



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Identification systems in the production process

### Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

4/8

Profile of study

general academic

Course offered in

polish

Requirements

elective

### Number of hours

Lecture

10

Laboratory classes

8

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Ph.D. (Eng) . Jarosław Adamiec

E-mail: jaroslaw.adamiec@put.poznan.pl

Ph: + 48 61 665 2054

Faculty of Mechanical Engineering

Piotrowo Street, 3, 60 – 965 Poznan, Poland

Responsible for the course/lecturer:

Ph.D. (Eng) . Jan Górecki

E-mail: jan.gorecki@put.poznan.pl

Ph: + 48 61 665 2053

Faculty of Mechanical Engineering

Piotrowo Street, 3, 60 – 965 Poznan, Poland

### 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. 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.

3. Identification systems using matrix codes.

Discussing the principle of operation and characteristic features. Presenting the construction and principle of operation of code reading devices.

3. 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.

4. 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.

Laboratories:

1. identification systems with the use of barcodes

Getting to know the technology, construction, and the principle of operation of devices for reading barcodes.

2. identification systems using matrix codes

Technology, construction and principles of operation of code reading devices.

3 RFID identification systems

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

4. identification systems with the use of vision systems I

Technology, design and operation of vision sensors.

**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	25	1
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	50	2,0

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