



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Automated Production Systems

### Course

Field of study

Logistics

Area of study (specialization)

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Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

Polish

Requirements

elective

### Number of hours

Lecture

10

Laboratory classes

12

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr inż. Marcin Kielczewski

Responsible for the course/lecturer:

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Wydział Automatyki, Robotyki i Elektrotechniki

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### Prerequisites

The student starting this subject should have basic knowledge of linear algebra, Boolean algebra, information technology and the basics of programming. He should also have the skills to obtain information from literature and technical documentation, work in a team and use IT tools, be aware of the risks when working with mechanical and electrical devices and have a sense of responsibility for the safety of other people.

### Course objective

Presentation of theoretical and practical knowledge in the field of production automation and robotics.

### Course-related learning outcomes

Knowledge



1. The student knows the basic issues of design and principles of operation of automation and control systems. - [P6S\_WG\_01]
2. Knows the basic issues of mechanics, construction and operation of industrial manipulators. - [P6S\_WG\_02]

#### Skills

1. The Student is able to apply appropriate experimental and measuring techniques as well as software tools to solve the problem within the subject. - [P6S\_UW\_03]
2. Can formulate and solve engineering tasks to see their systemic and non-technical aspects as well as socio-technical, organizational and economic aspects. - [P6S\_UW\_04]
3. Is able to identify changes in requirements, standards, regulations, technical progress and based on them determine the needs of supplementing knowledge. - [P6S\_UU\_01]

#### Social competences

1. The student is aware of the initiation of activities related to the formulation and transfer of information and cooperation in society. - [P6S\_KO\_02]
2. Is aware of the need to cooperate and work in a group to solve the problems posed. - [P6S\_KR\_02]

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

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by the 45-minute final test consists of 25-30 questions. Passing threshold 50% of points.

Skills acquired as part of the laboratory classes are verified on the basis of completed laboratory tasks and prepared protocols.

#### Programme content

The concept of automation, automatic control system, example systems, elements and classification of control systems, tools for supervision of technological processes, SCADA systems. Controllers: tasks of controllers, types and properties of controllers, bang-bang and double bang-bang controllers, continuous PID controllers, tuning of controller settings using selected techniques. Basic concepts of robotics, types and general construction of robots, tasks of industrial robots, coordinate systems, location representation, manipulator kinematics, manipulator programming and languages on the example of KUKA and Staubli robots. Construction and operation principle of programmable logic controllers (PLC), the sweep of the controller, input and output of controllers, programming languages, basics of programming in ladder language. Construction and operation of selected sensors and measuring devices used in automation and robotics.

#### Teaching methods

Lecture - informative and conversational lecture



Laboratory - laboratory method

## Bibliography

Basic

1. Wprowadzenie do robotyki: mechanika i sterowanie, J.J. Craig, WNT 1995
2. Elementy, urządzenia i układy automatyki, J. Kostro, WSiP 1998
3. Modelowanie komputerowe i obliczenia współczesnych układów automatyzacji, R. Tadeusiewicz, G.G. Piwniak, W.W. Tkaczow, W.G.Szaruda, K. Oprzędkiewicz, AGH 2004

Additional

1. Springer Handbook of Automation, S.Y. Nof (Edytor), Springer 2009
2. Modelowanie i sterowanie robotów, K. Kozłowski, P. Dutkiewicz, W. Wróblewski, PWN 2003

## Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	22	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation of reports, preparation for the final test) <sup>1</sup>	28	1,0

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