COURSE DESCRIPTION CARD - SYLLABUS

Course name
Generation of electric energy [S2Eltech2>WEE]

Course

Field of study
Electrical Engineering

Year/Semester
1/1

Area of study (specialization)
Electrical Systems in Industry and Vehicles

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
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Student starting this course should have a basic knowledge of issues related to the construction of energy devices and energy conversion processes taking place in steam power plants. He should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of the team.

Course objective

Getting to know the technological systems of modern steam, gas and gas-steam power plants. Understanding the structure of the manufacturing sector of the National Energy System and the role of distributed energy, including renewable energy sources, for its operation.

Course-related learning outcomes

Knowledge:
1. Student has knowledge of the construction and operation of the power system.
2. Student has knowledge of increasing the energy efficiency of the process of converting primary energy into electricity.
3. Student has knowledge of conventional and unconventional electricity production technologies

Skills:
1. Student is able to model the technological system of a steam, gas, gas and steam power plant and conduct its energy analysis
2. Student is able to carry out energy analyzes of selected distributed technologies

Social competences:
1. Student is aware of the need to develop professional achievements and observe the rules of professional ethics, fulfill social obligations, inspire and organize activities for the benefit of the social environment

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture
- evaluation of the knowledge and skills listed on the written exam,
Laboratory classes
- assessment of knowledge and skills related to the implementation of the exercise task, assessment of the report of the exercise.

Programme content

Characteristics of the national power system. Types of generation sources in the power system, including distributed sources. The role of combined heat and power generation. Technological systems of generation sources. The role of generation sources in the power system.

Course topics

Lecture
The national energy system including the role of distributed energy including renewable energy sources. Characteristics of local combined heat and power systems. The role of distributed power generation in the national energy market. Indicators characterizing the operation of generation sources. Technological systems of steam, gas, gas-steam, nuclear power plants. Optimization of the work of the power system, criteria and ways to implement optimization assumptions. Conditions of operation of different types of generating sources in the power system.

Laboratory
Modeling and analysis of the operation of a power unit. Study of the impact of the value of the parameters of the working medium on the efficiency of the power generation process. Energy analysis of gas and gas-steam systems. Modeling of technological systems of steam, gas, gas-steam thermal power plants. Energy analyses of distributed generation sources.

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. D. Laudyn, M. Pawlik, F. Strzelczyk: Elektrownie, WNT W-wa 2000
2. W. Szuman: Maszyny i urządzenia energetyczne, WSiP W-wa 1985
3. J. Paska: Wytwarzanie rozproszone energii elektrycznej i ciepła, Oficyna Wydawnicza Politechniki Warszawskiej. 2010
4. Poradnik Inżyniera Elektryka . t.3. WN-T, Warszawa 2011
5. Kowalska A., Wilczyński A., Źródła rozproszone w systemie elektroenergetycznym. Kaprint. 2007
6. Matla R., Gładyś H., Praca elektrowni w systemie elektroenergetycznym. WNT. 1999

Additional:
1. Radosław Szczerbowski - Strategia zrównoważonego rozwoju a sektor wytwarzania energii w Polsce

Energetyka - 2018, nr 7, s. 384-388
2. Radosław Szczerbowski - Wpływ Energiewende i polityki energetycznej krajów UE na polski sektor energii Elektro Info - 2018, nr 12, s. 86-90
3. Ceran B.: Wpływ pracy farm wiatrowych w systemie elektroenergetycznym na pracę konwencjonalnego bloku parowego. Przegląd Naukowo-Metodyczny, Edukacja dla Bezpieczeństwa - 2016, nr 1, s. 1161-1168

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	62	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	38	1,50