



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Testing of electrical drives in mechatronics

Course

Field of study

Electrical Engineering

Area of study (specialization)

Electrical Systems in Mechatronics

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Electrical Engineering

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Responsible for the course/lecturer:

Prerequisites

Knowledge of:

- the theory of the electromagnetic field, electrical engineering and electrodynamics, metrology of non-electrical and electrical quantities;
- knowledge of the structure of energy converters
- basic knowledge of the structure and principles of mechatronic devices

Skills:

- ability to use the technical documentations; ability to carry out independent measurements of electrical quantities,
- the ability to effectively self-education in a field related to the chosen field of study



Social competencies:

- skills in teamwork and verbal communication,
- the awareness of the need to broaden their skills and knowledge, a willingness to work together as a team

Course objective

The transfer of knowledge in the field: research and analysis of mechatronic actuators. Understanding the problems associated with the operation of mechatronic devices. Acquiring knowledge on methods eliminate hazards associated with the exploitation of electromagnetic drive systems with particular emphasis on environmental hazards arising from the use of mechatronic systems

Course-related learning outcomes

Knowledge

1. Know the structure of selected electromechanical and electromagnetic transducers
2. Get to know the problems of operation of mechatronic systems and methods for eliminating risks associated with the operation of electromagnetic drive systems
3. Know the laws in force in the putting into service of mechatronic devices

Skills

1. Formulate and solve problems related to the operation and diagnosis of complex systems, electromechanical systems
2. Indicate the potential use of new technologies in the construction of electric power converters

Social competences

1. Teamwork and aware of the responsibility for joint action
2. understandable reporting of the results of their own work and teamwork

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The lecture:

- assess the knowledge and skills listed on the completion of a written,
- continuous evaluation for each course (rewarding activity and the quality of speech)

Laboratory:

- test and favoring knowledge necessary for the accomplishment of the problems in the area of laboratory tasks,
- continuous evaluation for each course - rewarding gain skills they met the principles and methods, as well as the social skills of working in a team,
- assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment report performed exercise

Get extra points for the activity in the classroom, ie for:- the effectiveness of the application of the knowledge gained during solving the given problem;- ability to work within a team practice in the



laboratory performing the task;- subsequent to the improvement of teaching materials;- developed aesthetic diligence reports.

Programme content

Legislation allowing for the exploitation of power systems (Polish Standard, EU directives). Methods for measuring force, mechanical stress, torque, moment of inertia, speed and slip occurring in the electromechanical and magnetic pickups. To determine the parameters characterizing the electromagnetic field. Heat source in mechatronic drive systems and methods for its removal. Ventilation systems propulsion systems. Sources of acoustic noise and vibration. Measurement of vibrations and noise generated by the transducers. Electromechanical compatibility issues of the powertrain. Simulation of selected machines work. Analysis of the electromagnetic field in some electromagnetic devices.

Teaching methods

The teaching methods used:

The lecture:

- lecture with multimedia presentation (including drawings, photos, animations) supplemented with examples given on the board,
- taking into account various aspects of the issues presented, including: economic, ecological, legal and social issues,
- introducing a new topic preceded by a reminder of related content, known students in other subjects,

The laboratory:

- detailed review of reports by the laboratory leader, demonstrations, teamwork

Bibliography

Basic

1. Turowski J.: Elektrodynamika Techniczna, wyd. II, WNT, Warszawa, 1993
2. Bishop R. H.: The Mechatronics Handbook, Austin, Texas, CRC Press, 1999
3. Dąbrowski M.: Konstrukcja maszyn elektrycznych, wyd. II, PWN,, Warszawa, 1985
4. Latek W.: Badanie maszyn elektrycznych w przemyśle, WNT, Warszawa, 1987
5. Idziak P.: Analiza zjawisk sprzężonych zachodzących w maszynach prądu stałego, Seria Rozprawy nr 510, Wydawnictwo Politechniki Poznańskiej, Poznań 2013
6. Prawo energetyczne., Dz. U. 2013 z późniejszymi zmianami
7. IEC Standard
8. ISO Standard
9. Polska Norma PN-IEC-34-1; 4; 17
10. www.komel.katowice.pl/zeszyty.html



Additional

1. Schmid D.: Mechatronika, tłum. z niem. oprac. wersji pol. Olszewski M., Wyd. REA, Warszawa, 2002
2. czasopismo: Napęd i sterowanie

Breakdown of average student's workload

	Hours	ECTS
Total workload	76	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	36	1,0

¹ delete or add other activities as appropriate