POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)
pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
New technology in electromechanics

Course

Field of study	Year/Semester
Electrical Engineering	2 / 4
Area of study (specialization)	Profile of study
Electrical Systems in Mechatronics	general academic
Level of study	Course offered in
Second-cycle studies	polish
Form of study	Requirements
part-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
10		
Tutorials	Projects/seminars	

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Dorota Stachowiak

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Faculty of Control, Robotics and Electrical
Engineering

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Students starting this subject should have a basic knowledge of: electromagnetic field theory, electrical engineering and electrodynamics, knowledge of energy converters. He should also have the ability to effectively self-study in the field related to the selected field of study and be aware of the need to broaden their competences and knowledge.

Course objective

The main goal is to get acquainted with the modern applications of the phenomena associated with the electromagnetic field. Knowledge of principles of operation, property and construction of electromechanical transducers discussed.

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Course-related learning outcomes

Knowledge

1. Know the structure of selected electromechanical and electromagnetic cyclic and acyclic transducers and systems that use the energy phenomena: superconductivity, magnetic levitation .

Skills

1. The student will be able to indicate the potential use of new technologies in the construction of the electromechanical transducers.

Social competences

1. The student is aware of the value of his work, respect the principles of teamwork, takes responsibility for collaborative work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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

Superconductivity and its applications, magnetic separators, magnetic levitation, magnetic bearings. Structure and properties of magnetic fluid. Magnetic fluid applications. Structure and properties of shape memory alloys. Shape memory alloys applications. Mechatronic elements: sensors and actuators. Microelectromechanical systems (MEMS): microsensors, microactuators, silicon technology applications. Nanotechnology, nanomachines.

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. Stankowski J., Czyżak B., Nadprzewodnictwo, Wydwanictwa Naukowe-Techniczne; Warszawa; 1994.

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2. Burcan J., Łożyska wspomagane polem magnetycznym, Wydawnictwa Naukowo-Techniczne, Warszawa; 1996.

3. Ławniczak A., Milecki A.: Ciecze elektro- i magnetoreologiczne oraz ich zastosowania w technice, WPP 1999.

4. Schmid D., Mechatronika, tłum. z niem. oprac. wersji pol. Olszewski M., Wyd. REA, Warszawa 2002.

Additional

1. Bishop R. H.,The Mechatronics Handbook, Austin, Texas, CRC Press 2002

2. Gad-el-Hak M. The MEMS Handbook, CRC Press 2006

3. Hoffmann K. H., Functional Micro and Nanosystems, Springer ? Verlag Berlin Heidelberg 2004.

4. Stachowiak D., Kurzawa M., Charchuta I., Oprogramowanie do projektowania aktuatorów liniowych wykonanych ze stopów z pamięcią kształtu, Academic Journals Poznan University of Technology, Numer: 91/2017 Str: 355-364, 2017

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1
Classes requiring direct contact with the teacher	12	
Student's own work (literature studies, preparation for tests) [1]	18	1

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[1] delete or add other activities as appropriate