

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	Niekonwencjonalne i przyrostowe metody wytwarzania
Name of the course in English	Non-conventional and additive manufacturing processes
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	Prof. Sebastian Skoczypiec, <i>doctor habilitatus</i> sebastian.skoczypiec@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 physical phenomena used in erosive and incremental machining.
Objective 2	Introduction to the most important methods and technological possibilities of erosive and incremental machining.

### 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>			
E UW1	The doctoral student is able to characterize the erosive and incremental machining processes and to provide the most essential technological indicators.	E_W01, E_W02	Involvement in class activities, a presentation.
E UW2	The doctoral student is able to describe the basic physical phenomena used in the processes of erosive and incremental machining.	E_W01, E_W02	Involvement in class activities, a presentation.

OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to provide examples of the application of erosive and incremental machining.	E_U01	A presentation, discussion.
EUU2	The doctoral student is able to make and justify the selection of an appropriate erosion or incremental technology for the selected product.	E_U01	A presentation, discussion.
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is able to indicate and justify the possibilities of the application of erosive and incremental machining in an issue related to the subject of the doctoral dissertation.	E_K03	Discussion.

### Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	The characteristics of erosive machining.	EUW1	2
W2	Thermal erosion machining.	EUW1, EUW2 EUU1, EUU2 EUK1	3
W3	Chemical and electrochemical erosion machining.	EUW1, EUW2 EUU1, EUU2 EUK1	2
W4	Mechanical erosive machining.	EUW1, EUW2 EUU1, EUU2 EUK1	2
W5	The characteristics of additive manufacturing.	EUW1, EUW2 EUU1, EUU2 EUK1	1
W6	Additive manufacturing technologies.	EUW1, EUW2 EUU1, EUU2 EUK1	3
W7	Principles of designing models for additive manufacturing.	EUW1, EUW2 EUU1, EUU2 EUK1	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	2
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	4

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
<b>COURSE CREDIT ASSIGNMENT CONDITIONS</b>	
1	80% attendance in class.
2	Presentation of a paper.
<b>METHOD OF THE FINAL GRADE CALCULATION</b>	
Grade for the presentation.	

#### Additional information

The thematic scope of the lecture, including the level of advancement of the discussed phenomena and processes, takes into account the scope of knowledge acquired by the doctoral students at earlier stages of education.

#### The course reading list

1	Skoczypiec S., <i>Elektroerozyjne i elektrochemiczne metody mikrowytwarzania</i> , Kraków, 2019, Wydawnictwo Politechniki Krakowskiej.
2	Grzesik W., Ruszaj A., <i>Hybrydowe metody obróbki materiałów konstrukcyjnych</i> , 2021, Wydawnictwo Naukowe PWN.
3	Stříteský O., Průša J., Bach M., <i>Podstawy druku 3D z Josefem Prusą</i> , Prusa Research a.s. (ebook: <a href="https://www.prusa3d.com/pl/strona/podstawy-druku-3d-z-josefem-prusa_490/">https://www.prusa3d.com/pl/strona/podstawy-druku-3d-z-josefem-prusa_490/</a> ).
4	Siemiński P., Budzik G., <i>Techniki przyrostowe. Druk 3D. Drukarki 3D</i> , 2015, OWPW.
5	El Hofy H.-G., <i>Advanced machining processes nontraditional and hybrid machining processes</i> , New York, 2005, McGraw Companies..