

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Basics of electrical power engineering</b>		Code
Field of study <b>Mathematics in technology</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>2 / 4</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies (Polish Qualifications Framework level six)</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>15</b> Laboratory: <b>15</b> Project/seminars: <b>-</b>		No. of credits <b>5</b>
Status of the course in the study program (Basic, major, other) <b>basic</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>Technical sciences Technical sciences</b>		ECTS distribution (number and %) <b>5 100% 5 100%</b>
<b>Responsible for subject / lecturer:</b> dr inż. Robert Wróblewski email: robert.wróblewski@put.poznan.pl tel. 61 665 2523 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge in the field of mathematics, physics and basics of electrical engineering. [K_W01 (P6S_WG)]
2	<b>Skills</b>	The ability of effective self-education in the field related to the chosen field of study. [K_U01(P6S_UW)]
3	<b>Social competencies</b>	Is aware of the need to expand their competences, readiness to cooperate within the team. [K_K01(P6S_KK)]
<b>Assumptions and objectives of the course:</b> Understanding the structure and characteristic features of the power system and the physical basis for generating electricity in various types of power plants..		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. Has knowledge in the field of electricity, thermodynamics and mechanics, including knowledge necessary to understand the basic physical phenomena occurring in energy components and systems and their environment. [K_W04 (P6S_WG); K_W05 (P6S_WG); K_W11 (P6S_WG)] 2. Has knowledge in the field of design, construction and operating principles of electrical power equipment. [K_W11 (P6S_WG)]		
<b>Skills:</b> 1. Is able to assess technologies of electricity generation in terms of their efficiency and environmental impact. [K_U08 (P6S_UW)] 2. Is able to test and diagnose simple energy systems and devices. [K_U10 (P6S_UW); K_U11 (P6S_UW)]		
<b>Social competencies:</b> 1. knows the limits of own knowledge and understands the need for further education - [K_K02 (P6S_KK)] 2. Understands the social aspects of the practical application of the acquired knowledge and skills and the related responsibility, is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment. [K_K03 (P6S_KO)] 3. Can understand information and opinions on the content of engineering issues in a comprehensible way. [K_K05 (P6S_KR)]		

<b>Assessment methods of study outcomes</b>		
<p>-Lecture</p> <ul style="list-style-type: none"> <li>- assessment of knowledge and skills demonstrated on a written problem test,</li> <li>- continuous assessment on each class (rewarding activity and quality of perception)</li> </ul> <p>Laboratory exercises:</p> <ul style="list-style-type: none"> <li>- testing and rewarding the knowledge necessary to implement the set problems in a given area of laboratory tasks,</li> <li>- assessment of knowledge and skills related to the implementation of the exercise task, evaluation of the report on the exercise.</li> </ul> <p>Project:</p> <ul style="list-style-type: none"> <li>- based on the evaluation of the self-performed project task</li> </ul> <p>Getting points for classes during classes, and wood for:</p> <ul style="list-style-type: none"> <li>- suggesting discussion of additional aspects of the issue;</li> <li>- the effectiveness of using the acquired knowledge while solving a given problem;</li> <li>- ability to cooperate within a team that practically performs a detailed task in the laboratory;</li> <li>- comments related to the improvement of didactic materials;</li> <li>- aesthetic diligence in the preparation of reports and tasks as part of your own learning.</li> </ul>		
<b>Course description</b>		
<p>General characteristics of the power system; Basic values in network calculations (current, voltage, power factor, power, phasor diagrams, voltage drop, power losses); Line substitute and power transformer diagram; Calculations of current flow and voltage drops in a repeatedly loaded line; The course and characteristic values of short-circuit current according to normative recommendations; Characteristics of the process of generating electricity in various types of power plants. Calculating the efficiency of indirect energy transformations in conventional power plants. Construction and operation principle of basic steam power plant equipment: boiler, turbine, carburizing system, condenser, heat exchangers, degasser, pumps, fans. Systems and types of MV and LV power grids. Selected elements of power stations. Distortion of currents and voltages in power grids.</p> <p>Update: 10.2018</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Laudyn D., Pawlik M., Strzelczyk F.: Elektrownie, wyd. IV. WNT Warszawa. 2000.</li> <li>2. Łaski A.: Elektrownie wodne. Rozwiązania i dobór parametrów. WNT. Warszawa 1971.</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>3. Lewandowski M., Proekologiczne źródła energii odnawialnej, WNT W-wa 2001</li> </ol>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. lecture	30	
2. preparation for the exam	20	
3. exam	2	
4. attend lectures	10	
5. laboratories	15	
6. preparation for laboratory exercises	15	
7. preparation of laboratory reports	4	
8. Participate in laboratory consultations	5	
9. participate in the exercise classes	15	
10. participate in exercise consultations	5	
11. preparation to pass the exercises	10	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	131	5
Contact hours	82	3
Practical activities	34	1