COURSE DESCRIPTION CARD - SYLLABUS

Course name
Machining of automotive parts [S1MiTPM1>OSCM]

Course

Field of study
Materials and technologies for automotive industry

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr hab. inż. Paweł Twardowski prof. PP
pawel.twardowski@put.poznan.pl

Lecturers

Prerequisites

Basic knowledge of machining and material science. The student is able to use the acquired knowledge to analyze specific manufacturing techniques and has the ability to obtain information from the indicated sources. The student shows independence in solving problems, gaining and improving the acquired knowledge and skills, understanding the need to lern.

Course objective

Acquainting future engineers with kinematics, technological possibilities, machine tools and tools for various cutting methods. Understanding the method of calculating thearetical roughness, parameters and cutting power. Acquiring the ability to select the material, cutting edge geometry and cutting parameters. Understanding energy issues in the cutting process and tribological issues in the tool operation process.

Course-related learning outcomes

Knowledge:
1. The student has knowledge about the methods of shaping car parts using machining processes.

Skills:

1. The student is able to select the machining process for the production of car parts.

Social competences:
1. The student is aware of the importance of machining for the automotive industry.
2. The student is able to work in a group.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit based on a test containing questions from the content presented in the lecture (in the case of answers to: from 50 to 60% of questions - 3.0, over 60 to 70% - 3.5, over 70 to 80% - 4.0, over 80 to 90% - 4.5, above 90 to 100% - 5.0)
Laboratories: Assessment based on oral and / or written answers on the content of each performed laboratory exercise, reports on each performed exercise according to the teacher's instructions. In order to pass the laboratories, all exercises must be passed (positive grade from answers and reports).

Programme content

Characteristics of manufacturing techniques. Types and methods of cutting. Cutting conditions (material decohesion). Machining kinematics, technological possibilities. Technological and geometric cutting parameters and the basics of their selection. Materials for cutting tools. Wear and tool life. Accuracy and real and theoretical roughness of the machined surface. Forces, moment and cutting power. Selected tribological aspects. Machinability of various workpieces. Characteristics of the surface layer.

Course topics

Lecture
1) Characteristics of manufacturing techniques.
2) Types and methods of cutting.
3) Cutting conditions (material decohesion).
4) Machining kinematics, technological possibilities.
5) Technological and geometric cutting parameters and the basics of their selection.
6) Materials for cutting tools.
7) Wear and tool life.
8) Accuracy and real and theoretical roughness of the machined surface.
9) Forces, moment and cutting power.
10) Selected tribological aspects.
11) Machinability of various workpieces.
12) Characteristics of the surface layer.
Lab
1) Technological capabilities of milling machines and drills (machine tool, tools, process)
2) Technological capabilities of lathes and grinders (machine tool, tools, process).
3) Construction of cutting tools and analysis of tool materials
4) Assessment of geometrical and physical features of the surface layer after various processing methods
5) Evaluation of the machinability of cutting tools made of various tool materials
6) Assessment of machinability of processed materials

Teaching methods

1.Lecture: multimedia presentation, presentation illustrated with examples
2. Laboratory exercises: practical exercises, performing experiments, discussion, teamwork, case studies.

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. Kosmol J. (red.): Techniki wytwarzania ? obróbka wiórowa i ścierna. Wydawnictwo Politechniki Slaskiej, Gliwice 2002.
5. Olszak W.: Obróbka skrawaniem. WNT Warszawa 2008.
6. Wysiecki M.: Nowoczesne materiały narzędziowe WNT Warszawa 1997
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. Jemielniak K.: Obróbka skrawaniem. Oficyna Wydawnicza Politechniki Warszawskiej - Warszawa 1998.
3. Grzesik W.: Podstawy skrawania materiałów metalowych, WNT Warszawa 1998.
4. Shaw M.C.: Metal Cutting Principles. Oxford University Press, Oxford 1996.

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00