

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Praca systemów elektroenergetycznych 2**
 Name in English: **Power Systems Operation and Control 2**
 Main field of study (if applicable): **Electrical Engineering**
 Specialization (if applicable): **Electrical Power Engineering**
 Level and form of studies: **2nd level, full-time**
 Kind of subject: **obligatory**
 Subject code: **ELR042514**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):			30		
Number of hours of total student workload (CNPS):			60		
Form of crediting:			crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:			2		
including number of ECTS points for practical (P) classes :			2		
including number of ECTS points for direct teacher-student contact (BK) classes:			1.40		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of electrical power systems

SUBJECT OBJECTIVES

- C1. Read with the knowledge related to transmission of power and cooperation of modern power systems
 C2. Evaluation of the behavior of the power systems in the stability steady and disturbance.

SUBJECT EDUCATIONAL EFFECTS*relating to knowledge:**relating to skills:*

- PEK_U01 Based on the parameters of the line, the transformers, reactors, generators can designate the appropriate system for the analysis of arrays.
 PEK_U02 It can carry out the calculation of the steady state power system in electrical power engineering for the multi voltage transmission system

relating to social competences:

- PEK_K01 Knows how to justify the results obtained in the work of his own.

PROGRAMME CONTENT		
Form of classes - laboratory		Number of hours:
Lab 1	Individual scheme to study the operating state of the EPS	2
Lab 2	Calculation of the load flow in power multi voltage systems.	2
Lab 3	Adjust the tension and flow reactive power in power multi voltage EPS.	2
Lab 4	Calculation of load flow under the hybrid method.	2
Lab 5	Study of the effectiveness of the grounding network 110 kV.	2
Lab 6	Reducing power in short-circuit in the grid.	2
Lab 7	The effect of the transmission of power transformers on the calculation of short circuits.	2
Lab 8	Rules for the preparation of the alternative schemes to analyze transients-individual calculations.	2
Lab 9	Suppression of small turbulence with stabilizer system PSS.	2
Lab 10	Determination of the critical duration of short circuit method equal fields.	2
Lab 11	The interim system stability test: numerical method for integrating system generator.	2
Lab 12	The examination of the impact of the parameters of voltage and frequency on the stability of the interim regulator the generator.	2
Lab 13	Study of the stability of the voltage of the generator-system.	2
Lab 14	Primary frequency control the isolated power system.	2
Lab 15	Recovery of arrears, the pass mark.	2
Total hours:		30

TEACHING TOOLS USED
N1. preparation on the basis of the statements and the material of the lectures

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(L)	PEK_U01 PEK_U02 PEK_K01	test preparation for the exercise
F2(L)	PEK_U01 PEK_U02 PEK_K01	activity classes
F3(L)	PEK_U01 PEK_U02 PEK_K01	the report from the lab exercises
P(L)	$P = 0,4F1 + 0,3F2 + 0,3F3$	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] Kremens Z., Sobierajski M., Analiza systemów elektroenergetycznych. Warszawa. WNT 1996 [2] Kacejko P., Machowski J., Zwarcia w sieciach elektroenergetycznych, WNT 1993 [3] Kacejko P., Machowski J., Zwarcia w systemach elektroenergetycznych, WNT 2002 [4] Sobierajski M., Łabuzek M., Lis R., Electrical power system analysis in Matlab. Oficyna Wydawnicza Politechniki Wrocławskiej 2007 SECONDARY LITERATURE: [1] laboratory instructions on the internet

SUBJECT SUPERVISOR
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR042514 - Power Systems Operation and Control 2
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**
AND SPECIALIZATION **Electrical Power Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_U01	S2EEN_U06	C.1 C.2	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8 Lab9 Lab10 Lab11 Lab12 Lab13 Lab14	N.1
PEK_U02	S2EEN_U06	C.1 C.2	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8 Lab9 Lab10 Lab11 Lab12 Lab13 Lab14	N.1
PEK_K01	K2ETK_K06	C.1 C.2	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8 Lab9 Lab10 Lab11 Lab12 Lab13 Lab14 Lab15	N.1