

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Electric Power System Operation</b>		Code <b>1010311371010316898</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>4 / 7</b>
Elective path/specialty <b>Electric Power Systems</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>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>3</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>3 100%</b> <b>3 100%</b>
<b>Responsible for subject / lecturer:</b>  Dr inż. Ireneusz Grządzielski email: ireneusz.grzadzieski@put.poznan.pl tel. tel. 61 665 2392 Wydział Wydział Elektryczny Piotrowo 3A, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Possesses basic knowledge of the theory of electrical circuits, electrical machines, electric power engineering and electrical power generation
2	<b>Skills</b>	Has effective self-study ability in the domain of the chosen specialization, is able to integrate the knowledge acquired at the credited courses
3	<b>Social competencies</b>	Is aware of the need to develop his knowledge and competencies, is ready to undertake the cooperation and team work
<b>Assumptions and objectives of the course:</b> Getting knowledge of the electric power system operation under steady operating- computations of the symmetrical and asymmetrical steady short-circuit conditions in the power system, practical use of the short-circuit computation programs SCC and DAKAR.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. Has general knowledge of automatics and automatic control fundamentals - know the criteria and principles of selection power protection automation devices - [K_W22++ ] 2. Has knowledge of the electric power system fundamentals including structure and operation states of the electric power sectors: generation, transmission and distribution, knows basic rules of the operation and maintenance of the electric power system elements - [K_W24 +++] 3. Has knowledge of the electric power engineering development trends in the EU integrated electric power system as well as rules of its safe operation - [K_W25++]		
<b>Skills:</b> 1. Can elaborate the engineer task completion?s documentation and describe the task?s results - [K_U07++] 2. Can choose suitable technique and use measuring equipment (analog or digital) to measure the basic measurable magnitudes typical for engineering - [K_U14+] 3. Can properly use and maintain electrical devices according to the general requirements and technical docu - [K_U23+++]		
<b>Social competencies:</b> 1. Is aware of the weight and understands different aspects and effects of the electric engineer?s activities including those related to the environmental impact and regarding the responsibility for the undertaken decisions - [K_K02++]		

<b>Assessment methods of study outcomes</b>		
<p>Lectures:</p> <ol style="list-style-type: none"> <li>1. Assessment of the knowledge and skills shown at the written and oral examinations ,</li> <li>2. Continuous assessment during courses ( bonus for activity and perception quality).</li> </ol> <p>Project:</p> <ol style="list-style-type: none"> <li>1. On-line assessment of the preparation to the design tasks,</li> <li>2. Evaluation of the completed design task.</li> </ol>		
<b>Course description</b>		
<p>Lectures: Transient states in the electric power system. Calculations of the steady short-circuit conditions in the electric power system ? non-symmetrical short-circuit analysis using symmetrical component method, models of the system elements for symmetrical components.</p> <p>Project: includes the design tasks from the scope of the knowledge handed over at the lectures in the semester 6 and 7.</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Kremens Z. , Sobierajski M. : Analiza systemów elektroenergetycznych. WNT, Warszawa, 1996.</li> <li>2. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa, 2002.</li> <li>3. Poradnik Inżyniera Elektryka . t.3. WNT, Warszawa 2005</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Cegielski M.: Sieci i systemy elektroenergetyczne. PWN, Warszawa, 1979.</li> <li>2. Kończykowski S., Bursztyński J.: Zwarcia w układach elektroenergetycznych. WNT, Warszawa, 1965.</li> </ol>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. participation in lecture courses	15	
2. participation in project classes	15	
3. participation in discussions related to lectures	5	
4. participation in discussions related to project	5	
5. preparation to project classes	5	
6. elaborate to project	10	
7. preparation to examination	10	
8. taking an examination	3	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	68	3
Contact hours	43	2
Practical activities	25	1