

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	Metody badań materiałów
Name of the course in English	Material test methods
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	Stanisław Kuciel, <i>doctor habilitatus</i> , prof. of CUT stanislaw.kuciel@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 on modern methods of testing polymeric materials and thermoplastic composites
Objective 2	Expanding knowledge in the field of computer image analysis methods used in deformation analysis.
Objective 3	Acquiring the ability to select appropriate methods of polymer materials testing and to perform these tests.

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 modern material strength tests and processing tests of polymeric materials and composites	E_W01, E_W02	Involvement in class activities, graded presentation of a paper

EUW2	The doctoral student knows and understands the implementation of research according to a standard and the appropriate selection of research methodology to solve a material problem.	E_W01, E_W02	Involvement in class activities, graded presentation of a paper
OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to independently design the scope of research on the properties of polymeric materials and composites and correctly analyze the obtained results.	E_U01	Involvement in class activities, graded presentation of a paper
EUU2	The doctoral student is able to independently perform basic strength tests and determine the processing parameters.	E_U01	Involvement in class activities, graded presentation of a paper
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is ready to critically analyze the methodology of applied material research and its impact on the obtained results.	E_K01	Involvement in class activities, graded presentation of a paper

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Purposes and general principles of material testing of polymers and composites. Causes of measurement errors.	EUW1, EUU1, EUK1, EUK2	2
W2	Physical and chemical properties of thermoplastic composite materials. Selected methods of strength tests: tensile, bending, impact strength.	EUW1, EUU1, EUK1, EUK2	3
W3	Rheological properties of polymeric materials and evaluation of loads varying with time on the change of strength values.	EUW1, EUU1, EUK1, EUK2	2
W4	Methods for determining the Poisson's ratio and its physical interpretation in the light of polymer science.	EUW2, EUU2, EUK1, EUK2	2
W5	Methods for measuring the coefficient of friction and wear of polymers and composites.	EUW2, EUU2, EUK1, EUK2	2
W6	Principles of preparation of technical studies: protocol and test report; technical opinion, expertise, opinion.	EUW2, EUU2, EUK1, EUK2	2
W7	Model tests, manufacturing product models with additive methods and evaluation of the state of stresses and deformations.	EUW2, EUU2, EUU3, EUK1, EUK2	2

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	None 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 prepared by the doctoral student on the methodology of experimental research on materials / structures related to the subject of the doctoral dissertation.
METHOD OF THE FINAL GRADE CALCULATION	
Assessment of the completion of the presented work, taking into account the attendance.	

Additional information

None specified

The course reading list

1	Przygocki W.: Metody fizyczne badań polimerów, PWN Warszawa 2001
2	Frącz W., Krywuł B.: Projektowanie i wytwarzanie elementów z tworzyw sztucznych, Oficyna wydawnicza Politechniki Rzeszowskiej, Rzeszów 2005
3	Kapko J., Thomalla J., Broniewski T., Płaczek W.: Metody badań i ocena właściwości tworzyw sztucznych, WNT Warszawa 2000
7	Normy PKN do badań materiałów polimerowych i kompozytów, wyrobów i elementów konstrukcyjnych