COURSE DESCRIPTION CARD - SYLLABUS

Course name

Thermal power engineering

Course

Field of study

Industrial and Renewable Energ

Year/Semester

1/2

Area of study (specialization)

Thermal and Renewable Energy

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

15

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Environmental and Energy

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

The student should have basic knowledge in the field of energy machinery and equipment and relations

with other areas of knowledge. In addition, he should know and understand the basic methods and practical tools in the field of technical thermodynamics in the aspect of thermal energy as well as the main tasks of energy systems in the field of thermal energy and economic development.

The student should also have the ability to use concepts and methods in the description of energy facilities and to solve specific problems arising in thermal energy. He can also collect and process information from databases, literature and the Internet.

Course objective

Providing students with theoretical knowledge and technical aspects related to the analysis of thermal energy systems and deepening the knowledge of basic energy technologies, in particular in terms of minimizing their negative impact on the human environment.

Course-related learning outcomes

Knowledge

He knows the basic processes taking place in the life cycle, technical and technical points in energy, in particular in energy.

He knows the legal issues related to the design and use of energy systems, including energy devices used in industry.

Has knowledge of the structures and processes of managing energy companies, including supervision in energy companies.

Skills

He can use his knowledge to search for the right sources and interpret the information found in order to solve both standard and non-standard engineering problems.

He can use the knowledge related to the operation of power plants acquired in an environment professionally involved in engineering activities.

Can interact with other people as part of teamwork and take a leading role in teams.

Social competences

He is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem on his own.

It is ready to initiate activities for the benefit of the public.

Is willing to think and act in an entrepreneurial manner

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The knowledge acquired during the lecture is verified during an examination consisting of 5 choice questions with a score from 0 to 1 and 5 open questions with a score from 0 to 2. Passing threshold: > 50% of points. Final issues, on the basis of which the questions are developed, will be sent to students by e-mail using the university's e-mail system or on the eKursy platform.

Tutorials: Continuous assessment of skills and competences in each class through solving engineering tasks and analysis of special cases, assessment of the student's knowledge and skills on the basis of a final written test consisting of 10 questions. Passing threshold: > 50% of points.

Project: The skills acquired during the design class will be assessed on the basis of the solution to the engineering problem presented by the student during the last class presentation.

Programme content

Lecture: Basic thermodynamic and economic characteristics of thermal power machines and devices. Heat plants, heat and power plants. Problems of heat regeneration. Steam and gas power plants. Cogeneration and trigeneration. Use of waste energy. Physical and chemical recuperation. Problematyka odzyskiwania niskotemperaturowej energii odpadowej, absorpcyjne i sprężarkowe pompy ciepła. Associated energy-technological processes. Co-production of electricity and heat from renewable resources. Problems and methods of energy accumulation. Rational use of energy.

Tutorials: Analysis of the failure of machines and energy devices. Analysis of the circulation and efficiency of heating plants and power plants. Analysis of low-temperature waste energy recovery systems. Analysis of the combined production of electricity, heat and cold.

Project: Solving an engineering task in the field of thermal energy.

Teaching methods

Lecture: A multimedia presentation, illustrated with examples given on the board.

Laboratory: A multimedia presentation, students' performance of practical tasks indicated by the teacher.

Project: A multimedia presentation illustrated with examples given on the board and carrying out the tasks given by the teacher - practical exercises.

Bibliography

Basic

J. Szargut, A. Ziębik: Podstawy energetyki cieplnej, PWN, Warszawa 1998

A. Miller, J. Lewandowski: Układy gazowo-parowe na paliwo stałe, WNT, Warszawa 1993

R. Domański: Magazynowanie energii cieplnej, PWN, Warszawa, 1990

Additional

S. Perycz: Turbiny parowe i gazowe, Wyd. Pol. Gdańskiej,1982

T. Chmielniak: Technologie energetyczne, Wyd. Pol. Śląskiej,2004

R. Janiczek: Eksploatacja elektrowni parowych, WNT W-wa 1980,

S. Wiśniewski: Termodynamika Techniczna

S. Wiśniewski: Wymiana ciepła

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	50	1,7
Student's own work (literature studies, preparation for laboratories, development of laboratories, preparation for passing and exam, preparation of the project, participation in consultations) [1]	40	1,3

[1] delete or add other activities as appropriate