

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Basics of electric power engineering		Code 1010314341010310052
Field of study Power 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: 15 Classes: 15 Laboratory: 15 Project/seminars: -		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		ECTS distribution (number and %) 5 100%
Responsible for subject / lecturer: dr hab. inż. Ryszard Frąckowiak, prof. nadzw. email: ryszard.frackowiak@put.poznan.pl tel. 61 6652294 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
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 and 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		

<p>--Lecture ?Assessment of knowledge and skills presented in the exam, ?Continuous grading, at each section (Bonus for activity and perception quality)</p> <p>-Sections ?Continuous grading, at each section ? bonus for involvement and preparation to the class activities, ?Test in writing in 14th week</p> <p>-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.</p>		
Course description		
<p>-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.</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 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. 		
Additional bibliography:		
<ol style="list-style-type: none"> 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. 		
Result of average student's workload		
Activity	Time (working hours)	
1. taking part to the lectures	15	
2. participation in sections	15	
3. participation in labs	15	
4. preparation to the lab classes and elaboration of reports	30	
5. preparation to the sections and examinations	30	
6. discussions with lecturer	18	
7. examination	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	2
Practical activities	45	2