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
part-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
10	10	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Faculty of Control, Robotics and Electrical Engineering

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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. improving the skills of using a spreadsheet and acquiring basic skills to write computer programs for the purposes of modeling elements of power installations and networks.

Course-related learning outcomes

Knowledge

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

2. has knowledge of methods for determining loads on power installations and networks,

3. has knowledge of the possibilities of using existing and developing own computer programs supporting the analysis of the power network.

Skills

1. has the ability to use the crossover as a model of an element of the installation and power network,

2. has the ability to estimate, using a computer program, power and energy demand,

3. is able to develop a substitute diagram and analyze the state of work of a given power system configuration.

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: reports on exercises performed and the ability to write a program based on acquired knowledge (the method described during classes).

Programme content

Lecture: Determination of mathematical models of power plant installations and networks, forecasting, calculation and optimization of load distribution; fundamentals of object-oriented programming.

Laboratory classes: determining the demand for power and energy in residential and industrial buildings, introduction to object-oriented programming with Visual Studio environment, calculation in Openoffice Calc.

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 execution of 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. Normy i rozporządzenia związane z sieciami i instalacjami elektrycznymi.

2. Internet - wyselekcjonowana literatura tematu.

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	69	3,0
Classes requiring direct contact with the teacher	25	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	44	2,0

[1] delete or add other activities as appropriate