COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physical Methods of Materials Characterisations [S1IMat1>MFB]

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 inż. Mikołaj Popławski
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Lecturers

Prerequisites

Knowledge related to physics, chemistry, materials science.

Course objective

Introduction to the most popular methods of phase transition investigations (theoretical backgrounds, review of equipments, examples)

Course-related learning outcomes

Knowledge:
basic knowledge of metallurgy, phase transitions, solid state physics and thermodynamics.

Skills:
can obtain information from literature, databases and other properly selected sources in the area of physical methods of materials characterisations; can integrate, interpret and critically assess obtained information as well as draw conclusions, formulate and justify opinions; can apply methods used to carry out research into physical methods of materials characterisations and in material science and engineering;

Social competences:
understands the need for lifelong learning; can inspire and organize the learning process of others; can cooperate and work in a group, adopting various roles;

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Final test, laboratory reports.
Laboratory classes: evaluation of students knowledge necessary to prepare, and carry out the lab tasks and evaluation of reports.

Programme content

Temperature dependencies of physical properties of solid-state phase transitions (thermodynamic description of phase transitions). Calorimetric (DTA and DSC calorimeters), thermomechanical (dilatometers), thermogravimetrical (TG and magnetic equipments), and electric methods of material characteristies: theoretical backgrounds, equipments, examples, obtained information. Differences between methods and rules for their selection in order to obtain specific information. Introduction to characterisation of the equipments available in the Institute of Materials Science

Course topics

none

Teaching methods

Lectures, presentation of equipments available in the Institute of Materials Science and laboratory classes.

Bibliography

Basic
1. L.A. Dobrzański, R. Nowosielski, Metody badań metali i stopów. Badania własności fizycznych, Wydawnictwa Naukowo-Techniczne, Warszawa, 1987
2. D. Schultze: Termiczna analiza różnicowa, Państwowe Wydawnictwo Naukowe, Warszawa 1974 .
3. Metody i techniki strukturalnych badań metali, pod red. A. Barbackiego, Wydawnictwo Politechniki Poznańskiej, 1994.
4. W. Hume-Rothery, J.W. Christian, W.B. Pearson: Physics in Industry, Metallurgical Equilibrium Diagrams, The Institute of Physics, London 1952
Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	2,00
Classes requiring direct contact with the teacher	15	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00