

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Physical Aspects of Materials Science</b>		Code <b>1010601311010642031</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</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>2</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</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>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b> dr hab. inż. Ireneusz Malujda, prof. PP email: ireneusz.malujda@put.poznan.pl tel. 61 665-2244 Transport Engineering ul. Piotrowo 3, 60-965 Poznań		<b>Responsible for subject / lecturer:</b> dr inż. Krzysztof Talaśka email: krzysztof.talaska@put.poznan.pl tel. 61 665-2246 Transport Engineering 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, mathematics and chemistry.
2	<b>Skills</b>	The ability to effectively self-education.
3	<b>Social competencies</b>	He is aware of the social role of the engineer. It manifests a desire to broaden their competence. He can work in a team.
<b>Assumptions and objectives of the course:</b> Understanding microstructure and selected properties of solids used in engineering practice.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems - [T1A_W02]		
2. has a structured and theoretically founded general knowledge in the field of key technical issues and detailed knowledge in the field of selected guesses of this discipline of transport engineering - [T1A_W04]		
3. ma wiedzę nt. kodeksów etycznych dotyczących inżynierii transportu, jest świadomy zagrożeń związanych ochroną środowiska oraz rozumie specyfikę systemów krytycznych ze względów bezpieczeństwa (ang. mission-critical systems) - [T1A_W08]		
<b>Skills:</b>		
1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, appropriate to integrate them, make their interpretation and critical evaluation, draw conclusions, and fully justify the opinions they formulate - [T1A_U01]		
2. can communicate in Polish and English using specialized terminology, using various techniques, both in a professional environment and in other environments, also using tools in the field of transport engineering - [T1A_U15]		
<b>Social competencies:</b>		
1. understands that in technology, knowledge and skills quickly become obsolete - [T1A_K01]		
2. is aware of the importance of knowledge in solving engineering problems and knows examples and understands the reasons for malfunctioning transport systems that led to serious financial and social losses or to serious health and even life - [T1A_K02]		

<b>Assessment methods of study outcomes</b>		
Written examination covering the topics discussed in the lecture.		
Written examination regarding the material discussed in the exercises.		
<b>Course description</b>		
Introduction to solid state physics. Solids and Materials Engineering. Breakdown of solids used in engineering practice. Breakdown properties of solids. The atomic structure of solids (basic types of networks, examples of network solids, diffraction on crystals). Imperfections in crystals networks - dislocations. The movement of atoms in the crystal networks - diffusion. Mechanical properties of solids (elasticity, plasticity, fracture, fatigue, creep). Electric and magnetic properties of solids. Thermal properties. Porous solid centers. Physical and mathematical models of solids.		
<b>Basic bibliography:</b>		
1. C. Kittel, Wstęp do fizyki ciała stałego, PWN, Warszawa 1974		
2. B. N. Buszmanow, J. A. Chromow, Fizyka ciała stałego, WNT, Warszawa 1973		
3. D. R. Askeland, The science and engineering of materials, PWS Publishers, Boston 1985		
<b>Additional bibliography:</b>		
1. M. F. Ashby, D. R. H. Jones, Materiały inżynierskie, t.1 i 2, WNT, Warszawa 1996		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in the lecture	30	
2. Fixation of the lecture	10	
3. Consultations	2	
4. Preparation for the exam / credit	10	
5. Participation in exams / completing	2	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	54	2
Contact hours	34	1
Practical activities	0	0