



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechanics and mechatronics [S1Eltech1>MiM2]

### Course

Field of study

Electrical Engineering

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

practical

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

1,00

### Coordinators

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### Lecturers

### Prerequisites

Students starting this subject should have a basic knowledge of: in the field of physics, basics of electrical engineering, mechanics and computer science. He should also be able to use literature sources available in both print and electronic versions, integrating acquired information and be aware of the need to expand his competencies and knowledge.

### Course objective

The main goal is to obtain knowledge of the basics of mechatronics. Introduction to the design and principle of work of mechatronic devices.

### Course-related learning outcomes

Knowledge:

1. Define the concepts of mechatronics, mechatronic system. Describe the role of sensor and actuator in the mechatronic system.
2. Know the application of MEMS.

Skills:

1. Describe the essence of mechatronic systems.
2. Search of information from literature, databases, and other sources in field of mechatronics.

Social competences:

1. Can deal with with selected mechatronic systems and demonstrate confidence in activities requiring knowledge of mechatronic devices.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture:

- assessment of knowledge and skills by the completion of a written test,
- continuous evaluation for each course (rewarding activity and quality of the expression).

Extra points for the activity in the classroom, and in particular for:

- discussion and proposition of additional aspects of the subjects,
- comments related to the improvement of teaching materials,
- quality and diligence of the developed reports.

### Programme content

Definitions, purpose and scope of mechatronics. Mechatronic systems. Sensors and actuators. Microelectromechanical systems (MEMS) microactuators, microsensors, the use of silicon technology. Smart materials.

### Course topics

Definitions, purpose and scope of mechatronics. Mechatronic systems. Subsystems integration of mechanical, hydraulic, electrical and information technology in complex mechatronic systems. Sensors and actuators. Actuators electromagnetic, electrostatic, piezoelectric, pneumatic and hydraulic. Microelectromechanical systems (MEMS) microactuators, microsensors, the use of silicon technology. Smart materials.

### Teaching methods

- lecture with multimedia presentation supplemented with examples given on the board,
- interactive lecture with questions to students,
- student activity is taken into account during the course of the assessment process.

### Bibliography

Basic

1. Schmid D., Mechatronika, tłum. z niem. oprac. wersji pol. Olszewski M., Wyd. REA, Warszawa 2002.
2. Heimann B., Gerth W., Popp K.: Mechatronika. Komponenty ? metody ?przykłady. Warszawa: Wyd. Nauk. PWN 2001.
3. Turowski J., Podstawy Mechatroniki, Wyd. WSHE, Łódź 2008.

Additional

1. Bishop R. H., The Mechatronics Handbook, Austin, Texas, CRC Press 2002
2. Gad-el-Hak M. The MEMS Handbook, CRC Press 2006

### Breakdown of average student's workload

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 30    | 1,00 |
| Classes requiring direct contact with the teacher   | 15    | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 15    | 1,00 |