FACULTY OF ELECTRICAL ENGINEERING

SUBJECT CARD

Name in Polish:	**Nowoczesne aparaty elektryczne**
Name in English:	**Modern electrical devices**
Main field of study (if applicable):	**Industrial Control Engineering**
Specialization (if applicable):	**Automation and Control in Electrical Power Systems**
Level and form of studies:	**2nd level, full-time**
Kind of subject:	**optional**
Subject code:	**APR012412**
Group of courses:	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30		15		
Number of hours of total student workload (CNPS):	60		30		
Form of crediting:	crediting with grade		crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:	2		1		
including number of ECTS points for practical (P) classes :			1		
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40		0.70		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The student should have knowledge of the construction, operation and phenomena occurring in electrical devices
2. He knows the rules for the selection and design of protection for low and high voltage electrical installations as well as electric motors and drives.

SUBJECT OBJECTIVES

C1. Knowledge of the construction and operating principles of modern designs of switching devices and protection units in low voltage circuits

C2. Knowledge of the possibilities of using modern electrical appliances in power installations and networks.

C3. Knowledge of the development trends of electrical devices.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEU_W01 He has in-depth knowledge of the construction and operation of electrical devices of modern design

PEU_W02 Has knowledge of the use of modern electrical devices.

PEU_W03 He knows the development trends of electrical devices.

relating to skills:

PEU_U01 The student is able to program, protect and use modern electrical devices.

PEU_U02 The student can remotely control modern electrical devices.

relating to social competences:

PEU_K01 The student understands the need to solve tasks and work in a group.

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours:**
Lec 1	Classification, functions and parameters of modern electrical devices.	2
Lec 2	Modern sources of reserve power supply.	2
Lec 3	Modern measuring equipment used in industrial and power plants.	2
Lec 4	Modern electrical devices with modular characteristics	2
Lec 5	Remote control of modern electrical devices.	2
Lec 6	Diagnosis of modern electrical devices	2
Lec 7	7 Reliability of modern electrical devices	2
Lec 8	Modern installations for reactive power compensation.	2
Lec 9	Switching interference generated by modern electrical devices.	2
Lec 10	The materials used in modern electrical devices.	2
Lec 11	The impact of modern electrical devices on the environment.	2
Lec 12	Simulation programs used to design modern electrical devices.	2
Lec 13	Automatic switching in low voltage switchgear.	2
Lec 14	Modern switchgear.	2
Lec 15	Final test	2
	Total hours:	**30**

Form of classes - laboratory		**Number of hours:**
Lab 1	Introduction - defining the rules in the laboratory and the criterion of passing	1
Lab 2	Remote control of modern electrical devices, modular devices (data registration and analysis)	4
Lab 3	Engine starting and protection via PSTX Softstarter	2
Lab 4	Protection, control of electric drives made on the ABC 100.3 UMC system.	2
Lab 5	Stand for testing of automatic switching in low voltage switchgear with the use of the ABB controller.	2
Lab 6	Examination of the protections in the low voltage switchgear.	2
Lab 7	Summary classes	2
	Total hours:	**15**

TEACHING TOOLS USED
N1. multimedia presentation N2. laboratory stand

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation *F – forming (during semester)* *P – concluding (at semester end)*	**Educational effect number**	**Way of evaluating educational effect achievement**
F1(W)	PEU_W01 PEU_W02 PEU_W03	test
P(W)	P=F1	
F1(L)	PEU_U01 PEU_U02 PEU_K01	Checking and assessment of preparation for laboratory exercises.
F2(L)	PEU_U01 PEU_U02 PEU_K01	Activity during laboratory classes.
F3(L)	PEU_U01 PEU_U02 PEU_K01	Evaluation of test reports.
P(L)	P=0,4*F1+0,4*F2+0,2*F3	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
Turan Gonen Electrical PowerTransmission System Engineering: Analysis and Design, ISBN 978148223226, May14 by CRC Press
SECONDARY LITERATURE:

SUBJECT SUPERVISOR
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