COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical Power Engineering

Course

Field of study
Electrical Engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

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

Number of credit points

5

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 has knowledge of the basics of electrical engineering and power engineering. He has basic knowledge in the field of automation in the power industry. Student has basic knowledge of the transmission and distribution of electricity. He can pre-evaluate devices included in the power system. Student is aware of the need to expand their competences, and is ready to cooperate as part of a team.

Course objective

Understanding the technology of generating electricity in various types of power plants as well as the construction and principles of operation of basic energy devices. Acquainting with the parameters and tasks of modern power systems, electricity transmission and distribution subsystems. The national

energy system, taking into account the role of distributed energy, including renewable energy sources. Operation procedures and operational aspects concerning distributed generation sources - wind, photovoltaic, fuel cells, small hydropower plants. Operating procedures for gas and gas-steam units. Criteria for the ability to connect the source to the power grid.

Course-related learning outcomes

Knowledge

1. Student has ordered and theoretically founded knowledge of the theory of electrical circuits, knows the basic laws of electrical engineering and thermodynamics.

2. Student has structured knowledge in the field of electricity generation technology. He knows the structure of the manufacturing sector of the National Power System.

3. Student has ordered knowledge about the principles of operation and operation of power equipment

4. Student knows and understands the principles of operation of energy devices and systems.

Skills

1. Student can make calculations of the energy balance of the power plant's steam cycle and carry out design calculations of the basic devices included in the power plant's technological system.

2.Student is able to assess the role and suitability of generating sources for work in the power system and carry out the analysis of power plant thermal cycles.

Social competences

1. Student is aware of the impact of electricity generation technology on the environment.

2. Understands the need to improve their professional, personal and social competences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

- checking knowledge in the form of passing a 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

Lecture

Construction and operation of the basic equipment of a steam power plant: boiler, turbine, carburizing system, condenser, heat exchangers, degasser, pumps, fans. Steam, gas and gas-steam CHP plants. National power system, including the role of distributed energy and renewable energy sources. Operating procedures and exploitation aspects of distributed generation sources - wind, photovoltaic,

fuel cells, small hydropower plants. Operating procedures for gas and gas-steam blocks. Criteria determining the connection capacity of the source to the power grid.

Laboratory classes

Modeling and analysis of the power block's work. Examination of the impact of the working factor parameter value on the efficiency of the electricity generation process.

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. P. Orłowski, W. Dobrzański, E. Szwarc: Kotły parowe. Konstrukcja i obliczenia, WNT W-wa 1979

4. E. Tuliszka: Turbiny cieplne. Zagadnienia termodynamiczne i przepływowe, WNT W-wa 1973

5. J. Paska: Wytwarzanie rozproszone energii elektrycznej i ciepła, Oficyna Wydawnicza Politechniki Warszawskiej. 2010

6. Poradnik Inżyniera Elektryka . t.3. WN-T, Warszawa 2011

7. Kowalska A., Wilczyński A., Źródła rozproszone w systemie elektroenergetycznym. Kaprint. 2007

8. Matla R., Gładyś H., Praca elektrowni w systemie elektroenergetycznym. WNT. 1999

Additional

1. M. Pawlik, J. Skierski: Układy i urządzenia potrzeb własnych, WNT W-wa 1986

2. J. Skorek, J. Kalina: Gazowe układy kogeneracyjne, WNT, 2005

3. T. J.Chmielniak: Technologie energetyczne,Wydawnictwo Politechniki Śląskiej, 2004

4. J. Górzyński, K. Urbaniec: Wytwarzanie i użytkowanie energii w przemyśle, Oficyna Wydawnicza Politechniki Warszawskiej, 2000

5. T. Kahl: Sieci elektroenergetyczne. WNT, Warszawa 1984

6. J. Popczyk: Elektroenergetyczne układy przesyłowe, WPŚ, Gliwice 1984

7. M. Cegielski: Sieci i systemy elektroenergetyczne. PWN, Warszawa, 1979

8. 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	130	5,0
Classes requiring direct contact with the teacher	70	3,0
Student's own work (literature studies, preparation for laboratory classes, preparation for exam) [1]	60	2,0

[1] delete or add other activities as appropriate