COURSE DESCRIPTION CARD - SYLLABUS

Course name

Machining

Course

Field of study

Management and Production Engineering

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

part-time

Requirements

compulsory

Number of hours

Lecture

12

Laboratory classes

12

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

PhD.Eng. Zbigniew Nowakowski

email: zbigniew.nowakowski@put.poznan.pl

phone +48(61) 665 27 52

Faculty of Mechanical Engineering

St. Piotrowo 3, 60-965 Poznań, room 605

Responsible for the course/lecturer:

Prerequisites

Basic scope of machining operations types and its kinematics, cutting tools, physics, mechanics and technical drawing. Familiarity with kinematics and operations of machine tools, operation of basic measuring equipment.

Course objective

Introducing basic knowledge of machining, cutting tools, cutting process and its physical, technological and economical effects.

Course-related learning outcomes

Knowledge

The student has basic knowledge of subtractive technologies applied in machine manufacturing process.

The student is able to characterize the kinematics of different methods of cutting.
The student will be able to describe design features of cutting tool and properties of tool materials.
The student is able to describe energetical and tribological relationships occurring in machining.
The student is able to characterize the surface layer after machining.
The student is able to determine economilcal and performance cutting speed.

Skills

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

Social competences

Is well aware of the necessity for continuous learning; knows how to inspire other people to learn.
Is aware of the non-technical aspects and results of subtractive manufacturing.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lectures is verified during the exam. The exam takes the form of a mixed test, a single choice consisting of 35-36 questions. The pass marker threshold: 50%.

Skills acquired in the laboratory classes are verified on the basis of:
- oral or written check of knowledge from theoretical preparation for the exercise,
- reports from each laboratory classes in which the ability to present and develop measurement results is assessed, the ability to analysis - comparing results, theoretical knowledge of the subject under examination and the ability to make conclusions.

Programme content

Scope of lecture:
- characteristics and application of machining in contemporary manufacturing,
- machining operations types and its kinematics,
- contemporary materials for cutting edge and cutting tools,
- selected physical phenomenons occurring in machining process (heat, diffusion, adhesion, friction),
- energetical aspects: cutting force, power and torque,
- tool life and reliability,
- surface layer characteristic,
- machinability of materials.

Laboratory classes include:
- design and application of cutting tools (tools with defined geometry and abrasive tools),
- evaluation of geometric characteristics of surface layer subjected to different types of machining,
- evaluation of machinability of different materials based on force and temperature measurement,
- comparison of cutting ability and econamical performance of different cutting materials,
- evaluation of feed force and cutting torque during drilling operation.

Teaching methods

Lecture: multimedia presentation illustrated with examples, animations and short films, discussion.

Laboratory classes: execution of experimental studies, solving problem, discussion, teamwork.

Bibliography

Basic

Praca zbiorowa pod red. Cichosza P., Techniki wytwarzania, obróbka ubytkowa, laboratorium, Oficyna wyd. Politechniki Wrocławskiej, Wrocław 2002.

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

Kawalec M., Kodym J., Jankowiak M., Laboratorium z podstaw skrawania, Wydawnictwo Politechniki Poznańskiej, Poznań, 1984.

Praca zbiorowa pod red. Kosmola J., Techniki wytwarzania ? obróbka wiórowa i ścierna, Wydawnictwo Politechniki Śląskiej, Gliwice 2002.

Olszak W., Obróbka skrawaniem. WNT Warszawa 2008.

Wysiecki M., Nowoczesne materiały narzędziowe, WNT Warszawa 1997.

Praca zbiorowa pod redakcją Żebrowskiego H., Techniki wytwarzania. Obróbka wiórowa, ścierna i erozyjna, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004.

Additional

Cichosz P., Narzędzia skrawające. WNT Warszawa 2006.

Grzesik W., Podstawy skrawania materiałów konstrukcyjnych, WNT Warszawa 2010.

Wieczorowski M., Cellary A., Chajda J., Przewodnik po pomiarach nierówności powierzchni czyli o chropowatości i nie tylko. Politechnika Poznańska, ITM, ZMiSP, Poznań 2003.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests/exam) [1]	55	2,0

[1] delete or add other activities as appropriate