



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Advanced machining problems

Course

Field of study

Mechanical Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

4/7

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

15

Tutorials

Laboratory classes

15

Projects/seminars

Other (e.g. online)

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. Marek Rybicki

Responsible for the course/lecturer:

Faculty of Mechanical Engineering

Institute of Mechanical Technology

ul. Piotrowo 3, 60-965 Poznań

pok. 632, tel.: +48616652752

e-mail: marek.rybicki@put.poznan.pl



Prerequisites

- 1) The student has basic knowledge of physics, mathematics and mechanics.
- 2) The student is able to use the acquired knowledge to analyze new manufacturing techniques and knows how to use information obtained from the library and the Internet.
- 3) The student shows independence in solving problems, acquiring and improving the acquired knowledge and skills, understanding the need to learn.

Course objective

Acquainting future engineers with advanced problems of selecting tools and machining conditions with regard to the quality of the machined surface, tool life, machining time, costs, machining efficiency, vibrations.

Course-related learning outcomes

Knowledge

- 1) Has detailed knowledge of the selection of tools for the machining task and cutting conditions in order to meet the specified performance requirements.

Skills

- 1) Can find information on manufacturing processes in mechanical engineering, integrate the obtained information, interpret it, as well as draw conclusions and formulate and justify opinions about them.
- 2) Can develop an opinion on the technology of product manufacturing.
- 3) Is able to select modern erosion technologies for the implementation of production processes, increase the efficiency of production systems through integration activities.

Social competences

- 1) Correctly identifies and resolves dilemmas related to the profession in the scope of the subject covered by the subject.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Written exam (in case of answers to: from 50 to 60% of questions - dst, above 60 to 70% - dst +, above 70 to 80% - db, above 80 to 90% - db +, above 90 to 100% - very good) .

Laboratory: Reports on exercises. To obtain credit for the laboratory, the number of absences cannot exceed 1/3 of the classes.

Programme content

- 1) Finishing work: lapping, smoothing with loose abrasive in containers, transfer-abrasive, abrasive blasting, brushing.
- 2) Burnishing the responsible surfaces on cutting machines.



- 3) Comparison of machining with milling cutters with different angles, the form of cutting edges (continuous, intermittent, wavy) in terms of roughness, shape errors.
- 4) Choice of methods of making various types of threads (turning, milling, threading, forming) due to its quality and processing time.
- 5) Selection of machining conditions with regard to the burrs of the machined surface. Ways of deburring.
- 6) Build up on the tool and how to prevent it. Polished tools and skid coatings.
- 7) High-performance cutting tools (wiper and smoothing corners, face mills with small main entering angle, oval cutters, ...)
- 8) Machining with slender tools or thin-walled components with minimization of forces and vibrations.
- 9) Comparison of slot and pocket turning and milling strategies.
- 10) Practical examples of tool life comparisons for different tools and cutting conditions.
- 11) Correction of shape and dimensional accuracy errors by correcting the blade path.
- 12) The specificity of cutting various groups of processed materials.
- 13) Comparison of rough and fine machining methods for various holes. E.t.c.

Teaching methods

Lecture: multimedia presentation, discussion.

Laboratory: Practical method of realization of production tasks, instruction, discussion, work with a book.

Bibliography

Basic

- 1) Harasymowicz J; red. Wantuch E., Obróbka gładkościowa: skrypt dla studentów wyższych szkół technicznych; Politechnika Krakowska im. Tadeusza Kościuszki. Kraków 1994
- 2) Grzesik W.: Podstawy skrawania materiałów konstrukcyjnych, WNT Warszawa 2010
- 3) Cichosz P.: Narzędzia skrawające. Wydawnictwa Naukowo-Techniczne, Warszawa 2006

Additional

- 1) GARANT. Poradnik. Obróbka skrawaniem
- 2) SANDVIK. Podręcznik szkoleniowy. Obróbka metali skrawaniem, 2017



Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	35	1,5

¹ delete or add other activities as appropriate