STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Testing of electrical drives in mechatronics		**1010322331010326092**
Field of study: **Electrical Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **2 / 3**
Elective path/specialty: **Electrical Systems in Mechatronics**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **15** Classes: **-** Laboratory: **15** Project/seminars: **-**		No. of credits: **3**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **technical sciences** **Technical sciences**		ECTS distribution (number and %): **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	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
2	**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
3	**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

Assumptions and objectives of the course:

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

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Know the structure of selected electromechanical and electromagnetic transducers - [K_W03++ ,K_W10+]
2. Get to know the problems of operation of mechatronic systems and methods for eliminating risks associated with the operation of electromagnetic drive systems - [K_W05+ K_W11++]
3. Know the laws in force in the putting into service of mechatronic devices - [K_W07++ K_W18+]

Skills:

1. Formulate and solve problems related to the operation and diagnosis of complex electromechanical systems - [K_U03+++ K_U10++]
2. Indicate the potential use of new technologies in the construction of electric power converters - [K_U01+++ K_U19+++]

Social competencies:

1. teamwork and aware of the responsibility for joint action - [K_K01 + K_K02 ++]
2. understandable reporting of the results of their own work and teamwork - [K_K02++]

Assessment methods of study outcomes

lecture

? assess the knowledge and skills listed on the passing tests,

? 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.

Course description

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.

Basic bibliography:

1. 1. Elektrodynamika Techniczna, wyd. II, J. Turowski, WNT, Warszawa, 1993
2. 2. The Mechatronics Handbook, Bishop R. H., Austin, Texas, CRC Press
3. 3. Konstrukcja maszyn elektrycznych., Dąbrowski M.,, PWN,, Warszawa, 1985
4. 4. Badanie maszyn elektrycznych w przemyśle., Latek W.,, WNT,, Warszawa,, 1987
5. 5. Prawo energetyczne., 2003
6. 6. IEC Standard
7. 7. ISO Standard
8. 8. Polska Norma PN-IEC-34-1; 4; 17
9. 1. Elektrodynamika Techniczna, wyd. II, J. Turowski, WNT, Warszawa, 1993
10. 2. The Mechatronics Handbook, Bishop R. H., Austin, Texas, CRC Press
11. 3. Konstrukcja maszyn elektrycznych., Dąbrowski M.,, PWN,, Warszawa, 1985
12. 4. Badanie maszyn elektrycznych w przemyśle., Latek W.,, WNT,, Warszawa,, 1987
13. 5. Prawo energetyczne., 2003
14. 6. IEC Standard
15. 7. ISO Standard
16. 8. Polska Norma PN-IEC-34-1; 4; 17

Additional bibliography:

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

Result of average student's workload

Activity	Time (working hours)
1. Participation in lecture classes	9
2. Participation in laboratory activities	9
3. Participation in consultation	8
4. Preparation for laboratory exercises	10
5. Prepare reports on the performed exercises	8
6. Preparing for the tests	10
7. Participation in the tests	4

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	86	3
Contact hours	46	2
Practical activities	45	2