COURSE DESCRIPTION CARD - SYLLABUS

Course name
CNC Machines

Course

Field of study	Year/Semester
Mechanics and Mechanical Engineering	4/7
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	polski
Form of study	Requirements
part-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
12	12	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

PhD Eng. Wojciech Ptaszynski

wojciech.ptaszynski@put.poznan.pl

tel. 61 665 2039

Faculty of Mechanical Engineering

ul. Piotrowo 3, 60-965 Poznan

Responsible for the course/lecturer:

Prerequisites

Basic knowlage in the field of machine science, machine parts, engineering graphics and other areas of education in the field of study. Basic knowledge of cutting tools and metalworking as well as electrical engineering. Ordered theoretical knowledge in the field of study. Ability to use literature (acquire knowledge from the indicated sources) and the Internet.

Course objective

Understanding the principles of construction, operation and operation of the OSN as well as their control and programming of machining.

Course-related learning outcomes

Knowledge

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Has detailed knowledge of machinery and technological equipment including numerically controlled, construction and operating principles, drives (main, feed and auxiliary) of CNC machine tools.

Skills

Is able to select machines and CNC devices for the implementation of product production processes, analyze and evaluate their construction, select components, plan and supervise maintenance tasks to ensure reliable operation.

Social competences

Understands the need for lifelong learning due to the constant development of CNC machine tools.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Completion of the laboratory based on the reports made.

Exam covering all issues in the form of a test.

Programme content

Lecture:

- division and requirements for CNC machine tools (according to ISO 230),

- marking and orientation of the axis,

- drive and servo drive systems: main and feed (DC, AC and linear types),

- analog and digital measuring systems.

- mechanical components and principles of CNC construction,

- overview and characteristics of currently produced CNC machine tools, machining centers,

- development trends (direct drives, electric spindles, machine tools for HSM and HSC,

- testing functional groups of CNC machine tools,

- division, principles and methods of programming CNC machine tools,

- structure and construction of control systems and systems,

- programming using special functions, subprograms and machining cycles.

Lab:

1. Basics of dialog programming in the Heidenhain control system

2. Servo drive simulation tests

3. Research on the dynamics of rotary table positioning in the range of small displacements

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4. Machining on a CNC milling machine

5. Electronic gear

6. Controllers in NC machine tools

Teaching methods

Lecture illustrated by multimedia presentations

Bibliography

Basic

1. Kosmol J.: Serwonapędy obrabiarek sterowanych numerycznie, WNT Warszawa, 1998.

2. Kosmol J.: Automatyzacja obrabiarek i obróbki skrawaniem, PWN Warszawa, 2000.

3. Singh N.: CNC programming and control, by John Wiley & sons, Inc. London, 1996.

4. Skoczyński W.: Sensory w obrabiarkach CNC, PWN Warszawa, 2018.

Additional

1. Programowanie ISO, Podręcznik użytkownika, Heidenhain, 1994 (w języku polskim, an-gielskim i niemieckim).

2. Kief Hans B.: NC/CNC Handbuch, Carl Hanser, Verlag Munchen, 1998.

Breakdown of average student's workload

	Hours	ECTS
Total workload	36	3
Classes requiring direct contact with the teacher	24	
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	12	

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[1] delete or add other activities as appropriate