COURSE DESCRIPTION CARD - SYLLABUS

Course name

Automated production systems

Course

Field of study

Logistics

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

Polish

Requirements

elective

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:

Ph.D., Eng. Marcin Kiełczewski

Mail to: marcin.kielczewski@put.poznan.pl

Phone: 61 665 23 68

Faculty of Control, Robotics and Electrical Engineering

ul. Piotrowo 3A, 61-138 Poznań

Responsible for the course/lecturer:

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. Student knows the basic issues of design and principles of operation of automation and control systems [P6S_WG_01]

2. Student knows the basic issues of mechanics, construction and operation of industrial manipulators [P6S_WG_02]

Skills

1. Student is able to use appropriate experimental and measurement techniques as well as software tools to solve a problem within the scope of automation and control [P6S_UW_03]

2. Student is able to notice their systemic and non-technical aspects, as well as socio-technical, organizational and economic aspects, when formulating and solving engineering tasks [P6S_UW_04]

3. Student is able to identify changes in requirements, standards, regulations, technical progress in the field of automation and control and, based on them, determine the need to supplement knowledge [P6S_UU_01]

Social competences

1. student is aware of the initiation of activities related to the formulation and transfer of information and cooperation in society [P6S_KO_02]

2. Student 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:

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

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

Programme content

Lecture: 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.

Laboratory: Students perform laboratory exercises related to the operation and programming of industrial manipulators, PLC controllers and automation systems.

Teaching methods

Lecture: informative lecture in the form of a multimedia presentation, conversational lecture

Laboratory: practical laboratory exercises

Bibliography

Basic

1. Craig J.J., Wprowadzenie do robotyki: mechanika i sterowanie, WNT, Warszawa 1995.

2. Kostro J., Elementy, urządzenia i układy automatyki, WSiP, Warszawa 1998.

3. Tadeusiewicz R., Piwniak G.G., Tkaczow W.W., Szaruda W.G., Oprzędkiewicz K., Modelowanie komputerowe i obliczenia współczesnych układów automatyzacji, AGH, Kraków 2004.

Additional

1. Springer Handbook of Automation, S.Y. Nof (Edytor), Springer, Cham 2009.

2. Kozłowski K., Dutkiewicz P., Wróblewski W., Modelowanie i sterowanie robotów, PWN, Warszawa 2003.

3. Michałek M., Kiełczewski M., Robustification of the modular tracking control system for non-Standard N-Trailers of uncertain kinematics, Control Engineering Practice, Vol. 64, 2017, s. 160-172.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation of reports, preparation for the final test) [1]	20	1,0

[1] delete or add other activities as appropriate