Polish course name	**PROJEKTOWANIE I DOBÓR MATERIAŁÓW**
English course name	**DESIGN AND MATERIALS SELECTION**
Course code	**WIP-MDL-D1-DAMS-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	**Test**

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			30	

TEACHERS:

Dr inż. Paweł Wieczorek.

COURSE OBJECTIVES:

› **C1** Providing students with knowledge in the field of design and materials selection.

› **C2** Obtaining by the students the practical skills in the field of design and materials selection.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

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

COURSE CONTENT

LECTURE

› **L1** Design process: function, material, shape and technology.

› **L2** Classification of materials used in engineering practice and their properties.

› **L3** Methods of presenting the properties of material.

› **L4** Materials indices.
› **L5** Procedure determining for materials indices without shape factor.
› **L6** Materials indicators with shape factor.
› **L7** Selection of manufacturing technology, joining and surface treatment.
› **L8** Economical aspects of choice of technology depending on the batch size.
› **L9** Ecological and environmental aspects of selection.
› **L10** Golden rules of designing.
› **L11** Obtaining of materials data during selection process.

LABORATORY

› **Lab1** Introduction to CES Edu Pack.
› **Lab2** Solving problems of material selection using property charts.
› **Lab3** Determining functionality indicators.
› **Lab4** Selection of materials based on one design criterion.
› **Lab5** Multi-criteria determination of functionality and material selection indicators.
› **Lab6** Determination of functionality indicators taking into account the shape of the finished product.
› **Lab7** Selection of methods and processes of manufacturing products, taking into account the bath size of production.

BASIC REFERENCES

1. M. F. Ashby, Dobór materiałów w projektowaniu inżynierskim, WNT, Warszawa, 1998 r.
2. M. Ashby, H. Shercliff, D. Cebon, Inżynieria materiałowa, Wydawnictwo Galaktyka, Łódź 2011 r.
3. L.A. Dobrzański, Wprowadzenie do nauki o materiałach, Wydawnictwo Politechniki Śląskiej, Gliwice 2007 r.
4. M. F. Ashby, D.R.H. Jones, Materiały inżynierskie, właściwości i zastosowania, WNT, Warszawa, 1995 r.
5. L.A. Dobrzański, Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, Wydawnictwo Naukowo-Techniczne, Warszawa 2006 r.
6. M. Ashby, Materials Selection i materials design; third edition, 2005 r., Butterwirth&Hainemann.

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 design and materials selection.
› **EU2** Student is able to practical use knowledge in the field of design and materials selection.

TEACHING TOOLS

› Multimedia presentations.
› Laboratory equipment, CES software.

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 - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test		
Exam		

Total contact hours	60	2,4
Student's own work		
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		
Preparation for classes		
Preparation for lab	15	0,6
Project preparation		
Consultation	4	0,18
Preparation for the test	6	0,24
Total student's own work	40	1,6
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_W03,	C1	L1 - L11	P1
EU 2	K_W03, K_U09, K_K02,	C2	Lab1 – Lab7	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has basic theoretical knowledge in the field of design and materials selection.

› 2,0 The student has not any basic knowledge in the field of design and materials selection.

- 3,0 The student has a basic knowledge in the field of design and materials selection.
- 3,5 The student has a little more than basic knowledge in the field of design and materials selection.
- The student has a basic knowledge in the field of design and materials selection 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 design and materials selection 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 design and materials selection 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 design and materials selection.

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