

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Praca systemów elektroenergetycznych 1**
 Name in English: **Power Systems Operation and Control 1**
 Main field of study (if applicable): **Electrical Engineering**
 Specialization (if applicable): **Electrical Power Engineering**
 Level and form of studies: **2nd level, part-time**
 Kind of subject: **obligatory**
 Subject code: **ELR042573**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	22				
Number of hours of total student workload (CNPS):	108				
Form of crediting:	examination				
For group of courses mark (X) final course:					
Number of ECTS points:	4				
including number of ECTS points for practical (P) classes:					
including number of ECTS points for direct teacher-student contact (BK) classes:	2.80				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of electrical 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.
 C3. Mastering the skills of active and reactive power analysis in closed transmission systems.

SUBJECT EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 Knows the rules of the functioning of the electricity system in the making, processing and transmission of power.
 PEK_W02 Has knowledge of power system models and methods of determining the load flow of power in modern, large systems.
 PEK_W03 Has knowledge of the methods of analysis for the various systems disruption of normal work.

*relating to skills:**relating to social competences:*

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

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
Lec 1	Introduction, basic concepts, thematic scope, requirements and method of assessment.	1
Lec 2	Mathematical models of elements in the system and mathematical models of generators and the arrivals. Characteristics of set working states.	1
Lec 3	The calculation of load flow of power control systems for the purposes of the power of large. Sure the results obtained	2
Lec 4	Basic system frequency control and power systems. Cooperation rules systems	2
Lec 5	The primary regulation systems-frequency as a parameter the quality of electrical energy. The equation and the characteristics of the primary regulation.	2
Lec 6	Integrated regulation of the secondary system. Response system for big power balance disorders	2
Lec 7	Adjust the power exchange. The equation and the characteristics of secondary regulation	2
Lec 8	Mathematical models of electric power system for analysis stability The stability of the local generator working in the system. Criteria of stability-stability improvement measures.	2
Lec 9	The stability of local-voltage of load. Simplification of the issues, the characteristics of the types of recipients. The criteria stability of the load.	2
Lec 10	Method of "equal fields"-derivation, reasons and examples.	2
Lec 11	Methods of numerical integration. The mathematical Model and analysis.	2
Lec 12	Matrix analysis of power system	2
Total hours:		22

TEACHING TOOLS USED
N1. informative lecture, multimedia presentation, examples of calculated members

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	in writing-oral exam
P(w)	P - F1	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] Kremens Z., Sobierajski M., Analiza systemów elektroenergetycznych., WNT, Warszawa 1996 [2] Kacejko P., Machowski J., Zwarcia w sieciach elektroenergetycznych, WNT, Warszawa 1993 [3] Kacejko P., Machowski J., Zwarcia w systemach elektroenergetycznych, WNT, Warszawa 2002 [4] your own notes SECONDARY LITERATURE: [1] Information on the Internet

SUBJECT SUPERVISOR
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR042573 - Power Systems Operation and Control 1
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_W01	S2EEN_W01	C.1 C.2	Lec1 Lec2 Lec3	N.1
PEK_W02	S2EEN_W01	C.1 C.2	Lec4 Lec5 Lec6	N.1
PEK_W03	S2EEN_W01	C.3	Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12	N.1
PEK_K01	K2ETK_K06	C.1 C.2 C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12	N.1