

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Diploma project		Code 1010321271010323898
Field of study Electrical Engineering	Profile of study (general academic, practical) general academic	Year /Semester 4 / 7
Elective path/specialty Electrical Systems in Mechatronics	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: - Classes: - Laboratory: - Project/seminars: 15		No. of credits 2
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: Mariusz Barański email: mariusz.baranski@put.poznan.pl tel. 61 665 2636 Electrical Piotrowo 3A Str., 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of electrical engineering, electrical machinery, electrical metrology, electrical circuit theory, power controls, power electronics, and operating system support. Basic knowledge of construction and design of electrical machines. Basic knowledge of computer science and numerical methods. Knowledges from the construction, analysis and synthesis of electromechanical transducers and measurement methods used in mechatronics.
2	Skills	Fundamentals of construction and operation of electrical systems and mechatronics with the use of tools.
3	Social competencies	Student is aware of the need to broaden their competence, willingness to work together as a team
Assumptions and objectives of the course: Acquiring modern methods of design, testing and analysis of mechatronics and actuators electromagnetic and electromechanical devices. The acquisition of skills in computing package selected.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has a basic knowledge of numerical methods allow to solve simple tasks in the field of electrical engineering, it is well versed in tools used to perform numerical computations and analysis and design of selected technical systems - [K_W02 ++]		
2. Student knows the typical engineering technologies in Electrical Engineering and it is versed in the latest trends and development in the field of direction being studied Electrical Engineering - [K_W18 ++]		
Skills:		
1. Student can formulate an algorithm, he uses a programming language and related software tools used in electrical engineering - [K_U04 ++]		
2. Student can use the known methods, mathematical models and computer simulations to analyze and evaluate the performance of electrical components and systems - [K_U10 ++]		
Social competencies:		

Assessment methods of study outcomes		
Project lectures ? Evaluation based on the current progress of the projects and thesis. Get extra points for the activity in the classroom, and in particular for: ? propose to discuss further aspects of the subject; ? the effectiveness of the application of the knowledge gained during solving the given problem.		
Course description		
Simulation of operation of electrical machines and DC permanent magnet machines in Matlab. Using Maxwell to analyze of magnetic field in the selected systems with magnetic field. Using LabVIEW to create virtual instruments supporting electromagnetic and thermal measurements of electromechanical transducers. Measuring systems for the study of phenomena in transformers. 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 in electrical machines.		
Basic bibliography:		
1. 1. AC micro-machinery, Simst J., Clarendon Press, New York, 1994 2. 2. Mikromaszyny elektryczne, Sochocki R., Ofic. Wyd. PW, Warszawa, 1996 3. 3. Silniki krokowe, Wróbel T., WNT, Warszawa, 1993 4. 4. Projektowanie maszyn elektrycznych prądu przemiennego, Dąbrowski M., WNT, Warszawa, 1994 5. 5. Techniki komputerowe CAX w inżynierii produkcji, Chlebus E., WNT, Warszawa, 2000 6. 6. LabVIEW w praktyce, Chruściel M., Wydawnictwo BTC, Legionowo, 2008 7. 7. Environment LabVIEW? w eksperymencie wspomaganym komputerowo, Tłaczała W., WNT, Warszawa, 2002 8. 8. Napęd elektryczny robotów, Wyd.2, Kaczmarek T., Wyd. Politechniki Poznańskiej, Poznań, 1998 9. 9. Układy napędowe z silnikami synchronicznymi, Kaczmarek T., Zawirski K., Wyd. PP, Poznań, 2000 10. 10. Metody Numeryczne w Turbo Pascalu, B. Baron, Wyd. Helion, Gliwice, 1995 11. 11. MATLAB i Simulink, B. Mrozek, Z. Mrozek, Helion, Gliwice, 2004 12. 12. Numerical Analysis, R. Burden, J.D. Faires, PWS Publishers, Prindle, Weber&Schmidt, 1985 13. 13. Analysis of Electric Machinery, P. Krauze, McGraw Hill Book Company, New York, 1986 14. 14. Programowanie w Matlabie dla elektryków, M. Sobierajski, M. Łabuzek, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2005 15. 15. Podręczniki, monografie i artykuły podane przez kierujących pracami dyplomowymi.		
Additional bibliography:		
1. 1. Handbook of small electric motors, Yeadon W.H., Yeadon A.W., Mc Graw Hill, 2001 2. 2. Dokumentacja systemu AUTOCAD 3. 3. Automatyka napędu przekształtnikowego, Tunia H., Kaźmierkowski M.P., PWN, Warszawa, 1988 4. 4. Control of Electrical Drives, Leonhard W., Springer-Verlag, Berlin-Heidelberg-NewYork-Tokyo, 1985 5. 5. Turbo Pascal i Borland C++. Przykłady. Wydanie II, Autor: Kazimierz Jakubczyk, Data wydania: 2006/04, Stron: 376, Zawiera CD-ROM 6. 6. LabVIEW Graphical Programming, Jennings Richard, Johnson Gary W., McGraw-Hill Professional Publishing, 2006		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in project activities	15	
2. Participation in consultation	20	
3. Participation in the exam	2	
4. Participation in the thesis	30	
Student's workload		
Source of workload	hours	ECTS
Total workload	67	2
Contact hours	37	1
Practical activities	30	1