COURSE DESCRIPTION CARD - SYLLABUS

Course name
Identification systems in the production process

Course

Field of study
Production Management and Engineering
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

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)
0
Tutorials
0
Projects/seminars
0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Prerequisites

Knowledge: physics, technology (automation, control and programming fundamentals), electronics and electrical engineering fundamentals

Skills: Describing basic phenomena, constructing electrical systems, analysing technical and electrical documentation

Social competence: to be aware of responsibility for decisions taken in the process of construction

Course objective

Learning about systems that enable the identification of objects, their construction, principle of operation and applicability in the production process.

Course-related learning outcomes

Knowledge

1. Has general knowledge concerning automation and robotization of production processes, including the structure of operation of numerical control and automatic regulation. [K_W11]

2. Has basic knowledge of electrical engineering and electronics, enabling orientation in the area concerning design and analysis of electric drive systems and machine control. [K_W12]

3. Has detailed knowledge of measurement systems, in particular the role of measurements and the information arising from them, methods and techniques of measuring length, angle, geometric deviations and surface roughness. He has knowledge concerning the possibility of occurrence of measurement errors and their sources. [K_W10]

Skills

1. He/she can apply the acquired knowledge of mathematics to all the most important areas of mechatronics, in particular to formulate equations describing the most important physical phenomena and technical processes. He/she can use mathematical apparatus to describe and calculate parameters of elements of mechanical and electronic constructions and automation systems, control algorithms and signal processing, as well as control systems. [K_U03]

2. He/she is able to develop assumptions for the selection of automation and robotization systems of production processes and to select a justified degree of automation and robotization. [K_U15]

3. Can, on the basis of a schematic diagram, determine the purpose of an electronic system and the tasks that it should perform. [K_U17]

Social competences

1. Is able to cooperate with different environments using computer networks and multimedia techniques. [K_K12]

2. Understands social conditions of automation processes and dilemmas related to their application. [K_K04]

3. Understands relations between human resources management process and technical and non-technical aspects of his/her activity, including responsibility for decisions taken. [K_K09]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Short tests after the lecture. Test of the lecture at the end of the semester. Credit tests and laboratory reports.

Programme content

Lecture:

1. Introductory information - definitions, historical background.
Discussion of the history of creation and application of identification systems. Presenting basic definitions and terminology.

2. Classification of identification systems on the example of visual and radio frequency identification.
Characterise visual identification systems on the example of barcodes and matrix codes, radio frequency identification on the example of RFID technology and optical identification systems using CMOS or CCD matrix cameras.

3. Identification systems with the use of barcodes.
Discussing the principle of operation and characteristic features. The presentation of the structure and principle of operation of code reading devices.

4. identification systems with the use of matrix codes.
Discussing the principle of operation and characteristic features. Demonstration of the construction and principle of operation of code reading devices.

5. RFID (radio-frequency identification) identification systems.
The discussion of the principle of operation and RFID standards. The presentation of the construction and the principle of operation of data reading and writing devices.

6. Identification systems with the use of vision systems.
The presentation of the principle of operation and types of vision systems. The presentation of the construction and the principle of operation of cameras and vision sensors.

7. Object identification systems in industrial applications – examples.
Discussion of object identification systems used in industrial machines and equipment and manufacturing processes.

Laboratories:

1. Organisational
Division into laboratory groups. Introduction to the regulations of the laboratory and rules of performing laboratory exercises.

2. identification systems with the use of barcodes
Getting to know the technology, construction, and the principle of operation of devices for reading barcodes.

3. identification systems using matrix codes
Technology, construction and principles of operation of code reading devices.

4 RFID identification systems
Understand the technology, construction and principle of operation of devices for reading and writing data on RFID cards.

5. identification systems with the use of vision systems I
Technology, design and operation of vision sensors.

6. Identification systems with the use of vision systems II
Technology, design and operation of CCD/CMOS cameras.

7. Course credit
Assessment of theoretical credits and reports

Teaching methods

Lecture with multimedia presentation. Kospekty for laboratories, laboratory stands.

Bibliography

Basic
1. E. Hałas (red.): Kody kreskowe i inne globalne standardy w biznesie. Instytut Logistyki I Magazynowania 2012.
2. B. Gładysz, M. Grabia, K. Santarek: RFID od koncepcji do wdrożenia : polska perspektywa, PWN, 2017.
3. M. Kubas, M. Molski: Karta elektroniczna : bezpieczny nośnik informacji, Mikom, 2002

Additional
1. Kody kreskowe: rodzaje, standardy, sprzęt, zastosowania (wyd. 2). Instytut logistyki i magazynowania, 2000

2. K. Finkenzeller: RFID Handbook, (wyd. 3), Wiley, 2010

3. W. Wieczerzycki (red.) E-Logistyka.. Polskie Wydawnictwo Ekonomiczne, 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1

[1] delete or add other activities as appropriate