

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Materials Science</b>		Code <b>1011101221010240142</b>
Field of study <b>Engineering Management - Full-time studies -</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 2</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>-</b> Laboratory: <b>15</b> Project/seminars: <b>-</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b> dr hab. inż. Jarosław Jakubowicz, prof. nadzw. email: jaroslaw.jakubowicz@put.poznan.pl tel. 616653781 Wydział Budowy Maszyn i Zarządzania ul. Piotrowo 3, 60-965 Poznań		<b>Responsible for subject / lecturer:</b> Maciej Tuliński email: maciej.tulinski@put.poznan.pl tel. 061 665 3628 Wydział Budowy Maszyn i Zarządzania ul. Piotrowo 3, 60-965 Poznań
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge of physics and mathematics (program basis for high school level)
2	<b>Skills</b>	Ability to solve basic problems of physics on the basis of existing knowledge, the ability to obtain information from identified sources
3	<b>Social competencies</b>	Understanding the need to broaden the competence, willingness to work together as a team
<b>Assumptions and objectives of the course:</b>		
1 Provide students with basic knowledge of materials, to the extent specified by the content of the program relevant to the field of study		
2 Development of students' ability to solve simple problems related to the choice of materials, distinguishing between materials and analysis of the results of microscopic observations based on the gained knowledge		
3 Development of students' teamwork skills		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. To explain the purpose and meaning of the technology of materials and their further processing - [K07-InzA_W5]		
2. To explain the purpose and importance of recycling of engineering materials - [K01-InzA_W01]		
3. To connect the microstructure of the material with its physico-chemical and mechanical properties etc., and on this basis to suggest the potential use - [K04-InzA_W02]		
<b>Skills:</b>		
1. To formulate simple conclusions on the basis of the calculations and results of measurements and conducted observations - [K01-InzA_U1]		
2. To choose materials with suitable physicochemical and structural properties for engineering applications - [K01-InzA_U7, K01-InzA_U8, K01-InzA_U12]		
3. To choose the appropriate production technologies in order to shape the products, their structure and properties - [K01-InzA_U7, K01-InzA_U6]		
<b>Social competencies:</b>		

1. To actively engage in solving the questions, independently develop and expand skills - [K1A\_K01]  
 2. To work together as a team, to discharge the duties assigned to the division of labor in a team, demonstrate responsibility for own work and the responsibility for the results of the team - [K1A\_K02]

### Assessment methods of study outcomes

Assessment:

- a) in the laboratory: on the basis of the current progress of the tasks assessed by written work-report  
 b) in respect of lectures: on the basis of answers to questions about the material assimilated in previous lectures,

Assessment summary:

- a) in the laboratory on the basis of grade average of partial evaluation  
 b) in respect of lectures: a written test exam. The exam can be applied after completion of laboratories.

Assessment based on a written test of knowledge:

3 50.1% -70.0%

4 70.1% -90.0%

5 from 90.1%

### Course description

Matter and its components.

Rules for selection of engineering materials.

Basis of material design. Sources of information on engineering materials, their properties and applications.

The strengthening of metals and alloys and shaping their structure and properties with technological methods (crystallization, plastic deformation, recrystallization, thermo-forming, phase transformations during heat treatment, diffusion, coatings and surface layers).

Working conditions and mechanisms of wear and decohesion (mechanical properties, fracture toughness, fatigue, creep, corrosion, tribological wear).

Steels, ferrous casting, non-ferrous metals and their alloys.

Sintered materials and ceramic, glass and glass ceramics.

Polymeric materials and composites.

Modern functional and special materials.

Methods of testing materials.

#### Basic bibliography:

1. Leszek. A. Dobrzański, ?Podstawy nauki o materiałach?, Wydawnictwo Naukowo-Techniczne
2. Leszek. A. Dobrzański, ?Metaloznawstwo i obróbka cieplna? Wydawnictwo Naukowo-Techniczne
3. Karol Przybyłowicz, Janusz Przybyłowicz, ?Materiaoznawstwo w pytaniach i odpowiedziach? , Wydawnictwo Naukowo-Techniczne
4. Skrypt: ?Materiały do ćwiczeń laboratoryjnych z metaloznawstwa? Wydawnictwo Politechniki Poznańskiej

#### Additional bibliography:

1. Michael Ashby i in.: ?Inżynieria materiałowa? tom I i II, Wydawnictwo Galaktyka
2. Poradnik Inżyniera: ?Obróbka cieplna metali?, Wydawnictwo Naukowo-Techniczne

### Result of average student's workload

Activity	Time (working hours)	
1. Participation in classes	30	
2. Participation in laboratory	15	
3. Consultations	10	
4. Preparation for laboratory	20	
5. Preparation for the exam	20	
6. Exam	5	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	60	2
Practical activities	15	1

