

Polish course name	KSZTAŁTOWANIE WŁASNOŚCI MATERIAŁÓW
English course name	SHAPING OF MATERIALS PROPERTIES
Course code	WIP-MDL-D1-SOMP-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	4
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Paweł Wieczorek.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of shaping of materials properties.
- › **C2** Obtaining by the students the practical skills in the field of shaping of materials properties.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. Basic knowledge of materials science and thermodynamics.
2. Ability to work independently and in a group.
3. Ability to use literature and internet sources.

COURSE CONTENT

LECTURE

L1 Issues concerning the relationship between the structure, properties and the manufacturing process.

L2 Shaping of the structure and properties by plastic deformation. High effective plastic deformation.

L3 Shaping of the structure and properties using powder metallurgy: manufacturing of powders, preparing, cold forming, sintering and finishing techniques.

L4 Techniques of the structure and properties shaping of surface engineering materials PVD, CVD techniques.

L5 Shaping of the structure and properties by casting technologies.

LABORATORY

Lab1, Lab2 Investigations of the structure and properties of materials created by plastic deformation. High effective plastic deformation.

Lab3, Lab4 Investigations of the structure and properties of materials created by powder metallurgy.

Lab5, Lab6 Investigations of the structure and properties of surface of materials created by CVD and PVD techniques.

Lab7, Lab8 Investigations of the structure and properties of materials created by casting technologies.

BASIC REFERENCES

1. M. Ashby, H. Shercliff, D. Cebon, Inżynieria materiałowa, Wydawnictwo Galaktyka, Łódź 2011 r.
2. L.A. Dobrzański, Wprowadzenie do nauki o materiałach, Wydawnictwo Politechniki Śląskiej, Gliwice 2007 r.
3. L.A. Dobrzański, Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, Wydawnictwo Naukowo-Techniczne, Warszawa 2006 r.
4. L.A. Dobrzański, Podstawy kształtowania struktury i własności materiałów metalowych, Wydawnictwo Politechniki Śląskiej, Gliwice 2007 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Lacki P., Więckowski W., Luty G., Wieczorek P., Motyka M., Evaluation of Usefulness of AlCrN Coatings for Increased Life of Tools Used in Friction Stir Welding (FSW) of Sheet Aluminum Alloy, Materials, vol. 13 iss. 18, 2020 r.

2. Golański G., Merda A., Wieczorek P., Klimaszewska K., Metody badania wybranych właściwości mechanicznych materiałów metalowych i ich złączy spawanych- Politechnika Częstochowska, 2021 r.

LEARNING OUTCOMES

- › **EU1** Student has basic theoretical knowledge in the field of shaping of materials properties.
- › **EU2** Student is able to practical use knowledge in the field of shaping of materials properties.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.

WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)

- › **F1.** Assessment of preparation for exercises
- › **F2.** Assessment of the ability to apply the acquired knowledge during exercises
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - Exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam	2	0,08
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		

Preparation for classes		
Preparation for lab	30	1,2
Project preparation		
Consultation	6	0,24
Preparation for the exam	17	0,68
Total student's own work	68	2,72
Total number of hours/ ECTS points for the course	100	4,0

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow
Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow

MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program	Course objectives	Course content	Ways of assessment
EU 1	K_W04,	C1	L1 - L5	P1
EU 2	K_W04, K_U08, K_K02,	C2	Lab1 - Lab8	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has basic theoretical knowledge in the field of shaping of materials properties.

- › 2,0 The student has not any basic knowledge in the field of shaping of materials properties.
- › 3,0 The student has a basic knowledge in the field of shaping of materials properties.
- › 3,5 The student has a little more than basic knowledge in the field of shaping of materials properties.

- › 4,0 The student has a basic knowledge in the field of shaping of materials properties and is able to characterize a goal with their use at good level.
- › 4,5 The student has a basic knowledge in the field of shaping of materials properties and is able to characterize a goal with their use at almost perfect level.
- › 5,0 The student has a basic knowledge in the field of shaping of materials properties and is able to characterize a goal with their use at perfect level.

EU2 Student is able to practical use knowledge in the field of shaping of materials properties.

- › 2,0 The student is no able to practice use knowledge of the shaping of materials properties.
- › 3,0 The student has only a basic practical knowledge of the shaping of materials properties.
- › 3,5 The student has an almost good practice knowledge of the shaping of materials properties.
- › 4,0 The student correctly uses the knowledge and solves the problems of the shaping of materials properties.
- › 4,5 The student has almost very well mastered the practical knowledge of the shaping of materials properties.
- › 5,0 The student has mastered the practical knowledge of the shaping of materials properties.