



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Machining

### Course

Field of study

Management and Production Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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### Prerequisites

Basic scope of machining operations types and its kinematics, cutting tools, physics, mechanics and technical drawing.

### Course objective

1. Introducing advanced knowledge and skills related to forming (subtractive) technologies.
2. Fostering basic problem solving skills and independently carrying out assignments based on acquired knowledge.



### Course-related learning outcomes

#### Knowledge

Has basic knowledge of subtractive technologies applied in machine manufacturing process.

#### Skills

1. Knows how to define application scope for given forming technology
2. Knows how to select proper technology to manufacture given part and can justify his/her choice
3. Knows how to characterize given manufacturing technology and can describe its pros and cons
4. Knows how to perform initial economical analysis of manufacturing technology in given case

#### Social competences

Is aware of relations between human resources management and non-technical aspects of his/her work including responsibilities for his/her decisions

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Lecture:

Final exam from lecture material at the end of the semester (pass if you obtain at least 50.1% of the correct answers). Up to 50.0% - ndst, from 50.1% to 60.0% - dst, from 60.1% to 70.0% - dst +, from 70.1 to 80 - db, from 80.1% to 90 , 0% - db +, from 90.1% - very good.

#### Laboratory classes:

Credit is awarded based on oral questioning and/or written test checking knowledge on the subject of laboratory exercise, reports from each laboratory exercise with accordance to given guidelines.

### Programme content

#### Lecture:

1. Characteristics and application of machining in contemporary manufacturing.
2. Machining operations types and its kinematics.
3. Contemporary materials for cutting edge and cutting tools.
4. Selected physical phenomenons occurring in machining process (heat, diffusion, adhesion, friction).
5. Energetical aspects: cutting force, power and torque.
6. Tool life and reliability.
7. Surface layer characteristic.
8. Machinability of materials.



Laboratory classes:

1. Comparison of cutting ability and economical performance of different cutting materials.
2. Evaluation of geometric characteristics of surface layer subjected to different types of machining.
3. Evaluation of machinability of different materials based on force and temperature measurement.
4. Evaluation of feed force and cutting torque during drilling operation.
5. Tools and tool materials for cutting wedges.

### Teaching methods

Lecture: multimedia presentation illustrated with examples given on the blackboard, solving problems.

Laboratory classes: performing experiments, solving problems, discussion, working in a team.

### Bibliography

Basic

1. Adamczak S., Pomiary geometryczne powierzchni. Zarysy kształtu, falistości i chropowatości., WNT, Warszawa 2008.
2. Filipowski R., Marciniak M.: Techniki obróbki mechanicznej i erozyjnej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000.
3. Kawalec M., Kodym J., Jankowiak M.: Laboratorium z podstaw skrawania. WPP 1984.
4. Olszak W.: Obróbka skrawaniem. WNT Warszawa 2008.
5. Słupik H.: Obróbka skrawaniem. Podstawy teoretyczne. Wydawnictwo Politechniki Śląskiej. Gliwice 2010.
6. Wysiński M.: Nowoczesne materiały narzędziowe WNT Warszawa 1997.
7. Praca pod redakcją Żebrowskiego H.: Techniki wytwarzania. Obróbka wiórowa, ścierna i erozyjna. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004.
8. Cichosz P., Narzędzia skrawające., WNT, Warszawa 2006.
9. PN-EN ISO 4287:1999 – Specyfikacje geometrii wyrobów – Struktura geometryczna powierzchni: metoda profilowa – Terminy, definicje i parametry struktury geometrycznej powierzchni.
10. PN-ISO 3002-1+A1 – Podstawowe pojęcia w obróbce wiórowej i ścierniej. Geometria części roboczej narzędzi skrawających. Terminologia ogólna, układy odniesienia, kąty narzędzia i kąty robocze oraz łamacze wióra.



Additional

1. Praca zbiorowa pod red. P. Cichosza, Techniki wytwarzania, obróbka ubytkowa, laboratorium, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2002.
2. Grzesik W., Podstawy skrawania materiałów konstrukcyjnych., Wydawnictwo Naukowe PWN, 2018.
3. Jemielniak K.: Obróbka skrawaniem. Oficyna Wydawnicza Politechniki Warszawskiej - Warszawa 1998.
4. Praca zbiorowa pod red. J. Kosmola: Techniki wytwarzania - obróbka wiórowa i ścierna. Wydawnictwo Politechniki Śląskiej, Gliwice 2002.
5. Miernik M., Skrawalność metali. Metody określania i prognozowania., Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006
6. Wieczorowski M., Cellary A., Chajda J.: Przewodnik po pomiarach nierówności powierzchni czyli o chropowatości i nie tylko. Politechnika Poznańska, Instytut Technologii Mechanicznej, Zakład Metrologii i Systemów Pomiarowych, Poznań 2003.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	65	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	35	1,0

<sup>1</sup> delete or add other activities as appropriate