



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Industrial robots programming

Course

Field of study

Mechanical Engineering

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

4/7

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

15

Tutorials

-

Laboratory classes

15

Projects/seminars

-

Other (e.g. online)

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Academic Professor Olaf Cizak

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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 the fundamentals of robotics and



informatics, automation and mechanical engineering - 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

Providing students with theoretical and practical issues related to the programming of industrial robots for typical tasks carried out at production workstations, including basic manufacturing techniques in the scope specified by the program content appropriate for the field of study. Developing students ability to analyze, evaluate, verify and select variants (solutions) related to the programming of industrial robots as well as to solve conceptual problems and teamwork.

Course-related learning outcomes

Knowledge

The student has knowledge about:

- kinematics of industrial robots
- methods of programming industrial robots
- building an algorithm and cyclogram of an industrial robot
- selection of appropriate programming instructions for a specific task in the field of programming industrial robots
- identification and description of issues (problems) of operation, diagnostics and safety rules for industrial robots.

Skills

The student should be able to:

- develop the kinematics of an industrial robot
- develop an algorithm and cyclogram of an industrial robot, taking into account the initial and final conditions
- develop control programs for industrial robots cooperating with external devices (sensors, control and measurement and technological devices, etc.) and end devices, and carry out tests of the control program
- analyze the developed control program and propose alternative solutions and optimization.

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: Forward and inverse kinematics of an industrial robot; Architecture and tasks of the modules of the industrial robot control system; Methods of programming industrial robots (on- and off-line); Theoretical basis for the development of the robot control system work algorithm with the use of basic programming instructions and cooperation with technical and technological equipment - examples.

Laboratory: Practical exercises in the field of the principles and methods of programming robots educational and industrial with cooperation with technological equipment. Work with 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
- Gołda G., Kost G. (red.), Swider J. (red.), Zdanowicz R., Programowanie robotów online, WPS, Gliwice, 2011
- Podręczniki programowania robotów: ABB, Fanuc, Panasonic

Additional

- Pires, J. Norberto, Industrial Robots Programming, Springer-Verlag GmbH, 2006
- Honczarenko J., Roboty przemysłowe. Budowa i Zastosowanie, WNT, Warszawa, 2010
- Zdanowicz R., Podstawy Robotyki, WPS, Gliwice, 2001
- Zdanowicz R., Podstawy Robotyki - Laboratorium z robotów przemysłowych, WPS, Gliwice, 1999



Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	35	1,5

¹ delete or add other activities as appropriate