

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Exploitation of energy sources in electric power system		Code 1010314491010316273
Field of study Power Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 5 / 9
Elective path/specialty Electrical Power Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 18 Classes: - Laboratory: 9 Project/seminars: 9		No. of credits 5
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 Technical sciences		ECTS distribution (number and %) 5 100% 5 100%
Responsible for subject / lecturer: Radosław Szczerbowski email: radoslaw.szczerbowski@put.poznan.pl tel. 61 665 20 30 Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Has a basic knowledge about the energy technology and electric machines, and fuel and energy conversion.
2	Skills	Understand the basic principles of operation of the machines and know the construction of power generation equipment
3	Social competencies	Is aware of the need to expand their skills and willingness to work together as a team.
Assumptions and objectives of the course: Gaining basic knowledge about the tasks, the role and operation of generation sources in the power system. Understanding and applying the principles of correct operation of power equipment.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a general knowledge about work of different generation sources in the power system including energy security - [K_W07++K_W09+]		
2. Knows the basic principles of operation and use of power sources in the power system - [K_W12++]		
Skills:		
1. Student is able to characterize the Polish power system from the point of view of generation sources - [K_U20++]		
2. Able to assess the role and suitability of generation sources to work in the power system, and can analyze circuits of thermal power plants - [K_U22++]		
Social competencies:		
1. Understand the role of generation sources in the power system, and is aware of the importance of the role of the energy engineer in planning and operation of the power system - [K_K02++]		
Assessment methods of study outcomes		

<p>Lecture. Continuous evaluation for each course: skills and competences by conducting discussions on current issues related to the work, knowledge evaluation based on written work about problematic character.</p> <p>Laboratory. tests the knowledge necessary for the accomplishment of problems evaluation knowledge and skills related to the implementation of the tasks, evaluation report on performed exercise.</p>		
Course description		
<p>The national energy system, including the role of distributed generation including renewable energy sources. Characteristics cogeneration local energy systems. The role of distributed generation on domestic energy market. Indicators characterizing the work of generation sources. Optimization of the energy. criteria and methods for the delivery of the optimization. Working conditions for different types of generation sources in the power system.</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 1. Skorek J., Kalina J.: Gazowe układy kogeneracyjne. Wydawnictwa Naukowo-Techniczne 2005. 2. Szargut J., Ziębik A.: Skojarzone wytwarzanie ciepła i elektryczności ? elektrociepłownie. Wydawnictwo Pracowni Komputerowej Jacka Skalmierskiego 2007. 3. Eckermann G.: Eksploatacja elektrowni jądrowych, WNT Warszawa 1987 4. Paska J., Elektrownie jądrowe, Oficyna Wydawnicza Politechniki Warszawskiej, 1990 5. Janiczek R.S.: Eksploatacja elektrowni parowych, WNT, 1992. 6. Kowalska A., Wilczyński A., Źródła rozproszone w systemie elektroenergetycznym. Kaprint. 2007 7. Matla R., Gładys H., Praca elektrowni w systemie elektroenergetycznym. WNT. 1999 8. Paska J., Wytwarzanie rozproszone energii elektrycznej i ciepła. Oficyna Wydawnicza Politechniki Warszawskiej. 2010 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. Michałowski S., Plutecki J., Energetyka wodna. WNT. 1975 2. Legutko S.; Podstawy eksploatacji maszyn, Wyd. Politechniki Poznańskiej, Poznań 2002 3. Zdzisław Celiński, ?Energetyka jądrowa?, PWN, Warszawa 1991 		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in lectures	18	
2. exam preparation	20	
3. presence on the exam	5	
4. the consultation of lectures	5	
5. participation in laboratory	9	
6. preparation to laboratory exercises	10	
7. development of laboratory reports	15	
8. the consultation of the laboratory	5	
9. participation in project activities	9	
10. participating in consultations for the design	5	
11. independent execution of the project	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	121	5
Contact hours	56	2
Practical activities	73	3