COURSE DESCRIPTION CARD - SYLLABUS

Course name
PO1: Power engineering - RES in the power system

Course

Field of study
Electromobility

Year/Semester
2/3

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

1

Lecturers

Responsible for the course/lecturer:
Phd Eng. Arkadiusz Dobrzycki

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Faculty of Control, Robotics and Electrical Engineering

street Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

A student starting this course should have basic knowledge in the field of electrical engineering and electromobility.

Course objective

Introduction to the power system components and their modeling and analysis of components and operating conditions of the power system. Understanding the methods of calculating the power flow and losses as well as voltage drops in power grids.

Course-related learning outcomes

Knowledge

1. Has theoretically underpinned general knowledge about the construction, principles of operation and operation of individual elements of the power system

2. Knows and understands the construction, principles of operation and operation of devices and installations used in the infrastructure for charging hybrid and electric vehicles

3. Knows the rules and methods of analyzing the operating states of the power system

Skills

1. Can use models of power system components to describe their operating status

2. Can make a technical and economic analysis of the role of charging stations in the operation of power grids

Social competences

1. Is aware of the impact of electromobility on the functioning of the power system, the need to use information (knowledge of specialists) about the power system in the field of infrastructure for charging electric vehicles

2. Understands the need to publish the impact of electromobility on the balance of 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 test. Passing threshold: 50% of the total number of points.

Programme content

Lecture:

Basic information about the power system, characteristics of the national power system. Electricity distribution. Modeling the operation of elements and the power system. RES in the power system: connecting RES to the power system, RES as local generation sources and the impact of RES on the parameters of electricity. The impact of RES faults on the system operation. Renewable energy micro-installations in receiving installations. The impact of electromobility on the operation of the power system.

Teaching methods

Lecture:

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

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

Bibliography

Basic

1. Markiewicz H.: Urządzenia elektroenergetyczne, WNT, Warszawa 2016.

2. Pawlik M., Strzelczyk F.: Elektrownie, WNT, Warszawa 2017

3. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa 2002

Additional

1. A.Dobrzycki, P. Ambrozik, Analiza wpływu elektrowni fotowoltaicznej na sieć elektroenergetyczną. Poznan University of Technology Academic Journals. Electrical Engineering, vol. 89, Poznań 2017, str. 321 – 333

2. Jajczyk, J., Dobrzycki, A. , Filipiak, M. , Kurz D., Analysis of power and energy losses in power systems of electric bus battery charging stations, E3S Web Conf. 19 01027 (2017),DOI:10.1051/e3sconf/20171901027

3. Dobrzycki, A. , Filipiak, M. , Jajczyk, J. , Zasilanie układów ładowania akumulatorów autobusów elektrycznych, Poznan University of Technology Academic Journals. Electrical Engineering, vol. 92, Poznań 2017, str. 25 – 35

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for tests/exam, project preparation) [1]	10	0,5

[1] delete or add other activities as appropriate