COURSE DESCRIPTION CARD - SYLLABUS

Course name

Machining

Course

Field of study

Construction and Exploitation of Means of Transport

Year/Semester

2/3

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. Marek Rybicki

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Responsible for the course/lecturer:

Prerequisites

1) The student has basic knowledge of physics, mathematics and mechanics.

2) The student is able to use the acquired knowledge to analyze specific manufacturing techniques and is able to use information obtained from the library and the Internet.

3) The student shows independence in solving problems, gaining and improving the acquired knowledge and skills, understanding the need to learn.

Course objective

Acquainting future engineers with kinematics, technological possibilities, machine tools and tools for various cutting methods. Understanding the method of calculating theoretical roughness, parameters and cutting power. Acquiring the ability to select the material and geometry of the blade, cutting parameters as well as the length of the roll-out and coast-down path of various tools.

Course-related learning outcomes

Knowledge

1) Can characterize various cutting methods (kinematics, technological possibilities, machine tools and tools)

2) Has knowledge of the types of tool materials and methods of their production

Skills

1) He can choose the methods of cutting and tool materials to make a given part

2) He can distinguish and find different tools, methods of cutting and machine tools

3) Can communicate using the basic concepts and quantities in the field of machining contained in books, magazines, tool catalogs, materials of machine tool companies

4) Can calculate the length of the roll-out and coast-down path so that there is no collision during machining. He can calculate the cutting parameters with which he can machine so as not to exceed the machine power, roughness of the machined surface, tool life for various cutting methods

Social competences

He can solve dilemmas in the field of machining at the level of modern economy and society

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit on the basis of a test conducted at the last class in the semester (for answers to: 50 to 60% of questions - satisfactory, above 60 to 70% - satisfactory +, above 70 to 80% - good, above 80 to 90% - good +, above 90 to 100% % - very good)

Tutorials: Credit based on two small tests conducted in the middle and at the end of the semester. In order to obtain credit for the exercises, the number of absences cannot exceed 1/3 of the classes. In the case of solutions from 50 to 60% of tasks - satisfactory, above 60 to 70% - satisfactory +, above 70 to 80% - good, above 80 to 90% - good +, above 90 to 100% % - very good

Programme content

Lecture:

1) Classification of manufacturing techniques.

2) Cutting conditions (material decohesion).

3) Kinematics, technological possibilities, machine tools and tools for various cutting methods:

a. performed with tools with defined geometry (turning, milling, milling, drilling operations, broaching, chiselling),

b. performed with tools with undefined geometry (grinding, ultrasonic assisted grinding, honing, oscillating superfinishing, lapping).

4) Technological and geometric cutting parameters and the basics of their selection.

5) Basic concepts of blade geometry and tool materials. Blade wear and durability.

6) Accuracy and real and theoretical roughness of the machined surface.

7) Forces, moment and cutting power.

8) Machinability of various workpieces.

9) Trends in the tether technique.

Tutorials:

1) Kinematics of the cutting process:

a. Cutting speed, feed rate, feed per revolution and per tooth, effective speed.

b. The roll-out and coast-down distance and machine time.

2) Geometric and technological elements of the cut layer with various processing methods:

a. Width and thickness of the cut layer, depth of cut,

b. Variation in the cross-section of the cutting layer for one blade and the total cross-section.

3) Kinematic and geometric mapping of the blade in the material. Theoretical surface roughness.

4) Forces, moment and power with different methods and types of cutting.

5) Tool life and periodic cutting speed.

Teaching methods

Presentation, exercises, work with catalogs

Bibliography

Basic

1) Dul-Korzyńska B.: - Obróbka skrawaniem i narzędzia. Oficyna Wydawnicza Politechniki Rzeszowskiej 2009.

2) Erbel J. (red.): Encyklopedia technik wytwarzania w przemyśle maszynowym. Tom II. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001.

3) Filipowski R., Marciniak.: Techniki obróbki mechanicznej i erozyjnej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000.

4) Kawalec M.: Ćwiczenia z podstaw skrawania. Skrypt 1138, Wydawnictwo Politechniki Poznańskiej 1983.

5) Kosmol J. (red.): Techniki wytwarzania – obróbka wiórowa i ścierna. Wydawnictwo Politechniki Slaskiej, Gliwice 2002.

6) Olszak W.: Obróbka skrawaniem. WNT Warszawa 2008.

7) Żebrowski H. : Techniki wytwarzania. Obróbka wiórowa, ścierna i erozyjna. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004.

Additional

1) Cichosz P.: Narzędzia skrawające. WNT. Warszawa 2008.

2) Czasopisma naukowo-techniczne: Mechanik, Przegląd Mechaniczny, Werkstatt und Betrieb

3) Materiały firm narzędziowych (strona ZOS IMt PP)

4) Schneider G.: Cutting tool applications. ASM International 2002

5) Shaw M.C.: Metal Cutting Principles. Oxford University Press, Oxford 1996.

Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	50	2,0

[1] delete or add other activities as appropriate