



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basis of mechatronics

### Course

Field of study

Safety Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

15

Tutorials

Laboratory classes

15

Projects/seminars

Other (e.g. online)

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

Ph.D., Eng., Jarosław Adamiec

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### Prerequisites

Knowledge: physics, general mechanics, fundamentals of machine construction, engineering graphics, basics of electronics and electrical engineering

Skills: description of basic phenomena, construction of mechanical and electrical systems, analysis of technical and electrical documentation

Social competence: is aware of the responsibility for decisions made during the construction process



## Course objective

Learning the structure and components of the mechatronic system.

## Course-related learning outcomes

### Knowledge

1. Knows issues concerning engineering issues (physics, chemistry, material science, manufacturing technologies, strength of materials, mechanics [P6S\_WG\_01]
2. Knows issues in the life cycle of products, equipment, objects, systems and engineering systems [P6S\_WG\_06].

### Skills

1. Is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks, also by using methods and tools of information and communication [P6S\_UW\_04].
2. Is able to critically analyze the way of functioning and evaluate - in connection with Safety Engineering the existing technical solutions, in particular machines, devices, objects, systems, processes and services [P6S\_UW\_06].
3. Can identify changes in requirements, standards, regulations and technical progress and the reality of the labour market, and on their basis determine the need to supplement the knowledge [P6S\_UU\_01].

### Social competences

1. is aware of the recognition of the importance of knowledge in solving safety engineering problems and continuous improvement [P6S\_KK\_02].
2. is aware of understanding non-technical aspects and effects of engineering activities, including its impact on the environment and related responsibility for decisions taken [P6S\_KK\_03].
3. is aware of professional behaviour, professional ethics and respect for diversity of views and cultures [P6S\_KR\_01].

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Short tests after the lecture. Testing from the lecture at the end of the semester. Oral answers from laboratory preparation and report.

## Programme content

Lecture: Introductory news - definitions, interdisciplinarity, history. Structure of mechatronic systems - components and their role. Mechatronic system - examples. Sensorics - classification, structure and principle of operation. Actuators-classification, construction and principle of operation. Mechatronic drive - examples, construction and principle of operation. Communication network in mechatronic system e.g. AS-i (actuator - sensor -interface). Decision mechanism - examples, construction and principle of operation.

Laboratories: Sensorics. Actuators. Mechatronic drive. Communication network. Decision-making mechanism.

## Teaching methods



Lecture with a multimedia presentation. Laboratory handouts, laboratory workstations.

### Bibliography

#### Basic

1. Heimann B., Gerth W., Popp K.: Mechatronika, Komponenty, Metody, Przykłady, PWN, Warszawa 2001,,
2. Schmidt D.: Mechatronika, wydawnictwo REA, Warszawa 2002,
3. Świder J.: Sterowanie i automatyzacja procesów technologicznych technologicznych układów mechatronicznych, Wyd. Politechniki Śląskiej, Gliwice 2002.

#### Additional

1. Gawrysiak M.: Mechatronika i projektowanie mechatroniczne, Wyd. elektroniczne, Białystok 1997.
2. Urządzenia i systemy mechatroniczne, wydawnictwo REA, Warszawa 2009.
3. Olszewski M.: Podstawy mechatroniki, wydawnictwo REA, Warszawa 2006.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	46	1,0
Classes requiring direct contact with the teacher	30	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests, project preparation) <sup>1</sup>	16	0,5

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