

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Metody wytwarzania i przetwarzania materiałów
Name of the course in English	Manufacturing methods and post-processing technology of materials.
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Choosable
Field of education	Engineering and technology
Discipline of education	Materials engineering
Person responsible for the course Contact	Marek Hebda, <i>doctor habilitatus</i> , prof. of CUT marek.hebda@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical classes	Laboratory	Computer Lab	Project Class	Seminar
2, 3, 4, 5	G	15	0	0	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Expanding knowledge in the field of manufacturing possibilities and methods of modifying material properties.
Objective 2	Acquiring the ability to select methods of manufacturing and processing materials and their control depending on the expected properties to be obtained.

Learning outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUD DS	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student knows and understands the methodology of conducting modern laboratory tests of materials.	E_W01, E_W02	Involvement in class activities, a presentation
EUW2	The doctoral student knows and understands the basic structural phenomena occurring in engineering materials under the influence of external factors.	E_W01, E_W02	Involvement in class activities, a presentation

OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to select the appropriate methods of manufacturing and testing the properties of materials, and to correctly analyze and evaluate / classify the results obtained.	E_U01	Involvement in class activities, discussion
EUU2	The doctoral student has the ability to plan and carry out basic methods of testing engineering materials, operate specialized scientific and research equipment, and is able to collect and process test results and evaluate measurement errors.	E_U01	Involvement in class activities, discussion
EUU3	The doctoral student is able to use appropriate analytical, simulation and experimental methods to formulate and solve material problems in technology.	E_U01	Involvement in class activities, discussion
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is able to refer to the solutions and research results related to the technology of manufacturing and processing a material with various methods known in the literature, and to indicate solutions that can be used for issues related to the implementation of the doctoral dissertation or justify the lack of the need to use such research methods.	E_K01	Involvement in class activities, discussion
EUK2	The doctoral student is able to apply appropriate methods of manufacturing and processing materials in the formulation and solving of material problems in technology.	E_K03	Involvement in class activities, discussion

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
Production and processing of modern materials, including smart, super-hard, functional gradient materials. Modern technologies in surface engineering. Nanomaterials and nanotechnologies.			
W1	Objectives and general principles of methods of manufacturing and processing materials.	EUW1, EUU1, EUK1, EUK2	1
W2	Classification of methods of manufacturing and processing materials.	EUW1, EUU1, EUK1, EUK2	1
W3	Manufacturing of modern smart materials, super-hard, functional gradient materials.	EUW1, EUU1, EUK1, EUK2	2
W4	Technologies in surface engineering.	EUW2, EUU2, EUK1, EUK2	2
W5	Additive methods.	EUW2, EUU2, EUK1, EUK2	3

W6	Nanomaterials and nanotechnologies.	EUW2, EUU2, EUK1, EUK2	1
W7	Identifying the possibility of using thermal analysis methods in issues related to the subject of ongoing doctoral dissertations.	EUW2, EUU2, EUU3, EUK1, EUK2	5

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH AN ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	1
HOURS WITHOUT THE PARTICIPATION OF AN ACADEMIC TEACHER	
Independent study of the course contents	8
Preparation of a paper, a report, a project, a presentation, a discussion	5
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Not specified

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	75% attendance in class.
2	Presentation of a paper.
METHOD OF THE FINAL GRADE CALCULATION	
Assessment of the presented paper, taking into account the attendance.	

Additional information

Not specified

The course reading list

1	Andreas Gebhardt and Jan-Steffen Hötter - Additive Manufacturing 3D Printing for Prototyping and Manufacturing, 2016
2	Michael F. Ashby - Nanomaterials, nanotechnologies and design, 2009
3	Alicia Esthere Ares - Manufacturing and Surface Engineering, 2018
4	Fundamentals of Smart Materials, Royal Society of Chemistry, 2020
5	Marinella Ferrara, Murat Bengisu - Materials that Change Color: Smart Materials, Intelligent Design, 2013

6	Mark Munday, Serdar Ozbayraktar, Charles Simon James Pickles, Geoffrey Scarsbrook - Handbook of Applied Superhard Materials, 1st ed., 2018
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