STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Exploitation of energy sources in electric power system	**1010314391010316273**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**5 / 9**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
Electrical Power Engineering	**polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours	No. of credits
Lecture: **18** Classes: **-** Laboratory: **9** Project/seminars: **9**	**5**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**5 100%**

Responsible for subject / lecturer:

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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 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

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.

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.

Course description

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.

Basic bibliography:

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., Gładyś H., Praca elektrowni w systemie elektroenergetycznym. WNT. 1999
8. Paska J., Wytwarzanie rozproszone energii elektrycznej i ciepła. Oficyna Wydawnicza Politechniki Warszawskiej. 2010

Additional bibliography:

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	3
5. participation in laboratory	9
6. preparation to laboratory exercises	10
7. development of laboratory reports	15
8. the consultation of the laboratory	3
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	170	7
Contact hours	85	3
Practical activities	100	2