



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Modern methods of research materials [S1IMat1>NMBM]

Course

Field of study

Materials Engineering

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

2,00

Coordinators

dr hab. inż. Adam Piasecki

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Lecturers

Prerequisites

Basic knowledge of chemistry, physics, materials science. Logical thinking, use of the information obtained from the library and the Internet. Understanding the need for learning and acquiring new knowledge.

Course objective

Knowing the modern methods of testing materials

Course-related learning outcomes

Knowledge:

1. students should describe the basic methods for testing the properties of materials. - [k_w08, k_w11]
2. students should describe the construction of modern machines and equipment for material testing. - [k_w11]

Skills:

1. the student is able to propose appropriate methodology for testing materials. - [k_u01, k_u05, k_u10]
2. the student is able to conduct research. - [k_u08, k_u18]

3. the student is able to analyze test results - [k_u01, k_u05, k_u08]

Social competences:

1. the student is able to work in a group - [k_k03]

2. the student is aware of the importance of modern methods of researching materials in the modern economy and for society - [k_k02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: - credit on the basis of a test consisting of both open and test questions carried out at the end of the semester.. Scale of estimate: 51-60% - dst(C), 61-70% - dst+(C+), 71-80% - db(B), 81-90% - db+(B+), 91-100% - bdb(A).

Laboratory classes: evaluation of students knowledge necessary to prepare, and carry out the lab tasks and evaluation of reports.

Programme content

Lecture: Testing methods to assess physical and mechanical properties of materials. Testing methods to assess microstructure: optical microscopy, scanning electron microscopy, transmission electron microscopy, X-ray diffraction, testing methods to assess material surfaces. Testing methods to assess the chemical and phase composition of materials. Calorimetric methods. Tribology.

Laboratory classes: 1. Scanning electron microscopy. 2.EDS X-ray microanalysis. 3. Atomic force microscopy. 4. Dilatometric method. 5. Differential scanning calorimetry. 6. Tribological research.

Course topics

none

Teaching methods

multimedia presentations

Bibliography

Basic

1. Kubiński W., Wybrane metody badania materiałów. Badanie metali stopów. Wyd. PWN. 2020.

2. Barbacki A. (red.), Metody i techniki strukturalnych badań metali, Wyd. Politechniki Poznańskiej, Poznań 1994.

Additional

1. Barbacki A. (red.), Mikroskopia elektronowa, Wyd. Politechniki Poznańskiej, Poznań 2005.

2. Kurzydłowski K., Lewandowska M., Nanomateriały inżynierskie konstrukcyjne i funkcjonalne, Wyd. PWN. 2010.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	34	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00