COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematical modeling of energy installations

Course

Field of study
Power Engineering

Year/Semester
I/2

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

1

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Knowledge of the basics of electrical engineering, electrical power engineering, the ability to use a spreadsheet, as well as readiness to cooperate within a team.

Course objective

Understanding the principles of construction, modeling, calculation, design and operation of power installations and networks also in emergency conditions. Acquiring the skill of writing computer programs for the purpose of modeling elements of power installations and networks also in transient states.

Course-related learning outcomes

Knowledge

1. has knowledge about modeling the components of the power system using ready-made models and developing own models,

2. has knowledge about the use of object-oriented programming in modeling the state of work of energy elements and installations,

3. has knowledge of the effects of mechanical and thermal flows of short-circuit currents,

4. has knowledge of the principles of safe performance of work on power equipment.

Skills

1. has the ability to implement a computer mathematical model of energy installation elements,

2. has the ability to develop a computer program to analyze the work of power components and installations also in transient states.

Social competences

1. is aware of the responsibility of the power engineering engineer, in particular the impact of his activities on safety, related to the occurrence of emergency states in the power system.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: assessment of knowledge and skills demonstrated on the written exam of a descriptive / problem nature (checking the ability to use the acquired knowledge); individual elements assessed according to the points system, 50% of the maximum number of points required to pass.

Laboratory classes: development of a computer program simulating short circuits in power installations, development of the application with additional functionalities, presentation of programming techniques used.

Programme content

Lecture: analysis of the operating states of components and installations in transient states, assessment of mechanical and thermal effects of short-circuit currents in rigid and flexible wiring, rules for the safe performance of work on power equipment.

Laboratory clsses: object oriented programming in VS in the C # programming language (property fields, constructors, inheritance, creation of own controls and charts).

Teaching methods

Lecture: multimedia presentation (including drawings, photos, animations, sound, movies) supplemented with examples given on the board, lecture conducted in an interactive way with the formulation of questions for a group of students or specific students indicated, during the lecture initiating discussions, taking into account various aspects issues presented, including: economic,

ecological, legal, social, etc., presenting a new topic preceded by a reminder of related content known to students in other subjects.

Laboratory classes: demonstrations, independent programming (computational) tasks.

Bibliography

Basic

1. Musiał E. "Instalacje i urządzenia elektroenergetyczne", WSiP, Warszawa 1998.

2. Markiewicz H. "Instalacje elektryczne", WNT, Warszawa,2012.

3. Lejdy B. "Instalacje elektryczne w obiektach budowlanych", WNT, Warszawa 2003.

4. Marzecki J. "Miejskie sieci elektroenergetyczne", Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1996.

5. Strojny J., Strzałka J. "Zbiór zadań z sieci elektrycznych", Uczelniane Wydawnictwa Naukowo-Dydaktyczne AGH, Kraków 2000.

6. Handke A., Mitkowski E. , Stiler J "Sieci elektroenergetyczne", Wydawnictwo Politechniki Poznańskiej, Poznań 1978.

Additional

1. Standards and regulations related to electrical networks and installations

2. Internet - selected literature on the subject

3. Dobrzycki A., Filipiak M., Konputerowo wspomagana analiza pracy układów czwórnikowych, Academic Journals Poznan University of Technology, nr 89, 2017, 155-162

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	1,0
Classes requiring direct contact with the teacher	32	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for exam) [1]	18	0,0

[1] delete or add other activities as appropriate