STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Fundamentals of electric power engineering	**1010311441010310052**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**2 / 4**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

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

No. of hours	No. of credits
Lecture: **30** Classes: **15** Laboratory: **15** Project/seminars: **-**	**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 %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in mathematics, physics and electrical engineering, mainly on AC circuits calculations.
2	**Skills**	General-level programming skills and effective self-education skills concerning the domain related to the chosen direction of studies.
3	**Social competencies**	Is aware of the need to widen his competences and to undertake the team cooperation.

Assumptions and objectives of the course:

Getting basic knowledge on the electric power system and its operating condition analysis as well as on the electrical grid?s design, construction and computing; getting knowledge on the control systems of the small hydropower plants as well as their cooperation within the micro-grid.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has acquired elementary knowledge on basic regulations within the electric power system annd control of the small hydropower plants cooperating in the micro-grids. - [K_W07+]

2. Has acquired elementary knowledge on modeling and analysis of the simple transmission systems and power supply networks as well as on the power sources balance in the electric power system. - [K_W11++]

Skills:

1. Can choose elements of the measuring system and the power and energy consumption control system in the selected electrical energy supply systems - [K_U10 +]

2. Can apply the rules of rational electric power management related to the selected production process - [K_U20+]

Social competencies:

1. Is aware of the engineer?s responsibility for his actions and for the tasks carried out in the team co-operation. - [K_K04 +]

Assessment methods of study outcomes

--Lecture

?Assessment of knowledge and skills presented in the exam,

?Continuous grading, at each section (Bonus for activity and perception quality)

-Sections

?Continuous grading, at each section ? bonus for involvement and preparation to the class activities,

?Test in writing in 14th week

-Lab sections:

?Test and bonus for knowledge necessary to deal with the indicated problems,

?Continuous assessment ? at each class ? bonus for increase in skills of dealing with acquired rules and methods

?Assessment of knowledge and skills related to the lab experiments run, grading of the report from the carried-out lab experiments,

-Acquisition of additional marks for in-class activity, especially for:

?Effective application of acquired knowledge when solving the indicated problem;

?Cooperation skills within the team carrying out the specific lab task;

?Accuracy and esthetic form of the report prepared in the framework of the individual work.

Course description

-General characteristics of electric power system operation; modeling of the system?s basic elements, calculation of the power flow and short-circuit currents in the electric power grid, power and energy losses, basic system regulations, local and global stability question, basic knowledge on the electric power automatic protections, electric power lines design and construction, control systems of small hydroelectric power plants cooperating in micro-grids.

Topics of the section and lab classes correspond to the content of lectures.

Basic bibliography:

1. Kujszczyk Sz. (pod red.): Elektroenergetyczne układy przesyłowe, WNT, Warszawa, 1997.
2. Kujszczyk Sz. (pod red.): Elektroenergetyczne sieci rozdzielcze, tom 1 i 2, PWN, Warszawa, 2004.
3. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa 2002.
4. Laudyn D., Pawlik M., Strzelczyk F.: Elektrownie, wyd. IV. WNT Warszawa. 2000.
5. Łaski A.: Elektrownie wodne. Rozwiązania i dobór parametrów. WNT. Warszawa 1971.
6. Kujszczyk Sz. (pod red.): Elektroenergetyczne układy przesyłowe, WNT, Warszawa, 1997.
7. Kujszczyk Sz. (pod red.): Elektroenergetyczne sieci rozdzielcze, tom 1 i 2, PWN, Warszawa, 2004.
8. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa 2002.
9. Laudyn D., Pawlik M., Strzelczyk F.: Elektrownie, wyd. IV. WNT Warszawa. 2000.
10. Łaski A.: Elektrownie wodne. Rozwiązania i dobór parametrów. WNT. Warszawa 1971.

Additional bibliography:

1. Adamska J., Niewiedział R.: Podstawy elektroenergetyki. Sieci i urządzenia elektroenergetyczne. Wyd. PP, Poznań 1989
2. Kowalski Z., Jakość energii elektrycznej. Wyd. Politechniki Łódzkiej, Łódź, 2007.
3. Wiszniewski A., Winkler W.: Automatyka zabezpieczeniowa w systemach elektroenergetycznych Wydanie 2, Warszawa, WNT 2009.
4. Praca zbiorowa: Napowietrzne linie elektroenergetyczne wysokiego napięcia, WN-T 1973
5. Lewandowski M., Proekologiczne źródła energii odnawialnej, WNT W-wa 2001.
6. Ograniczanie strat energii elektrycznej w elektroenergetycznych sieciach rozdzielczych, pod redakcją J. Kulczyckiego, PTPiREE, Poznań 2002.
7. Adamska J., Niewiedział R.: Podstawy elektroenergetyki. Sieci i urządzenia elektroenergetyczne. Wyd. PP, Poznań 1989
8. Kowalski Z., Jakość energii elektrycznej. Wyd. Politechniki Łódzkiej, Łódź, 2007.
9. Wiszniewski A., Winkler W.: Automatyka zabezpieczeniowa w systemach elektroenergetycznych Wydanie 2, Warszawa, WNT 2009.
10. Praca zbiorowa: Napowietrzne linie elektroenergetyczne wysokiego napięcia, WN-T 1973
11. Lewandowski M., Proekologiczne źródła energii odnawialnej, WNT W-wa 2001.
12. Ograniczanie strat energii elektrycznej w elektroenergetycznych sieciach rozdzielczych, pod redakcją J. Kulczyckiego, PTPiREE, Poznań 2002.

Result of average student's workload

Activity	Time (working hours)

1. taking part to the lectures	30
2. participation in sections	15
3. participation in labs	15
4. preparation to the lab classes and elaboration of reports	23
5. preparation to the sections and examinations	20
6. discussions with lecturer	20
7. examination	2

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	125	5
Contact hours	82	3
Practical activities	35	1