

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject The work of electric power system		Code 1010315341010313673
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 4
Elective path/specialty Power Networks and Electric Power System	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 9 Classes: - Laboratory: 9 Project/seminars: -		No. of credits 2
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		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: dr inż. Andrzej Trzeciak email: andrzej.trzeciak@put.poznan.pl tel. +48 61 665 2581 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	They have knowledge of the basics of electrical engineering, electric power industry and automatic protection
2	Skills	They can autonomously calculations for electricity networks
3	Social competencies	They are aware of the need to supplement the expertise and to cooperate in a group
Assumptions and objectives of the course: -The grove of specific knowledge for the work of power electric grid and the activities of the automatic protection. The grove of the skill of laboratory verification of correctness working of automatic protection arrangements		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. They have an expanded knowledge of the selection of equipment and setting of eliminative automatic protection. They have knowledge of restitutive and preventive automatic protections. They know the rules of changes of setting adaptive protections on the effect of other automatic - [K_W16+, K_W19+++]		
2. They have an expanded knowledge of automatic protection equipment requirements ? start up characteristic, measure mistake and relay mistake, compactness of start up values - [K_W11+]		
Skills:		
1. They can find the right settings of automatic protection to required tasks in according to network configuration. - [K_U09+]		
2. They can perform the test of relay on physical model of power system. They can assemble the measuring system and perform research of selected protection equipment, work up results of measurement. - [K_U18+++]		
Social competencies:		
1. They understand, how it is important for investment the location its in development plan, and the ensure its proper ?public relation? for public consultation. - [K_K02+++]		
Assessment methods of study outcomes		
- Test and reward the necessary knowledge to complete the laboratory exercises - Evaluation accuracy of measurements and the ability to interpret their results - Evaluation of knowledge and skills shown out on the written exam		

Course description		
<p>-Widening of automatic protection information? preventive, eliminative (power sources), restitutive protection systems . Reconciling of work of automatic, their mutual influence on each other (automatic change delays, or coverage zones).Laboratory testing and checking the operating conditions of the protection equipment on physical model of part of power system.</p> <p>Applied training methods Lecture: the theory of the closely related to practice, Multimedia lecture Laboratory: Computational experiments, working in a team</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Machowski J. : Stany nieustalone i stabilność systemu elektroenergetycznego. WNT, Warszawa, 1989. 2. Machowski J.: Regulacja i stabilność systemu elektroenergetycznego. OWPW, Warszawa 2007. 3. Machowski J., Białek J., Bumby J. Power System Dynamics: Stability and Control. IEEE Wiley, 2008. 4. Poradnik Inżyniera Elektryka . t.3. WNT, Warszawa 2005 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Z. Kremens, M. Sobierajski: Analiza systemów elektroenergetycznych. WNT, Warszawa, 1996. 2. Zb. Jasicki : Elektromechaniczne stany przejściowe w systemach energetycznych. T.1 i 2. PWN, Warszawa, 1987 3. Kacejko P., Machowski J.:Zwarcia w systemach elektroenergetycznych . WNT, Warszawa, 2013 		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	9	
2. Participation in laboratories	9	
3. Participation in consultations	3	
4. Preparation for laboratory activities and development results	14	
5. Prepare for the exam	6	
6. Participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	50	2
Contact hours	23	1
Practical activities	27	1