

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Zagadnienia przesyłu energii elektrycznej
Name of the course in English	Problems of electrical energy transmission
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Elective
Field of education	Engineering and Technology
Discipline of education	Automatic Control, Electronics and Electrical Engineering
Person responsible for the course Contact	Jerzy Szczepanik, <i>doctor habilitatus</i> in Engineering, prof. of CUT jerzy.szczepanik@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical class	Laboratory	Computer laboratory	Project class	Seminar
2, 3, 4, 5	G	15	0	0	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Introduction to the problems of electrical energy transmission and distribution
Objective 2	Introducing the doctoral students to the methods for controlling the flow of electrical energy

Learning outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUT DS	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student knows and understands the theoretical foundations of electrical energy transmission and distribution	E_W01 E_W02	Attendance in class, written test
EUW2	The doctoral student knows and understands methods for controlling power flow in power lines	E_W01 E_W02	Attendance in class, written test
OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to select power flow control parameters	E_U01	Written test
OUTCOMES RELATED TO SOCIAL COMPETENCES			

EUK1	The doctoral student is prepared to critically evaluate the power flow control methods presented in subject-related literature	E_K01 E_K03	Discussion
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Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Electric power systems and their structure	EUW1	4
W2	Existing methods of voltage control in transmission network nodes	EUW2	4
W3	Methods for controlling the flow of current in a line based on the use of booster voltages	EUW1, EUW2	3
W4	FACTS devices and their applications	EUW2	4

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH THE ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Course credit assignment	2
HOURS WITHOUT THE PARTICIPATION OF THE ACADEMIC TEACHER	
Independent study of the course contents	6
Preparation of a paper, report, project, presentation, discussion	6
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Knowledge of the basic laws of electrical engineering.

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	Attendance in class, successful completion of a written test on knowledge covered in the lecture
METHOD OF THE FINAL GRADE CALCULATION	
The final grade is the same as the grade obtained on the written test of knowledge covered in the lecture	

Additional information

None

The course reading list

1	Control and Dynamics in Power Systems and Microgrids, <i>Lingling Fan</i> 2017
2	Principles of Electrical Power Control [in:] Power Electronics in Smart Electrical Energy Networks (pp.13-53) Zbigniew Hanzelka , Jovica V. Milanović
3	CONTROL SYSTEMS, ROBOTICS AND AUTOMATION - Vol. XVIII - Automation and Control of Electrical Power Generation and Transmission Systems - Hans Glavitsch 2017
4	Integrating high levels of variable renewable energy into electric power systems, Benjamin KROPOSKI ORCID: orcid.org/0000-0002-6215-52061 Journal of Modern Power Systems and Clean Energy volume 5, pages 831–837 (2017)