COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of technological fixture

Course

Field of study

Management and Production Engineering

Year/Semester

4/8

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

elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
10	8	
Tutorials	Projects/seminars	

Number of credit points

3

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

Responsible for the course/lecturer:

PhD.Eng. Remigiusz ŁABUDZKI

email: remigiusz.labudzki@put.poznan.pl

phone +48(61) 665 20 51

Faculty of Mechanical Engineering

St. Piotrowo 3, 60-965 Poznań

Prerequisites

Basic knowledge of mechanics, machine construction, methods and kinematics of cutting, use of cutting tools and construction of machine tools. The ability to think logically, operate simple technical equipment, use information obtained from various sources.

Course objective

Getting to know the current solutions of toolholders and workholders and their exploitation, preparation for different machining tasks, implementation in the company.

Course-related learning outcomes

Knowledge

The student has a general knowledge of toolholders and workholders used in manufacturing technologies, mainly in the engineering industry.

Skills

The student is able to determine the area of application of particular holders in manufacturing technology.
The student is able to select appropriate technological fixture for making a part and justify the choice.
The student is able to make a characteristic of particular holders, indicate their strengths and weaknesses.
The student is able to make an initial economic analysis of the application of a given technological fixture in a particular case.

Social competences

The student is open to implementation of information technologies in engineering activity.
The student is able to independently develop knowledge in the subject.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lectures is verified at the end of the semester in the form of an exam. The exam consists of 10 short theoretical and problem questions. The pass threshold is 50%.

Skills acquired in the laboratory classes are verified by evaluating student activity and skills to solution basic problems. The skill to present and analyze research results is checked in the form of experience reports.

Programme content

Scope of lecture:
- the role of technological fixtures in technological processes,
- place and role of workholders in technological processes, specificity for different manufacturing techniques,
- purposefulness and need for using holders - examples,
- basic definitions and classifications of workholders,
- basing and fixing a workpiece in a chuck,
- necessary technological calculations: clamping forces, influence of fixture on workpiece accuracy, machining errors,
- workpiece clamping into chuck, fixing and clamping of chucks on machine tool and tool in relation to the chuck,
- selection of technological fixtures and serial production,

- importance of toolholders in the technological process,
- construction and subdivision of toolholders according to various criteria,
- basing and transmission of mechanical loads in toolholders,
- review of toolholders design solutions,

- preparation of cutting tools and tooling for various machining tasks,
- toolholders used in HSM machining,
- influence of toolholder on technological effects of machining (tool life, geometric structure of the surface),
- interfaces used in connecting the toolholder to the machine tool and technological effects of machining,
- economics of tool and toolholder operation,
- identification and coding of tools, tool data management in manufacturing systems,

Laboratory classes consist of set of exercises on which students: familiarize themselves with various solutions for toolholders and work holders, and select them according to various criteria, carry out performance tests on toolholders and work holders (run-out, clamping repeatability, rigidity, etc.), prepare the tooling for the machining task, and become acquainted with computerised systems for managing tools and tooling.

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

Cichosz P., Narzędzia skrawające. Wydawnictwa Naukowo-Techniczne, Warszawa 2006.

Dobrzański T., Uchwyty obróbkowe, Poradnik konstruktora. Wydawnictwa Naukowo-Techniczne, Warszawa, 1987.

Feld M., Uchwyty obróbkowe. Wydawnictwa Naukowo-Techniczne, Warszawa 2002.

Kosmol J., Automatyzacja obrabiarek i obróbki skrawaniem. Wydawnictwa Naukowo-Techniczne, Warszawa 2000.

Meldner B., Darlewski J., Narzędzia skrawające w zautomatyzowanej produkcji. Wydawnictwa Naukowo-Techniczne, Warszawa 1991.

Poradnik inżyniera. Obróbka skrawaniem t. II.

Additional

Honczarenko J., Elastyczna automatyzacja wytwarzania. Obrabiarki i systemy obróbkowe. Wydawnictwa Naukowo-Techniczne, Warszawa 2000.

Pietrusewicz W., Kwaczyński W., Nazzal A., Projektowanie uchwytów obróbkowych specjalnych, Wydawnictwo Politechniki Szczecińskiej, 2004.

Breakdown of average student's workload

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

[1] delete or add other activities as appropriate