron and carbon alloys: steels, cast iron and cast steel. Non-ferrous metals and their alloys (copper, aluminum, titanium, nickel). Ceramic materials (engineering ceramics, porous, glass). Composite materials.

Main bibliography:

1. Barbacki A., Kachlicki T., Materiały inżynierskie, PWSZ Gniezno 2014
2. Dobrzański LA., Podstawy nauki o materiałach i metaloznawstwo, WNT, Warszawa 2002.
3. Leda H., Współczesne materiały konstrukcyjne i narzędziowe, Wydawnictwo Politechniki Poznańskiej, 1996



Supplementary bibliography:

1. Dobrzański L. „Metaloznawstwo z podstawami nauki o materiałach” WNT 1998
2. Blicharski M. „Wstęp do inżynierii materiałowej” WNT 2003
3. Przybyłowicz K. „Metaloznawstwo” WNT 1996
4. Ashby M., Jones D. „Materiały inżynierskie cz1. Właściwości i zastosowania” WNT 1995
5. Praca zbiorowa, Materiały w budowie maszyn, Wyd. Politechniki Poznańskiej 2006

Student's involvement

Form of activity	Hours	ECTS
Total number of hours	90	3
Hours requiring direct contact with a lecturer	50	
Activities requiring self-studying		