



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Automation and robotization of technological processes

### 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

compulsory

### Number of hours

Lecture

12

Laboratory classes

8

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr inż. Piotr Siwak

Responsible for the course/lecturer:

e-mail:piotr.siwk@put.poznan.pl

### Prerequisites

Basic knowledge of the basics of robotics and mechanics, automation and machine construction technology (core curriculum for first-cycle studies in the field of mechanics and machine construction)

### Course objective

1. Provide students with theoretical and practical issues related to the automation and robotization of technological processes including basic manufacturing techniques in the scope specified by the program content appropriate for the field of study
2. Developing students' skills in solving simple problems and performing simple experiments as well as analyzing the results based on the acquired knowledge
3. Shaping students' teamwork skills

### Course-related learning outcomes

Knowledge

1. W01 Characterize the basic areas of application as well as the role and tasks of automation and



robotization in typical technological processes and indicate the cost components of automated production - [K\_W07]

2. W02 Select appropriate programming instructions for a specific task in the field of programming industrial robots - [K\_W13]

3. W03 Identify and describe issues (problems) of operation, diagnostics and safety rules for industrial robots - [K\_W07]

#### Skills

1. U01 Identify the technical problem, define its complexity, and then propose a solution that takes into account the final goal (effect) - [K\_U03]

2. U02 Develop algorithms and control programs for industrial robots cooperating with external devices and taking into account the initial and final conditions - [K\_U15]

#### Social competences

1. K01 Actively engage in solving the problems posed, independently develop and expand their competences, and cooperate in a team - [K\_K03]

2. K02 Properly define the priorities for the implementation of the tasks set by yourself or others - [K\_K04]

3. K03 Act in an entrepreneurial and creative (innovative) manner - [K-K06]

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

a) in the field of exercises: based on the assessment of the current progress in the implementation of tasks

b) in the field of lectures: on the basis of answers to questions about the material discussed in previous lectures

Summative assessment:

a) in terms of exercises on the basis of:

(1) public presentation on the topic indicated by the teacher,

(2) post-presentation discussion,

(3) the form and quality of the prepared materials,

b) in the field of lectures:



(1) an exam in the form of a multiple choice test, with at least one correct answer, each question scored on a scale from 0 to 1; the exam is passed after obtaining at least 55% of the points. You can take the exam after completing the exercises,

(2) review of the exam results.

## Programme content

### Lecture

Development and forecasting in the robotics market; Robot application areas; Profitability of robotization (components of robotic production costs, the impact of robotization on investment costs, economic efficiency calculation); Susceptibility of the process to robotization; Phases of the robotization project; Technical equipment? technological robotic stations (grippers, technological heads, cooperating devices), Work safety on robotic stations; Examples of robotic stations.

### Lab

Practical exercises in the field of principles and methods of programming educational and industrial robots and cooperating technical and technological equipment.

## Teaching methods

1. Lecture: presentation illustrated with examples given on the board, solving problems.
2. Laboratory exercises: conducting experiments, working in teams, discussion.

## Bibliography

### Basic

1. Żurek J., Podstawy Robotyzacji - Laboratorium., WPP, Poznań, 2006
2. Zdanowicz R. Robotyzacja dyskretnych procesów produkcyjnych, WPS, Gliwice, 2011
3. Zdanowicz R, Robotyzacja procesów technologicznych, WPS, Gliwice, 2001
4. Podręczniki programowania robotów, IRp-6, Fanuc, Panasonic

### Additional

1. Honczarenko J., Roboty przemysłowe. Budowa i Zastosowanie, WNT, Warszawa, 2010
2. Wrotny T., Robotyka i elastycznie zautomatyzowana produkcja, WNT, Warszawa 1991
3. Gołda G., Kost G. (red.), Swider J. (red.), Zdanowicz R., Programowanie robotów online, WPS, Gliwice, 2011



### Breakdown of average student's workload

	Hours	ECTS
Total workload	12	2,0
Classes requiring direct contact with the teacher	20	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	8	1

<sup>1</sup> delete or add other activities as appropriate