

FACULTY OF CHEMISTRY					
SUBJECT CARD					
Name of subject in Polish:	Wprowadzenie do nauki o materiałach i inżynierii materiałowej				
Name of subject in English:	Introduction to material science and engineering				
Main field of study (if applicable):					
Specialization (if applicable):					
Profile:	academic				
Level and form of studies:	2nd level – supplementary semester, full-time				
Kind of subject:	obligatory				
Subject code:	IMC024010W				
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	60				
Form of crediting	crediting with grade				
For group of courses mark final course with (X)					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1				
PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES					
1. Basic knowledge of the structure of matter. 2. Fundamentals of physics, mechanics, electronics, chemistry and physical chemistry. 3. Basic knowledge about the structure of popular engineering materials. 4. Communicative English skills.					
SUBJECT OBJECTIVES					
C1 To familiarize students with the basic relationships between the structure of the material and its properties.					
C2 To familiarize students with the principles of selection of materials for various applications.					
SUBJECT LEARNING OUTCOMES					
relating to knowledge:					
PEU_W01 The student has basic knowledge about the structure of popular construction materials.					
PEU_W02 The student understands the impact of structure defects on the potential properties of materials.					
PEU_W03 The student understands the impact of diffusion on the properties of construction materials.					
PEU_W04 The student has basic knowledge about the mechanical properties of materials and the generation of damage.					
PEU_W05 Student understands the impact of heat treatment on the properties of metals and alloys.					
PEU_W06 The student knows the basic electrical and magnetic properties of materials.					
PEU_W07 The student knows the basic optical and thermal properties of materials.					
PEU_W08 The student knows the selected methods of fabrication of materials.					
PEU_W09 The student understands the concept of composite materials and knows their example applications.					
PEU_W10 The student knows the concept of corrosion, its impact on the degradation of materials and how to prevent it.					

relating to skills:		
PEU_U01 The student can explain the structure of popular materials.		
PEU_U02 Student is able to determine the impact of defects and diffusion on the properties of materials.		
PEU_U03 The student knows how to link the alloy composition with the phase diagram.		
PEU_U04 Student is able to determine the influence of impurities (dopant) on the electrical properties of materials.		
PEU_U05 The student knows how to choose the right materials to minimize the risk of corrosion.		
relating to social competences:		
PEU_K01 The student is ready to apply the acquired knowledge to solve research problems.		
PEU_K02 Student understands the need to use expert knowledge.		
PROGRAM CONTENT		
Lectures		Number of hours
Lec 1	Atomic structure of solids. Bonding in solids.	2
Lec 2	Structures of metals, ceramics and polymers.	2
Lec 3	Defects in solids. Diffusion phenomena.	2
Lec 4	Mechanical properties of materials.	2
Lec 5	Deformation and strengthening of materials.	2
Lec 6	Failure of materials.	2
Lec 7	<i>I test</i>	2
Lec 8	Phase diagrams and phase transformations.	2
Lec 9	Electrical and magnetic properties of materials.	2
Lec 10	Optical and thermal properties of materials.	2
Lec 11	Synthesis, fabrication and processing of materials.	2
Lec 12	Composites materials.	2
Lec 13	Corrosion and degradation of materials.	2
Lec 14	<i>II test</i>	2
Lec 15	<i>Correction of test I and/or test II</i>	2
	Total hours	30
TEACHING TOOLS USED		
N1. Lecture - multimedia presentation + solving simple calculation tasks.		
N2. Discussion with students.		
N3. E-books and databases.		
EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation (F – forming (during semester), P – concluding (at semester end))	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEU_W01 – PEU_W04	Test with multiple-choice answers. About 20 questions, including one descriptive one.
F2	PEU_W05 – PEU_W10	Test with multiple-choice

		answers. About 20 questions, including one descriptive one.
<p>P – concluding grade, which consists of the total number of points obtained from both tests, with the obligatory obtaining about half of the points from each partial test. Grade scale according to the following scheme (% of points = grade):</p> <p>46-55 = dst 56-65 = dst+ 66-75 = db 76-85 = db+ >86 = bdb</p>		
PRIMARY AND SECONDARY LITERATURE		
<u>PRIMARY LITERATURE:</u>		
<p>[1] Ashby M.F., Materiały inżynierskie. 1. Właściwości i zastosowania, W N-T, Warszawa, 1997.</p> <p>[2] Ashby M.F., Materiały inżynierskie. 2. Kształtowanie struktury i właściwości, dobór materiałów, WNT, Warszawa, 1998.</p> <p>[3] Ashby M.F., Shercliff H., Cebon D., Materials: engineering, science, processing and design, Elsevier: Butterworth-Heinemann, Amsterdam, 2007.</p> <p>[4] Askeland D.R., Phule P. P., The Science and Engineering of Materials, Thomas Brooks/Cole, 2003.</p> <p>[5] Callister W. D. Jr, Materials science and engineering, John Wiley & Sons, New York, 1990.</p>		
<u>SECONDARY LITERATURE:</u>		
<p>[1] Blicharski M., Wstęp do inżynierii materiałowej, Wyd. N-T, Warszawa 2003 (i wcześniejsze).</p> <p>[2] Dobrzański L. A., Podstawy nauki o materiałach i metaloznawstwo, Wyd. N-T, Gliwice-Warszawa, 2002.</p> <p>[3] Wyatt O. H., Wprowadzenie do inżynierii materiałowej, Wyd. N-T, Warszawa, 1978.</p> <p>[4] Przybyłowicz K., Przybyłowicz J., Materiałoznawstwo w pytaniach i odpowiedziach, Wyd. N-T, Warszawa, 2004.</p> <p>[5] Ciszewski A., Radomski T., Szummer A, Materiałoznawstwo, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 1998.</p> <p>[6] Blicharski M., Inżynieria materiałowa – stal, WNT, Warszawa, 2004.</p>		
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)		
<p>Dr hab. inż. Juliusz Winiarski, juliusz.winiarski@pwr.edu.pl Department of Advanced Material Technologies</p>		