

Cracow University of Technology

## 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	Materiały kompozytowe – mikro- i nanostruktury
Name of the course in English	Composite materials - micro- and nanostructures
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Mandatory / Choosable
Field of education	Engineering and technology
Discipline of education	Materials engineering
Person responsible for the course Contact	Bożena Tylińczak, <i>doctor habilitatus</i> , prof. of CUT <a href="mailto:bozena.tylińczak@pk.edu.pl">bozena.tylińczak@pk.edu.pl</a>

### 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 about modern composite materials and the structure of materials from the macro scale to the microscopic scale.
Objective 2	Expanding knowledge in the field of methods of obtaining and testing advanced composite materials and nanomaterials
Objective 3	Acquiring the ability to select suitable composite materials and nanomaterials for industrial applications

### 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
<b>OUTCOMES RELATED TO KNOWLEDGE</b>			
EUW1	The doctoral student has extensive knowledge of the structure and properties of composite materials and nanomaterials	E_W01, E_W02	Involvement in class activities, a paper
EUW2	The doctoral student is able to define the basic types of composite materials and nanomaterials, knows the methods of their production and areas of application	E_W01, E_W02	Involvement in class activities, a paper

OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to choose the appropriate methods of testing composite materials and nanomaterials	E_U01	A paper, a presentation
EUU2	The doctoral student is able to design and conduct research on composite materials and nanomaterials	E_U01	A paper, a presentation
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is able to refer to the methods of designing, obtaining and testing composite materials and nanomaterials known in the literature, occurring in an issue related to the implementation of the doctoral dissertation, and is able to justify the methods they use or the lack of the need to use them.	E_K01, E_K03	Discussion

### Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Criteria for the division and classification of composite materials and nanomaterials	EUW1, EUW2, EUU1	7
W2	Physical and chemical properties of composite materials and nanomaterials. Mechanical properties of composite materials and nanomaterials.	EUW1, EUW2, EUU1	4
W3	Selected methods of laboratory tests and in situ tests, taking into account the specificity of materials.	EUW2, EUU2, EUK1	4

### 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	2
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	4
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

### Preliminary requirements

No.	Requirements
1	Not specified
2	

### Course credit assignment conditions / method of the final grade calculation

No.	Description
<b>COURSE CREDIT ASSIGNMENT CONDITIONS</b>	
1	80% attendance in class. Presentation of a paper.
<b>METHOD OF THE FINAL GRADE CALCULATION</b>	
Weighted average grade for the presentation.	

**Additional information**

Not specified
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**The course reading list**

1	K. Kurzydłowski, M. Lewandowska, Nanomateriały inżynierskie, PWN, Warszawa 2010.
2	Leszek Dobrzański „Materiały inżynierskie i projektowanie materiałowe” 2006, WNT