

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Electromechanical Devices in Automatics</b>		Code <b>1010324391010320071</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>5 / 9</b>
Elective path/specialty <b>Electrical Systems in Mechatronics</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>part-time</b>	
No. of hours Lecture: <b>9</b> Classes: <b>-</b> Laboratory: <b>18</b> Project/seminars: <b>9</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż. Paweł Idziak email: pawel.idziak@put.poznan.pl tel. +48 61 6652781 Elektryczny Wydział Elektryczny ul. Piotrowo 3A, 60-965 Poznań tel.: 061 665 2239		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Knowledge of: the theory of the electromagnetic field, electrical engineering and electrodynamics, metrology of electrical and non-electrical physical quantities, knowledge of the structure of energy converters.  Basic knowledge of the principles of construction and operation of facilities
2	<b>Skills</b>	Ability to use the technical documentation, the ability to independently carry out measurements of electrical quantities, the ability to effectively self-education in a field related to the chosen field of study
3	<b>Social competencies</b>	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
<b>Assumptions and objectives of the course:</b> 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 operation of electromagnetic propulsion systems with particular emphasis on environmental hazards arising from the use of mechatronics systems.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Know the structure of elected electromechanical and electromagnetic transducers cyclic and acyclic energy - [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 propulsion systems - [K_W05+ K_W11++ ]		
3. Know the laws in force in the putting into service of mechatronic devices - [K_W07++ K_W18+ ]		
<b>Skills:</b>		
1. formulate and solve problems related to the operation and diagnosis of complex systems, 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+++ ]		
<b>Social competencies:</b>		
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++]		

<b>Assessment methods of study outcomes</b>		
<p>lecture</p> <p>? assess the knowledge and skills listed on the completion of a written,</p> <p>? continuous evaluation for each course (rewarding activity and the quality of speech).</p> <p>Laboratory:</p> <p>? test and favoring knowledge necessary for the accomplishment of the problems in the area of ??laboratory tasks,</p> <p>? 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,</p> <p>? assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment report performed exercise</p> <p>Get extra points for the activity in the classroom, ie for:</p> <p>? the effectiveness of the application of the knowledge gained during solving the given problem;</p> <p>? ability to work within a team practice in the laboratory performing the task;</p> <p>? subsequent to the improvement of teaching materials;</p> <p>? developed aesthetic diligence reports.</p>		
<b>Course description</b>		
<p>Legislation allowing for the operation 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 sources. Measurement of vibrations and noise generated by the transducers mechatronics. Electromechanical compatibility issues of the powertrain. Simulation of selected machines work. Analysis of the electromagnetic field in some electromagnetic devices. Measurement stations to study phenomena in transformers and implementing systems mechatronics</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. AC micro-machinery, Simst J., Clarendon Press, New York, 1994</li> <li>2. Mikromaszyny elektryczne, Sochocki R., Ofic. Wyd. PW, Warszawa, 1996</li> <li>3. Silniki krokowe, Wróbel T., WNT, Warszawa, 1993</li> <li>4. Projektowanie maszyn elektrycznych prądu przemiennego, Dąbrowski M., WNT, Warszawa, 1994</li> <li>5. Silnik PM BLDC w napędzie elektrycznym analiza, właściwości, modelowanie, Krykowski K. Wydawnictwo Politechniki Śląskiej, Gliwice 2011</li> <li>6. <a href="http://www.komel.katowice.pl/zeszyty.html">www.komel.katowice.pl/zeszyty.html</a></li> <li>7.</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Handbook of small electric motors, Yeadon W.H., Yeadon A.W., Mc Graw Hill, 2001</li> <li>2. <a href="http://www.energoelektronika.pl">www.energoelektronika.pl</a></li> </ol>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in lecture classes	9	
2. Participation in laboratory activities	18	
3. Participation in project activities	9	
4. Participation in consultation	20	
5. Preparation for laboratory	28	
6. Prepare reports on the performed exercises	15	
7. Exam Preparation	18	
8. Participation in the exam	8	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	125	4
Contact hours	64	2
Practical activities	70	2