COURSE DESCRIPTION CARD - SYLLABUS

Course name
Robotization of production processes [N1ZiIP2>RPP]

Course

Field of study
Management and Production 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
8

Other
0

Tutorials
0

Projects/seminars
8

Number of credit points

3,00

Coordinators

Lecturers

Prerequisites

The student should have knowledge of physics, mechanics and technology at the level of a technical secondary school. He should have the ability to solve elementary problems in the field of building control algorithms (programming principles) and designing technological processes based on his knowledge and the ability to obtain information from indicated sources.

Course objective

Providing students with theoretical and practical issues related to the automation and robotization of production processes, including basic manufacturing techniques, within the scope determined by the program content appropriate for the field of study.

Course-related learning outcomes

Knowledge:
The student is able to: Identify, describe and explain the principles of operation of the basic construction units of the manipulator and the control system of an industrial robot. Characterize the basic areas of application and the role and tasks of automation and robotization in 2 typical technological processes. Select appropriate programming instructions for a specific industrial robot programming task.

Skills:

The student is able to: Develop algorithms and control programs for cooperating industrial robots, taking into account the initial and final conditions, and carry out tests of the control program. Identify a technical problem, determine its level of complexity, and then propose a solution that takes into account the final goal (result). Design a gripper for a specific production task.

Social competences:
Social competences: The student is able to: Actively engage in solving problems, independently develop and expand his/her competences and cooperate in a team. Appropriately define priorities for the implementation of the task specified by yourself or others. Act in an entrepreneurial and creative (innovative) way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified on the final exam. It consists of 5 open questions and one computational task, scored differently. Passing threshold: 50%. The knowledge acquired during laboratory classes is verified on the basis of an oral or written answer regarding the content of each laboratory exercise performed, and a report on each laboratory exercise according to the guidelines set out in the exercise guide and the instructions of the person conducting the laboratory exercise. To pass the laboratories, all exercises must be completed (positive grade for answers and reports). The knowledge acquired as part of the project is verified based on the assessment of the current progress in the implementation of tasks implemented as part of the creation of project documentation and the presentation of the developed construction solution within the topic received by the instructor. As well as the discussion following the presented results and the results achieved.
Assignment of grades to percentage ranges of results: <90-100> very good; <80-90) good plus; <70-80) good; <60-70) satisfactory plus; <50-60) satisfactory; <0-50) unsatisfactory.

Programme content

The program includes classification of robots, automation and robotization of production processes, construction and programming of educational and industrial robots, and gripper design.

Course topics

Lecture: Development and forecast on the robotics market; Application areas and classification of robots; Mechanization, automation and robotization of production processes; Flexibility of production systems; Basic construction of industrial robots and manipulators; Advantages and disadvantages of automation and robotization of production processes; Technical and technological equipment of robotic stations (grippers, technological heads, cooperating devices); Examples of robotization of production processes including basic manufacturing techniques; New trends in the development of automation and robotization.
Laboratory: Practical exercises in the field of principles and methods of programming educational and industrial robots.
Project: Creating concepts for gripper structures and kinematic diagrams based on tasks received from the instructor, developing a construction solution with documentation within the received topic.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on the blackboard.
Laboratory exercises: performing experiments, solving tasks, discussion, team work, programming.
Project: Work in design teams and discussion in creating concepts for gripper structures and kinematic diagrams.

Bibliography

Basic:
1. Kost G., Łebkowski P., Węsierski Ł., Automatyzacja i robotyzacja procesów produkcyjnych, PWE, 2014
2. Żurek J., Podstawy Robotyzacji - Laboratorium., WPP, Poznań, 2006
3. Zdanowicz R. Robotyzacja dyskretnych procesów produkcyjnych, WPŚ, Gliwice, 2011
4. Zdanowicz R, Robotyzacja procesów technologicznych, WPŚ, Gliwice, 2001
5. Podręczniki programowania robotów, IRp-6, Fanuc, Panasonic

6. Wiśniewski M., Podstawy robotyzacji. Laboratorium, Wydawnictwo Politechniki Poznańskiej, 2021

Additional:
1. Honczarenko J., Roboty przemysłowe. Budowa i Zastosowanie, WNT, Warszawa, 2010

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	24	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	51	2,00