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	Analiza i ocena stanu powierzchni warstwy wierzchniej
Name of the course in English	Analysis and assessment of the surface layer condition
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Choosable
Field of education	Engineering and technology
Discipline of education	Mechanical engineering
Person responsible for the course Contact	Magdalena Niemczewska-Wójcik *doctor habilitatus,* prof. of CUT magdalena.niemczewska-wojcik@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	Introduction to the subject of surface layer research.
Objective 2	Introduction to the subject of the surface layer analysis (parametric / non-parametric, 2D / 3D.
Objective 3	Acquiring the ability to select research devices and methods for surface layer analysis, depending on the research object.

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 the methodology of the surface layer research, including the research methods.	E_W01 E_W02	Involvement in class activities. A presentation.

EUW2	The doctoral student knows the methods of surface layer analysis.	E_W01 E_W02	Involvement in class activities. A presentation.
OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to list elements of the surface layer research methodology and select the surface layer research methods depending on the research object.	E_U01	A presentation, discussion.
EUU2	The doctoral student is able to present the stages of the surface layer analysis with the division into parametric and non-parametric analysis, 2D and 3D analysis, necessary in the implementation of the doctoral dissertation.	E_U01	A presentation, discussion.
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is able to refer to the methods of research and analysis of the surface layer known in the subject literature, in terms of issues related to the implementation of the doctoral thesis and with justification.	E_K01 E_K03	Discussion.

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	The surface layer – its elements and their characteristics.	EUW1	2
W2	Methodology of testing the surface layer.	EUW1	2
W3	Methods of testing the surface layer.	EUW1, EUW2, EUU1	3
W4	Methods of surface layer analysis - parametric and non-parametric analysis, 2D and 3D analysis.	EUW2, EUU2	4
W5	Principles of inference and assessment of the surface condition of the surface layer, depending on the research object and its purpose.	EUW1, EUW2, 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	Knowledge of materials science, manufacturing process and metrology.
2	Knowledge of the English language.

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 on an assigned subject.
METHOD OF THE FINAL GRADE CALCULATION	
Assessment of the presented paper, taking into account the known methods and analyzes.	

Additional information

The thematic scope of the lecture, including the level of advancement of the content presented, takes into account the scope of knowledge in the subject matter (materials science, metrology, manufacturing technology) acquired by doctoral students at earlier stages of education.

The course reading list

1	Górecka R., Polański Z*., Metrologia warstwy wierzchniej*, 1983, WNT.
2	Whitehouse D.J., *Surface and nanometrology*, 2003, IoP.
3	Pawlus P., *Topografia powierzchni*, Rzeszów, 2006, Oficyna Wydawnicza Politechniki Rzeszowskiej.
4	Niemczewska-Wójcik M., *Dualny system charakteryzowania powierzchni technologicznej i eksploatacyjnej warstwy wierzchniej elementów trących*, Radom-Kraków, 2018, Wydawnictwo Naukowe ITeE-PIB.