

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Problems of power engineering security</b>		Code <b>1010312421010315652</b>
Field of study <b>Power Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 2</b>
Elective path/specialty <b>Sustainable Energy Development</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-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>2</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>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b> dr inż. Radosław Szczerbowski email: radoslaw.szczerbowski@put.poznan.pl tel. 61 665 2030 Electric Engineering Piotrowo 3A, 60-965 Poznań		<b>Responsible for subject / lecturer:</b> dr inż. Jerzy Andruszkiewicz email: jerzy.andruszkiewicz@put.poznan.pl tel. 61 665 2392 Electric Engineering Piotrowo 3A, 60-965 Poznań
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge of electricity, power systems, energy management, fuels and their utilisation
2	<b>Skills</b>	Ability of effective self-education in the chosen field of study
3	<b>Social competencies</b>	Is aware of the need to expand his competences and aspires to improve the efficiency and safety of energy generation processes and energy transmission.
<b>Assumptions and objectives of the course:</b> Understanding the European Union's strategy for sustainable development of energy sector with special attention for the use of the environment, promotion of renewable energy and energy efficiency and the resulting actions taken in Poland. Knowledge about the measures undertaken to implement this strategy. Understanding the properties of power systems with special importance to their security, observed threats to this security and possible countermeasures.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. He has the knowledge necessary to understand the issues of energy security, including the risks involved and about measures how to improve the level of security. - [K_W15+++] 2. Able to formulate and test hypotheses related to the analysis of the energy system states as well as the states of its components - [K_W10++]		
<b>Skills:</b> 1. Able to assess the usefulness of the strategic objectives for the decision support in energy processes - [K_U09++] 2. Able to formulate and test hypotheses related to the analysis of the energy system states as well as the states of its components - [K_U10++]		
<b>Social competencies:</b> 1. He can think and act in a creative and entrepreneurial way, understands the need for the formulation and communication of information and opinions on the performance of energy industries to the public - [K_K01+] 2. Correctly identifies and resolves dilemmas related to the country energy security - [K_K02+]		
<b>Assessment methods of study outcomes</b>		

<p>Lectures:</p> <ul style="list-style-type: none"> <li>- evaluation of the knowledge and skills demonstrated in written test concerning issues presented,</li> <li>- evaluation of the activity and quality of perception.</li> </ul> <p>Classes:</p> <ul style="list-style-type: none"> <li>- results of test favoring the utilization of the acquired knowledge to solve problems in the area of the subject.</li> </ul>		
<b>Course description</b>		
<p>Fuel resources and modern energy generation and transmission technologies. The costs of generating electricity and heat, taking into account the impact on the environment (CO<sub>2</sub>, SO<sub>2</sub>). EU sustainable energy policy to reduce emissions, promote renewable energy and energy efficiency. Diversification of energy sources including different generation technologies. Legal regulations empowering the sustainable development of energy generation adequacy. Risks for security of energy supply characteristic for different energy sources and the methods for the evaluation and limitation of their values. Methods for granting the local security of energy supply by stand by power resources. Subject of classroom exercises consistent with the lectures.</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. G.Bartodziej, M.Tomaszewski, Polityka energetyczna i bezpieczeństwo energetyczne, Wydawnictwo Federacji Stowarzyszeń Naukowo-Technicznych ?Energetyka i Środowisko?, Warszawa, 2009</li> <li>2. M. Kaczmarski, Bezpieczeństwo energetyczne Unii Europejskiej. Wydawnictwo Akademickie i Profesjonalne. 2010.</li> <li>3. T.Sutkowski. Rezerwowe i bezprzerwowe zasilanie w energię elektryczną; urządzenia i układy. ESP COSiW, 2007</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Praca zbiorowa. Safety of the Polish Power System .Defence and Restoration Plans, Electrical Engineering Issue 57, Published by Poznan University of Technology, Poznań, 2008</li> <li>2. B. Poskrobko. Zrównoważony rozwój gospodarki opartej na wiedzy, Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku, Białystok 2009</li> <li>3. D.Laudyn, M.Pawlik, F.Strzelczyk. Elektrownie, WNT W-wa 2000</li> </ol>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Participation in courses and classrooms	30	
2. Preparation for examination	30	
3. Consultations concerning lectures and classrooms	5	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	65	2
Contact hours	35	1
Practical activities	0	0