COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technological Machines and Devices

Course

Field of study
Mechatronics

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	0
Tutorials	**Projects/seminars**	
0	0	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
Roman Staniek, Professor D. Sc. Eng.

Responsible for the course/lecturer:

Prerequisites

Basic knowledge in the field of engineering graphics, mechanics, strength of materials, automation, technology, mechanical engineering, drives and control; 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 conventional machines tools and NC machine tools construction and exploitation principles, knowledge of main and feed drives, control and diagnostic systems, as well as the ability to operate selected machines tools, including numerically controlled ones.

Course-related learning outcomes

Knowledge

1. Has detailed knowledge of technological machines and devices including conventional machine tools and NC machine tools, universal machine tools, construction and operation principles of machine tools,

drives (main, feed, auxiliary) of technological machines, typical parts of technological machines and devices, trends in the field of machine tools development.

2. Has detailed knowledge in the field of the technology of shaping and machining machine components on conventional machine tools an numerically controlled machine tools and basic methods of testing machine tools.

Skills

1. Able to select and apply appropriate manufacturing technologies to shape the form, structure and properties of products.

2. 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.

3. Is able to use various sources of information and has the ability to self-study.

Social competences

1. Understand the need for lifelong learning; able to inspire and organize learning process of other people.

2. Able to cooperate and working in the group, taking different roles.

3. 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:

Lecture: written examination.

Laboratory classes: passing the laboratory elasses(credit for all classes – the assessment includes: theoretical preparation, activity and involvement during lab exercise and a written report).

Programme content

Lecture:

Machine tool drives; construction, operation and purpose of conventional machine tools for metalworking (lathes, milling machines, drilling machines, boring machines, slotting machines, planing machines, broaching machines, grinding machines, unit construction machines); gear generating machines; numerically controlled machines (characteristics, axis designation, basic construction, main and feed drives – servo drives, control, measuring systems, machining centres, flexible machining systems: ASO,ESO); testing of positioning accuracy of numerically controlled machine tools according to ISO 230; development trends.

Laboratory classes:

1. Measurement and adjustment of clearance in the mechanical gearbox of the rotary axis of machine tool feed drive.

2. Testing the efficiency of the mechanical transmission.

3. Preparing and machining of parts on a numerically controlled lathe.

4. Preparing and machining of parts on a numerically controlled milling machine.

5. Shaping of special curves on a 4-axis numerically controlled milling machine.

6. Cutting the cylindrical gears on the gear hobbing machine.

Teaching methods

Lectures: Auditorium lectures augmented with multimedia presentations and selected example calculations presented on a blackboard.

Laboratory practicals: Exercises based on well-established lab standard operating procedures.

Bibliography

Basic

1. Wrotny L. T., Podstawy konstrukcji obrabiarek, WNT, Warszawa 1974.

2. Honczarenko J., Obrabiarki sterowane numerycznie, WNT , Warszawa 2009.

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

4. Kosmol J., Serwonapędy obrabiarek sterowanych numerycznie, WNT Warszawa, 1998.

Additional

1. Poradnik inżyniera mechanika. T.3. Zagadnienia technologiczne, rozdz. III, VI, VII, WNT, Warszawa 1970.

2. Kosmol J., Napędy mechatroniczne, WNT Warszawa, 2013.

3. Pritschow G., Technika sterowania obrabiarkami i robotami przemysłowymi. Oficyna Wydawnicza Politechniki Wrocławskiej, 1995.

4. Skoczyński W., Sensory w obrabiarkach CNC, Wydawnictwo Naukowe PWN SA, Warszawa 2018.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate