



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of machine tools and robots

Course

Field of study

Mechatronics

Area of study (specialization)

Design and control of mechatronic devices

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1 / 2

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

30

Tutorials

Laboratory classes

Projects/seminars

15

Other (e.g. online)

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

- 1) Knowledge of technical drawing, engineering mechanics, material strength, materials science, technological process design, selection of machinery and equipment.
- 2) Ability to think logically and extract information from literature and online resources.
- 3) Understand the need for self-education, acquiring new knowledge and skills.

Course objective

Knowledge of the design of conventional and numerically controlled machine tools, robots and manipulators, knowledge of the kinematic systems of main and feed drives, controllers and skills in the selection of components, including controllers.

Course-related learning outcomes

Knowledge

The student has knowledge of:

- Kinematics and construction of machine tools and industrial robots
- Questions related to the equipment of machine tools and robots
- basic evaluation criteria (technical, organizational and economic) for planning
- Identification and description of construction issues (problems) and safety rules of machine tools and robots

Skills

A student should be able to:

- map and measure components of machine tools and industrial robots; Design and execution of strength calculations of mechanical systems using computer-aided machine design.
- Develop versatile design solutions for machine tools, robots and robot production stations
- Analyze the proposed design variants and select the preferred solution

Social competences

Students should be able to work together in a group, to express and justify their assessment and to follow ethical principles. Working together in a group, taking on different roles and tasks.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The following shall be assessed:

- completion of the project,
- Recognition of acquired knowledge in the course.



Programme content

Lecture: Development and market opportunities of industrial machine tools and industrial robots; Fields of application of machine tools and robots; Technical aspects of the construction of machine tools and industrial robots; Kinematic systems, drives and a range of possible design solutions; Technical and technological equipment of machine tools and robots, collaborative equipment); design methodology for machine tools, manipulators, robots and robot production stations; Occupational safety on machine tools and robot stations; Examples for the configuration of machine tools and robot stations.

Project: Design of the construction of a selected technological instrument for a series and piece-produced product, development of a 3D model, analysis of machining forces and manipulation forces, calculation of accuracy, economic analysis.

Teaching methods

Lecture: Multimedia-Presentation – Moderator, Discussion

Project: Each student presents a multimedia presentation of the project progress, discussion

Bibliography

Basic

1. Praca zbiorowa pod red. Z. Osińskiego, Podstawy konstrukcji maszyn, PWN, W-wa, 1999
2. Automatyzacja obrabiarek i obróbki skrawaniem, J. Kosmol, WNT, Warszawa 2000.
3. Honczarenko J., Roboty przemysłowe. Budowa i Zastosowanie, WNT, Warszawa, 2010
4. Olszewski M., Barczyk J., i inni, Manipulatory i roboty przemysłowe, WNT, 1992
5. Wrotny T., Robotyka i elastycznie zautomatyzowana produkcja, WNT, Warszawa, 19913.
6. Kosmol J., Automatyzacja obrabiarek i obróbki skrawaniem, PWN, Warszawa, 2000.

Additional

1. Catalogues of machine component manufacturers.
2. Websites of machine and plant manufacturers.



Breakdown of average student's workload

| | Hours | ECTS |
|---|-------|------|
| Total workload | 100 | 4,0 |
| Classes requiring direct contact with the teacher | 45 | 2,0 |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹ | 55 | 2,0 |

¹ delete or add other activities as appropriate