COURSE DESCRIPTION CARD - SYLLABUS

Course name
Steam and gas turbines [N2EPiO1-ECiO>TPiG]

Course

Field of study
Industrial and Renewable Energy Systems

Year/Semester
1/2

Area of study (specialization)
Thermal and Renewable Energy

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
9

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
9

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of thermal cycles, steam and gas turbines Ability to describe and calculate basic processes in fluid flow machines. The ability to effectively self- study in a field related to the chosen field of study Is aware of the need to expand their competences, readiness to cooperate within the team

Course objective

Acquiring knowledge about various types of steam and gas cycles. Acquaintance with the principle of operation of steam and gas turbines and the basic processes occurring in these machines. Understanding the methods for describing the working medium flow in this type of machine.

Course-related learning outcomes

Knowledge:
student has extensive and specialized knowledge about the construction, methods of construction, production and operation will affect the economy of steam and gas turbines.
student has expanded knowledge of scientific discoveries in the field of thermodynamics, fluid mechanics, heat exchange related to steam and gas turbines.
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Skills:
student is able to use his knowledge to search for the right sources and interpret found information to solve both standard and custom engineering problems related to turbines.
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Social competences:
student is ready to critically assess knowledge and received content in the field of turbines.
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Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Knowledge acquired as part of the lecture is verified by a final exam consisting of 5 to 6 questions with various points depending on their level of difficulty. Passing threshold: 50% of points. Final issues on the basis of which questions are prepared will be sent to students by e-mail using the university e-mail system.
Skills acquired as part of the project classes are verified on the basis of short presentations during the semester, questions from the teacher and on the basis of the final project developed. Passing threshold: 50% of points.

Programme content

Theoretical right-hand and left-hand cycles. Steam cycles of power plants and combined heat and power plants. Gas turbine power plants. Combined cycles. Steam turbine stage theory. Oiler equation. Circumferential efficiency. Turbine blade profiles.
Radial balance equation. Flugel - Stodola equation. Strars in the turbine channels. Methods of regulating steam turbines. The lecture will be conducted using a multimedia presentation.

Course topics

Steam circuits of power plants and combined heat and power plants. Gas turbine power plants. Steam turbine stage theory. Oiler's equation. Circumferential efficiency. Profiles of the turbine blade. Action turbines, reaction turbines. Flugel-Stodola equation. Losses in turbine channels. Control methods of steam turbines. Labyrinth seals.

Teaching methods

Blackboard lecture with multimedia presentation.
Project classes: discussing theory and assumptions for classes on the board and performing tasks given by the teacher, independent work on the design task.

Bibliography

Basic
Chmielniak T., Obiegi termodynamiczne turbin cieplnych
Chmielniak T., Turbiny gazowe
Perycz S., Turbiny parowe i gazowe
Additional
Chmielniak T., Technologie energetyczne

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	20	0,70
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,30