

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	Klasyczne techniki obróbki
Name of the course in English	Conventional machining techniques
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. Wojciech Zębała, <i>doctor habilitatus</i> wojciech.zebala@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 of conventional machining techniques for construction materials.
Objective 2	Expanding knowledge about the construction and operation of modern cutting machine tools.
Objective 3	Acquiring the ability to select and optimize machining parameters.

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			
E UW1	The doctoral student knows and understands the principles of applying conventional machining techniques for processing construction materials and the construction of machining tools.	E_W01, E_W02	Involvement in class activities, grade for the presentation of a paper.

EUW2	The doctoral student knows and understands the construction and operation rules of modern cutting machine tools.	E_W01, E_W02	Involvement in class activities, grade for the presentation of a paper.
OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student can choose the appropriate cutting parameters.	E_U01	Involvement in class activities, grade for the presentation of a paper.
EUU2	The doctoral student is able to plan the manufacturing process with the ability to select appropriate tools and technological equipment.	E_U01	Involvement in class activities, grade for the presentation of a paper.
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is ready to critically evaluate the results of research on the machining of construction materials described in the subject literature.	E_K01	Involvement in class activities, grade for the presentation of a paper.
EUK2	The doctoral student is ready to recognize the importance of knowledge about the construction and operation of modern cutting machine tools.	E_K03	Involvement in class activities, grade for the presentation of a paper.

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Characteristics of subtractive machining. Machining kinematics. Classification of machining methods and techniques (turning and boring, broaching, drilling, countersinking and reaming, milling, gear machining, threading, abrasive machining).	EUW1, EEU1, EEU1	2
W2	Characteristics of the machined layer. The mechanics of the machining process. Forces, work and heat in the subtractive machining processes. Methods for optimizing the machining conditions.	EUW1, EEU1, EEU1	2
W3	Protective coatings on tools. PVD method (Physical Vapor Deposition) and CVD method (Chemical Vapor Deposition).	EUW1, EEU2, EEU1	1
W4	Applications of HPC (High-Pressure Coolant) and MLQ (Minimal Liquid Quantity) systems in chip machining. Manufacturing of parts of advanced shape on numerically controlled machine tools.	EUW1, EEU2, EEU1, EEU2	2
W5	Mechatronic tools in machining. Modern methods of rotating tools drive.	EUW2, EEU2, EEU1, EEU2	2
W6	Classic and numerically controlled cutting machines: definition, operation, driving, shaping, geometric systems.	EUW2, EEU2, EEU2	2
W7	Kinematic systems of multi-axis metal cutting machines and other numerically controlled technological machines.	EUW2, EEU2, EEU2	2
W8	Displacement and position measurement and control systems in CNC machine tools, incremental and absolute scales, and encoders. Tool and workpiece measurements.	EUW2, EEU2, EEU2	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	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	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.
METHOD OF THE FINAL GRADE CALCULATION	
Grade for the presentation of the paper, taking into account attendance.	

Additional information

None specified

The course reading list

1	Grzesik W., <i>Podstawy skrawania materiałów metalowych</i> , 2010, Warszawa, WNT.
2	Praca zbiorowa pod red. Czesława Niżankowskiego, <i>Podstawy obróbki ubytkowej i powłok ochronnych</i> , 2008, Kraków, WPK.
3	Praca zbiorowa pod redakcją H. Żebrowskiego, <i>Techniki wytwarzania, obróbka wiórowa, ścierna i erozyjna</i> , 2004, Wrocław, Oficyna Wydawnicza Politechniki Wrocławskiej.
4	Honczarenko J., <i>Obrabiarki sterowane numerycznie</i> , 2008, Warszawa, WNT.
5	Przybylski W., Deja M., <i>Komputerowo wspomagane wytwarzanie maszyn</i> , 2007, Warszawa, WNT.