COURSE DESCRIPTION CARD - SYLLABUS

Course name
Machines and technological devices I [N1MiBM1>MiUT]

Course

Field of study
Mechanical Engineering

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
8

Laboratory classes
10

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

Lecturers

Prerequisites

Basic knowledge in the field of theory of machines, machine parts, engineering graphics and other areas of education in the field of study. Basic knowledge of cutting tools and machining, and electrical engineering. Orderly theoretical knowledge in the field of study. Ability to use literature (acquiring knowledge from the indicated sources) and the Internet, has the ability to work in a team. Understanding the need for learning, acquire and improve skills throughout life and the importance of team collaboration.

Course objective

The student should obtain knowledge of technological machines tools and NC machine tools construction and exploitation principles, and their kinematic chains, forming systems, drives and control systems.

Course-related learning outcomes

Knowledge:
The student has general knowledge of manufacturing technologies used mainly in enterprises of the mechanical industry and which refers to metallurgy and casting, plastic forming, plastics processing, heat treatment, heat and chemical treatment, welding, swarf machining, grinding and eroding.
The student has detailed knowledge relating to fundamental and auxiliary processes in the construction of machines. Has knowledge allowing to design production flow (forms of production flow). Has knowledge indispensable for organizing the work of a production system depending on its type. Has

knowledge indispensable for the assessment of the work of a production system. Has knowledge indispensable for developing a technological process of typical parts of machines. Has knowledge enabling to evaluate the capabilities of a given process. Knows systems of computer aided process design

Skills:
Drawing upon norms, procedures and instructions, can write a simple program for the operation of a numerical control machine tool.
Able to select and apply manufacturing technologies to shape the form, structure and properties of products.
Able to select technological machines and devices to realize products manufacturing processes, analyze and evaluate their construction taking into account the principles of ergonomics, select machine parts, plan and supervise maintenance tasks to ensure reliable operation of machines and devices.

Social competences:
Understand the need for lifelong learning; able to inspire and organize learning process of other people.
Able to cooperate and working in the group, taking different roles.
Is open to discussion of complex technical problems and is capable of communicating its knowledge in an understandable way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: acquired knowledge is verified by a exam. The exam consists of 8 open questions. Credit in the case of correct answers to min. half of the questions (50% threshold).
Laboratory classes: acquired knowledge and skills are verified on the basis of an oral or written answer regarding the content of each laboratory exercise performed, reports on each laboratory exercise. To get a laboratory credit, all exercises must be completed and passed (positive assessment of responses and reports).

Programme content

Lecture:
Division and comparison of conventional machine tools and NC machine tools. Machine tool drives. Characteristics of drives and electric motors. Universal machine tools. Unit-construction machines. Machining centers and machine tool lines. Gear generating machines. Electrical Discharge Machining machines.
Laboratory classes:
Measurement and adjustment of clearance in the mechanical gearbox of the rotary axis of machine tool feed drive. Testing the efficiency of the mechanical transmission. Preparing and machining of parts on a numerically controlled lathe. Preparing and machining of parts on a numerically controlled milling machine. Shaping of special curves on a 4-axis numerically controlled milling machine. Cutting the cylindrical gears on the gear hobbing machine. Trends in the construction of technological machines in the context of the development of electronic control.

Teaching methods

Lecture: multimedia presentation, discussion.
Laboratory classes: independent performance of practical exercises in contact with machine tools, devices, materials, tools, apparatus, measuring instruments, discussion.

Bibliography

Basic
Wrotny L. T., Obrabiarki skrawające do metali, WNT, Warszawa 1979.
Honczarenko J., Obrabiarki sterowane numerycznie, WNT , Warszawa 2009.
Kosmol J., Automatyzacja obrabiarek i obróbki skrawaniem, PWN, Warszawa, 2000.
Kosmol J., Serwonapędy obrabiarek sterowanych numerycznie, WNT Warszawa, 1998.
Additional
Poradnik inżyniera mechanika. T.3. Zagadnienia technologiczne, rozdz. III, VI, VII. WNT, Warszawa 1970.

Kosmol J., Napędy mechatroniczne, WNT Warszawa, 2013.
Pritschow G., Technika sterowania obrabiarkami i robotami przemysłowymi. Oficyna Wydawnicza Politechniki Wrocławskiej, 1995.
Pająk E., Zaawansowane technologie współczesnych systemów produkcyjnych, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.
Skoczyński W., Sensory w obrabiarkach CNC, Wydawnictwo Naukowe PWN SA, Warszawa,2018.

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,00
Classes requiring direct contact with the teacher	35	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,50