

Polish course name	METODY BADANIA MATERIAŁÓW
English course name	METHODS OF MATERIALS INVESTIGATION
Course code	WIP-MDL-D1-MOMI-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	5
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			30	

TEACHERS:

Dr inż. Zbigniew Bałaga.

COURSE OBJECTIVES:

- › **C1** Providing students with basic knowledge in the field of research methods and techniques for mechanical and functional properties of engineering materials.
- › **C2** Mastering the use of selected modern research equipment by students.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of physics, chemistry, work safety rules when using machines and devices
2. Ability to use basic measuring tools.
3. Ability to work alone and in a group.
4. Ability to prepare written reports on the performed laboratory exercises.
5. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Introduction: materials, their structure and materials testing methods.
- › **L3, L4** Structural investigation of materials.
- › **L5, L6** Quantitative description of the structure of materials.
- › **L7, L8, L9, L10, L11** Methods of testing the properties of materials.
- › **L12, L13, L14, L15** Non - destructive testing of materials.

LABORATORY

- › **Lab1** Acquainting students with the rules of passing the course.
- › **Lab2 - Lab9** Research on the structure of materials.
- › **Lab10 - Lab20** Research on the properties of materials.
- › **Lab21 - Lab29** Non-destructive testing of materials.
- › **Lab30** Test.

BASIC REFERENCES

1. G. Golański, A. Dudek, Z. Bałaga: Metody badania właściwości materiałów. Wyd. Politechnika Częstochowska 2011 r.
2. Z. L. Kowalewski: Współczesne badania wytrzymałościowe. Wyd. Biuro Gamma, Warszawa 2008 r.
3. M. Wojas: Wady wyrobów wykrywane metodami nieniszczącymi - Cz.2. wady eksploatacyjne. Wyd. Biuro Gamma, Warszawa 2006 r.
4. J. Lis: Laboratorium z nauki o materiałach, Wyd. AGH, Kraków 2003 r.
5. K. Przybyłowicz: Metody badania metali i stopów. Wyd. AGH, Kraków 1997 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. M. Łomozik: Metaloznawstwo i badania metalograficzne połączeń spawanych. Instytut Spawalnictwa, Gliwice 2005 r.
2. M. Blicharski: Odkształcanie i pękanie. Uczelniane Wyd. AGH, Kraków 2002 r.
3. L.A. Dobrzański: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego. WNT, Warszawa 2002 r.

LEARNING OUTCOMES

- › **EU1** The student has basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › **EU2** The student has a basic knowledge of the operation, operation and selection of basic research equipment.
- › **EU3** The student is able to prepare a report on the course of the implementation of laboratory exercises.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › The e-learning platform of the Czestochowa University of Technology (if the classes are held in a stationary form, it can be used as an auxiliary tool), or other tools for distance learning. Computer stations with software.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of laboratory tasks - final test.
- P1.** Assessment of the mastery of the teaching material within the lectures – exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test		
Exam	2	0,08
Total contact hours	47	1,88

Student's own work		
Getting acquainted with the indicated literature	26	1,04
Preparation for seminar		
Preparation for classes		
Preparation for lab	26	1,04
Project preparation		
Consultation	4	0,16
Preparation for the exam	22	0,88
Total student's own work	78	3,12
Total number of hours/ ECTS points for the course	125	5,0

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow/plan-zajec/studia-stacjonarne
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_W01, K_W03, K_W04, K_U08, K_K01,	C1, C2	L1 - L15 Lab1 - Lab30	F1, P1
EU 2	K_W01, K_W03, K_W04, K_U08,	C1, C2	L1 - L15 Lab1 - Lab30	F1, F2, P1

	K_K01,			
EU 3	K_W01, K_W03, K_W04, K_U08, K_U09, K_K01,	C1, C2	Lab1 - Lab30	F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic theoretical knowledge in the field of studying the structure and functional properties of materials.

- › 2,0 The student has not mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 3,0 The student partially mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 3,5 The student has almost mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 4,0 The student has mastered good the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 4,5 The student has mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials almost very good.
- › 5,0 The student has mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials very good.

EU2 The student has a basic knowledge of the operation, operation and selection of basic research equipment.

- › 2,0 The student has not mastered the basic knowledge about the operation, operation and selection of basic research equipment.
- › 3,0 The student partially mastered the basic knowledge about the operation, operation and selection of basic research equipment.
- › 3,5 The student has almost mastered the basic knowledge of the operation, operation and selection of basic research equipment.
- › 4,0 The student has mastered good the basic knowledge of the operation, operation and selection of basic research equipment.

- › 4,5 The student has mastered the basic knowledge of the operation, maintenance and selection of basic research equipment almost very good.
- › 5,0 The student has mastered the basic knowledge of the operation, operation and selection of basic research equipment very good.

EU3 The student is able to prepare a report on the course of the implementation of laboratory exercises.

- › 2,0 The student is not able to prepare a report on the course of the implementation of laboratory exercises.
- › 3,0 The student can partially prepare a report on the course of the implementation of laboratory exercises.
- › 3,5 The student can almost prepare a report on the course of the implementation of laboratory exercises.
- › 4,0 The student is able to prepare a report on the implementation of laboratory exercises good.
- › 4,5 The student is almost very good at preparing a report on the implementation of laboratory exercises.
- › 5,0 The student is very good at preparing a report on the course of the implementation of laboratory exercises.