COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electric power engineering economy [S2Elenerg1>GE]

Course

Field of study
Electrical Power Engineering

Year/Semester
1/2

Area of study (specialization)
Smart Grids

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

The student has knowledge of the technology processes in the energy sector, the operation of power companies and the principles of operation of the energy market. Can determine the profitability of power companies on the market. Is aware of the readiness to teamwork and decision making.

Course objective

Understanding the variability of active and reactive power demand by consumers. Valuation of the power and energy losses. Learning about issues related to reactive power compensation. Ways of rational use of power and energy. Understanding the issues related to the reliability of power supply to consumers.

Course-related learning outcomes

Knowledge:
1. the student has knowledge of the types of energy carriers and methods of their use in the power industry.

2. the student has knowledge of the variability of active and reactive power demand by consumers and of reactive power compensation.
3. the student has knowledge of the sources of power losses in systems and the valuation of energy losses.

Skills:
1. the student is able to analyze a variability of loads in different time horizons.
2. the student is able to assess a power demand of industrial recipients.
3. the student is able to characterize a reliability indicators of power systems.
4. the student is able to identify sources of reactive power and evaluate the negative effects of their impact on the power system.
5. the student is able to develop a system of activities reducing the energy consumption of production processes.

Social competences:
1. the student correctly identifies the variability of loads and is able to properly reflect it in the operation of the power system.
2. student solves problems related to the selection of systems in terms of minimizing power and energy losses.
3. the student is prepared to inform and present his / her own opinions on the energy efficiency of objects.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture
1. assessment of the knowledge and skills shown in the test consisting open-ended questions - passing threshold 50% points
2.continuous assessment during each class (rewarding activity)
Tutorials
1. assessment of the knowledge and skills shown in the written test on tasks at the end of the semester - credit threshold 50% of points
2.continuous assessment during each class (rewarding activity)

Programme content

Energy resources and their use in Poland and in the world. Variability of active and reactive power demand by consumers in various time horizons. Diagram of active electrical load and load variability indices. Forecast of electric loads. The variability of the reactive load in industry. Characteristics of power and electric energy transmission. Active and reactive power losses. Energy waste. Parallel operation of transformers. Optimum transformer power. Reactive power compensation. Characteristics of the variability of the power factor. Associated economy. Rational use of power and energy. Reliability of consumers supply. Electricity quality. Economic (financial) account.

Course topics

Active and reactive power losses. Energy waste.
Diagram of active electrical load and load variability indices.

Teaching methods

Lecture: multimedia presentation, illustrated by examples presented by lecturer
Tutorials: student solves tasks with support of lecturer, example solutions presented by the lecturer

Bibliography

Basic
1. Michalak J., Jankowiak D., Szczerbowski R., Bezpieczeństwo energetyczne Polski i Chorwacji - analiza porównawcza, Przegląd Naukowo - Metodyczny, Edukacja dla Bezpieczeństwa, 2018, 1(38), s. 603-615

2. Matla R., Gospodarka elektroenergetyczna, Wydawnictwo Politechniki Warszawskiej, 1983
3. Góra S., Gospodarka elektroenergetyczna w przemyśle, Państwowe Wydawnictwo Naukowe, 1982
4. Kulczycki J., Straty energii elektrycznej w sieciach dystrybucyjnych, Polskie Towarzystwo Przesyłu i Rozdziału Energii Elektrycznej, 2009
5. Gawlak A., Efektywność w sektorze dystrybucji energii elektrycznej, Politechnika Częstochowska; Wydawnictwo Tekst, 2009.
Additional
1. Michalak J., Wybrane metody wspomagające podejmowanie decyzji inwestycyjnych w eneregtyce, Polityka Energetyczna - 2013, T. 16, z. 4, s. 77-86
2. Ayalew F., Hussen S., Pasam G., Reactive power compensation: a review, International Journal of Engineering Applied Sciences and Technology, 2019 Vol. 3, Issue 11, ISSN No. 2455-2143, Pages 1-7

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50