STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Transient states in electric power circuits		**1010312331010313680**
Field of study: **Electrical Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **2 / 3**
Elective path/specialty: **Distribution Devices and Electrical**	Subject offered in: **Polish**	Course (compulsory, elective): **elective**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **-** Classes: **-** Laboratory: **-** Project/seminars: **15**		No. of credits: **1**
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		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge on electrical engineering, mathematics, physics and electrical devices.
2	**Skills**	Able to perform analysis of steady state and transient state in electrical circuits.
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 steady state and transient state methods of calculation in electrical devices and systems. Purchase of skills in calculation and analysis of current and voltage waveform.

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

Knowledge:

1. Knows phenomena occurring in electrical devices and power supply. - [K_W05+ ++, K_W016+++]
2. Know how formulate mathematical and physical descriptions of phenomena and analyze methods. - [K_W06+ +,K_W16++]

Skills:

1. Able to perform the calculation of current and voltage waveform occurring in transient states of electrical power supply systems. - [K_U06 ++, K_U07 ++]
2. Able to perform analysis of important parameters resulting from the calculation taken into account in designing and testing electrical devices and power supply systems. - [K_U06 ++, K_U07 ++]

Social competencies:

1. A sense of importance of phenomena analyze to procedure formulation of devices and power supply systems designing and in diagnostic methods. - [K_K01 ++, K_K02]
2. A sense of influence of phenomena on the environment and the people working with electrical equipment and using them. - [K_K01 +++]

Assessment methods of study outcomes

Design exercises:

Skill assessment to:

- formulate mathematical and physical description of phenomena,
- perform the calculation of current and voltage waveform occurring in transient states of electrical power supply systems,
- analyze obtained results and formulate conclusions.

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

- proposing and analysis mathematical and physical phenomena in systems and conditions that were not discussed at the course,
- proposing other models of phenomena, their analysis and practical utilization.

Course description

Calculation of short-circuit current in power supply systems and installations and resulting normative parameters (short-circuit current, peak value of short-circuit current, let-through energy). Comparison of calculated waveform with measured during switching of short-circuit current by Modular Circuit Breakers (MCB) and fuses. Transient recovery voltage (TRV) calculation in one and three phase circuits. Switching in long power line ? method of traveling waves. Conclusions resulting from calculations of transient state for electrical devices, power system and installation designer. Application of transient state analyze to diagnostic and measurement in electric power system and installation.

Update 2017: installation project in industrial facility

Applied methods of education: lectures with multimedia presentation, interactive lecture with questions to student group and initiation of discussion, design calculations

Basic bibliography:

1. A. Kamińska A, L. Muszyński, Z. Boruta, R. Radajewski, Nowoczesne techniki w projektowaniu energooszczędnych instalacji budynkowych w systemie KNX, POIG.02.02.00-00-018/08-00, Warszawa 2011 (przekazywane studentom nieodpłatnie)

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

3. J. Maksymiuk, J. Nowicki, Aparaty elektryczne i rozdzielnice wysokich i średnich napięć,Wydawnictwo politechniki Warszawskiej, Warszawa, 2014

4. K. Żmuda, Elektroenergetyczne układy przesyłowe i rozdzielcze. Wybrane zagadnienia z przykładami, Wydawnictwo Politechniki Śląskiej, 2014

Additional bibliography:

1. J. D. Glover, M.S. Sarma, T.J. Overbye, Power System Analysis and Design, cengage Learning, Inc, Florence, KY, US, 2011

Result of average student's workload

Activity	Time (working hours)
1. participation in the course	9
2. participation in the consulting on the course	1
3. ion to the written test	15
4. participation in the written test	2

Student's workload

Source of workload	hours	ECTS
Total workload	27	1
Contact hours	12	1
Practical activities	9	1