

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Electrical Power Engineering		Code 1010324341010312426
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 4
Elective path/specialty -	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: 20 Classes: 10 Laboratory: 10 Project/seminars: -		No. of credits 4
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 %) 4 100% 4 100%
Responsible for subject / lecturer: dr inż. Krzysztof Sroka email: krzysztof.sroka@put.poznan.pl tel. 61 665 22 75 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		Responsible for subject / lecturer: dr hab. inż. Ryszard Frąckowiak email: ryszard.frackowiak@put.poznan.pl tel. 6652294 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of mathematics, physics and electrical engineering
2	Skills	Ability to effectively self-education in a field related to the chosen field of study
3	Social competencies	Is aware of the need to broaden their competence, willingness to work together as a team
Assumptions and objectives of the course: Acquiring knowledge of structure and characteristics of electric power system. Knowledge of physical fundamentals of electric energy generation in various types of power plants. Methods and rules for electrical power networks calculations.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. General knowledge about the structure of the power system and the understanding of the processes of generation, transmission and distribution of electricity. - [K_W24+++]		
2. Basic knowledge of energy conversion in various types of power plants, in particular, conventional and nuclear power plants. - [K_W18++K_W08+]		
3. Knowledge and use of alternative patterns of power system components. - [K_W08+]		
4. It has a general knowledge of issues relating to distributed and non-conventional energy sources. - [K_W24+++K_W18++]		
5. It has basic information on the analysis of steady-state and short-circuit electric power systems. - [K_W24+++]		
6. It has a basic knowledge of analysis of stability transmission and of quality of electricity supplied to. - [K_W24+++]		
Skills:		
1. Able to evaluate the power generation technologies in terms of efficiency and environmental impact. - [K_U12++]		
2. Able to perform basic calculations of currents and voltages in power system. - [K_U11+]		
3. Able to test and diagnose simple energy systems and equipment. - [K_U15+]		
4. It can classify the electricity generation technologies and to analyze the efficiency of energy conversion occurring in different types of generation sources - [K_U20++K_U12++]		
5. Able to explain the basic principles of regulatory processes in the power system and to explain the functioning of the power protection automation. - [K_W22++]		
Social competencies:		

1. Able to work in a group in the performance of laboratory tests and present the results of the work - [K_K06+]
 2. Understand the need to promote energy efficiency and reducing harmful effects on the environment of the electricity sector. - [K_K02++]

Assessment methods of study outcomes

Lectures:

- assess the knowledge and skills listed on the written exam,
- continuous grading knowledge and skills on each lecture by discussion regarding actual problems in the electric power engineering.

Classes:

- credit on the basis of the current check messages and two written tests of the accounting tasks.

Laboratory:

- tests verifying needed knowledge to realisation indicated problems in some field of laboratory tasks,
- grade of knowledge and skills related to realisation of laboratory tasks, grade of report,
- collection of extra points of collaboration in frame of team realising laboratory tasks.

Course description

Characterization of the electric power system. Characterization of the process of electric energy generation in various types of power plants. Intermediate processes of energy conversion in conventional power plants. Clean Coal Technologies. Energy conversion in nuclear power plants. Power system equivalent schemes. Calculation rules for power flow and voltage/power losses in simple networks. Gas and gas-steam power plants Combined heat and power plants. Power plants using renewable energy sources. Essential requirements of networks, reliability. Short-circuit analysis and standard based short-circuit calculations. Basics of power system stability.

Basic bibliography:

1. Pawlik M., Strzelczyk F.: Elektrownie, WNT W-wa 2012, 2017
2. Kujszczyk Sz. (pod red.): Elektroenergetyczne układy przesyłowe, WNT, Warszawa, 1997
3. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa 2002

Additional bibliography:

1. Chmielniak T.: Technologie energetyczne, WNT W-wa 2014
2. Marecki J.: Podstawy przemian energetycznych, WNT W-wa 2014
3. Lewandowski W. M.: Proekologiczne źródła energii odnawialnej, WNT, W-wa 2012
4. Kujszczyk Sz. (pod red.): Elektroenergetyczne sieci rozdzielcze, tom 1 i 2, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2004 r.

Result of average student's workload

Activity	Time (working hours)
1. participation in the lectures	20
2. participation in consultations on the lecture	3
3. participation in the laboratory exercises	10
4. preparation to the laboratory exercises	15
5. participation in the consulting on the auditorium exercises and laboratory exercises	3
6. preparation of practical exercises report	15
7. participation in the auditorium exercises	10
8. preparation to the auditorium exercises	15
9. preparation for the exam	15
10. participation in the exam	3

Student's workload

Source of workload	hours	ECTS
Total workload	109	4
Contact hours	49	2
Practical activities	43	1