COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design and programming of robotic systems

Course

Field of study

Mechanical Engineering

Area of study (specialization)

Machine Design

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

-

Projects/seminars

-

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Academic Professor Olaf Ciszak

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Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznan, room 638

Responsible for the course/lecturer:

Prerequisites

The student starting this subject should have a basic knowledge of mechanical engineering

(Robotics/Robot Applications in Manufacturing Systems/Application of Industrial Robots) and basics of production engineering (including organization and economics) - program basics for first-cycle studies in the field of management and production engineering. Student should also be able to obtain information from specified sources and be ready to cooperate in a team.

Course objective

To provide students with theoretical and practical issues related to the application of industrial robots to the manufacturing processes involving basic manufacturing techniques. Developing student's skills in solving conceptual problems and teamwork especialy in analyzing, evaluating, verifying and selecting variants (solutions) related to the design of robotic cells.

Course-related learning outcomes

Knowledge

The student has knowledge about:

- areas of application and the role and tasks of industrial robots in production systems

- issues related to the technical and technological equipment of industrial robots in the ESP

- basic evaluation criteria (technical, organizational and economic) in the design of robotized cells.

Skills

The student should be able to:

- develop multi-variant solutions of the robotic workstation taking into account the initial and final conditions

- analyze the proposed variants of the robotic cell and choose the preferred solution

- develop algorithms and control programs for industrial robots working in the field of manipulation and conduct tests of the control program taking into account the initial and final conditions.

Social competences

Students should be able to cooperate in a group, express their assessment and justify it, follow ethical principles.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The knowledge acquired in the lecture is verified by the test (approx. 20 questions). Passing threshold 50%.

Laboratory: evaluation of the project includes the development, presentation and discussion in a group of students.

Programme content

Lecture: Development and forecast on the robotics market; Areas of application of industrial robots; Technical and organizational aspects of robotization; Profitability of robotics (components of the cost of robotic production, investment costs; economic efficiency); Phases of the robotization project; Technical and technological equipment for robotic cells (grippers, technological heads, cooperating devices); Design methodology for robot application in production systems; Work safety in robotic workstations; Industrial robot applications - overview.

Laboratory: work in the computer aided engineering system to design, programming and analysis of robotic cells (e.g. RobotStudio, RoboGuide) - practical exercises in developing a robotic cell design for a specific manipulation or technological task.

Teaching methods

Lecture: multimedia presentation illustrated with video clips, problem discussion.

Laboratory: solving practical problems, searching for and using knowledge sources, teamwork, discussion.

Bibliography

Basic

- Żurek J., Podstawy Robotyzacji - Laboratorium., WPP, Poznań, 2006

- Zdanowicz R., Robotyzacja dyskretnych procesów produkcyjnych, WPŚ, Gliwice, 2011

- Zdanowicz R., Robotyzacja procesów technologicznych, WPŚ, Gliwice, 2001

Additional

- Honczarenko J., Roboty przemysłowe. Budowa i Zastosowanie, WNT, Warszawa, 2010

- Wrotny T., Robotyka i elastycznie zautomatyzowana produkcja, WNT, Warszawa, 1991

- Olszewski M., Barczyk J., i inni, Manipulatory i roboty przemysłowe, WNT, 1992

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	1,0

[1] delete or add other activities as appropriate