STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Electrical devices		**1010311261010310067**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**general academic**	**3 / 6**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Distribution Devices and Electrical	**Polish**	**obligatory**

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

No. of hours					No. of credits
Lecture: **1**	Classes: **-**	Laboratory: **1**	Project/seminars: **-**		**3**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge on electrical engineering, electrical devices semester 5th and electrical metrology.
2	**Skills**	Able to perform mathematical and physical analysis of phenomena occurring in electrical devices and power supply and read electrical wiring schemes.
3	**Social competencies**	A sense of the need to broaden the competence and willingness to work together in a team.

Assumptions and objectives of the course:

Knowledge of construction and functioning of devices and power distribution stations, analyze methods of station operation reliability. Able to design supply system, transformer and distribution stations and select devices. Experiment planning, selection of measurement instrument, realization of test set-up, researches performing and results analyzing.

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

Knowledge:

1. Know how operate electrical devices and power supply. - [K_W03 +, K?_W04+,]
2. Know the basics configurations of distribution stations, how they work and methods of reliability analysis. - [K_W08++, K_W24+++]

Skills:

1. Able to design supply system, transformer and distribution stations. - [K_U03 +++, K_U11 ++]
2. Able to perform the calculation and analysis necessary for selection of electrical devices in power distribution stations. - [K_U03 ++, K_U11 +++]
3. Able to plan experiment, measurement instrument select, test set-up realize, perform researches and analyze of results. - [K_U02+++, K_U14+++]

Social competencies:

1. A sense of influence of proper devices and station configuration selection on ensuring supply continuity to different electricity consumers. - [K_K01 +, K_K02 +++]
2. A sense of influence of phenomena, devices and distribution stations on the environment and the people working with electrical equipment and using them, and the consequent need for extensive cooperation both at the design stage and utilization. - [K_K02 +++, K_K03 +++]

Assessment methods of study outcomes

Lecture:

? skills assessment to select devices and configuration of power distribution station,

? assessment of knowledge and understanding of devices and power distribution stations functioning.

Laboratory exercises:

Skills assessment of:

? experiment planning,

? experimental set-up and device selection,

? experiment carry out and analyzing of results using modern methods and software,

? measurement accuracy analysis and conclusions.

Getting extra points for the activity during seminar, and in particular for:

? performing analysis of devices and power distribution stations work in configuration and conditions that were not discussed at the lecture,

? proposing and analysis of power distribution station configurations for specific requirements of the energy consumer,

? teamwork implementation of the extended experiment,

? the use of modern methods to describe measurement results, mathematical and physical analysis and proposing the extended conclusions.

Course description

The principles of operation and objectives of electric power devices: transformer, busbar, circuit-breakers, disconnectors, measurement transformers. Role of the transformer distribution stations in electric power system. Configuration of power stations, their equipment and operation. General principles of devices selection. Selected methods of reliability testing of station operation.

Basic bibliography:

1. J. Maksymiuk ? Aparaty elektryczne, WNT, Warszawa, 1992

2. H. Markiewicz, Instalacje elektryczne, WNT, Warszawa 2000

3. C. Królikowski, Z. Boruta, A. Kamińska, Technika łączenia obwodów elektroenergetycznych. Przykłady obliczeń, PWN Warszawa 1992

Additional bibliography:

1. C. H. Flurscheim ? Power circuit breaker theory and design. Peter Peregrinus Ltd, 1980

2. A. Greenwood ? Electrical transients in power systems, John Wiley and Sons, New York, 1991

Result of average student's workload

Activity	Time (working hours)
1. participation in the class lecture	15
2. participation in the laboratory exercises	15
3. participation in the consulting on the lecture and laboratory exercises	8
4. preparation to the laboratory exercises	8
5. preparation of practical exercises report	10
6. preparation to the written exam	20
7. participation in the exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	78	3
Contact hours	40	2
Practical activities	25	1