COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer aided design systems and decision making in the power industry

Course

Field of study
Power Engineering

Year/Semester
2/3

Area of study (specialization)
Electric Power Engineering

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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The Faculty of Environmental Engineering and Energy

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Responsible for the course/lecturer:

Prerequisites

Student as basic knowledge in the field of electrical engineering and computer skills. The ability to effectively self-study in a field related to the chosen field of study. Student is able to operate a computer at a basic level. Is aware of the need to expand their competences. He understands the need to use computer programs at work.

Course objective

Understanding the application of computer methods in the design of power systems and networks. The use of computer technology in the control of power processes. Introduction to computer-assisted decision support methods and design in power plants and the power system. Formulation of

mathematical models describing the properties of energy installations and their elements. Solving simple optimization problems.

Course-related learning outcomes

Knowledge

1. Student has knowledge in the field of decision support and design in power plants and the power system.

2. Student has knowledge of modeling processes in computer memory of physical processes.

Skills

1. Student is able to apply decision support and design tools in power plants and elements of the power system.

Social competences

1. Student understands the need to obtain economic and social acceptability for the chosen technical solution.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

- checking knowledge in the form of a written test.

Laboratory classes

- assessment of knowledge and skills related to the implementation of the exercise task, assessment of the report of the exercise

Programme content

Lecture

Data management in the Matlab environment. Analysis of the recipient's energy profile. Analysis of the work of selected renewable energy and unconventional sources - photovoltaics, wind farms, fuel cells. Modeling and analysis of power system elements in the Simulink environment. Modeling of operational characteristics of solar panels. Analysis of hybrid energy system operation in the power system using multi-criteria decision-making methods. Determining the value of decision criteria.

Laboratory classes

- data analysis in matlab - computer exercises,

- modeling of power system elements in the Simulink environment - computer exercises,

- modeling and determining the value of decision criteria (economic, ecological, technical) of renewable energy sources and unconventional sources - photovoltaics, wind farm, fuel cells.

Teaching methods

Lecture

Lecture with multimedia presentation supplemented with examples given on the board.

Laboratory classes

Laboratory exercises performed with the help of engineering programs.

Bibliography

Basic

1. Kulczycki J., Optymalizacja struktur sieci elektroenergetycznych, WNT, Warszawa, 1990 r.

2. Kujszczyk Sz.: Nowoczesne metody obliczeń elektroenergetycznych sieci rozdzielczych. WNT, Warszawa, 1984 r.

3. Pawlik M. Układy i urządzenia potrzeb własnych elektrowni. WNT. 1986.

4. Rakowski J. Automatyka cieplnych urządzeń siłowni. WNT. 1976.

5. Janiczek R. Eksploatacja elektrowni parowych. WNT. 1992

Additional

1. Planning of Power Distribution - the manual for Totally Integrated Power, Siemens AG, Erlangen, 2001.

2. Bartosz Ceran, Paul A. Bernstein: Application PEM fuel cells in virtual power plant. Computer Applications in Electrical Engineering, Rocznik: 2014 | Tom: vol. 12

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	55	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	20	2

[1] delete or add other activities as appropriate