COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of thermal power engineering [S1Energ1>PEC]

Course

Field of study
Power Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
15

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

- Basic knowledge of the basics of thermodynamics, fluid mechanics - The ability of effective self-education in the field related to the chosen field of study - Is aware of the need to expand their competences, readiness to cooperate within a team. Awareness of the need to expand their competences in the field of engineer work.

Course objective

Acquainting with systems working in thermal energy and achieving the ability to develop assumptions necessary for the design or modernization of systems in the area of thermal energy. This applies to devices such as turbines, compressors, heat exchangers. Practical familiarization with the construction of thermal motors and individual systems in energy systems.

Course-related learning outcomes

Knowledge:
1. knows and understands the need to use standardized symbolism of elements of thermal circuits in engineering graphics.
2. has systematic knowledge in the field of conventional energy. knows and understands phenomena,

operating principles of machines and energy devices. understands processes and phenomena occurring in the discussed power machines.
3. has structured, theoretically founded knowledge in the field of thermodynamics, fluid mechanics and the basics of gas dynamics in power equipment and machines.
4. knows and understands at an advanced level the relationships between the parameters of thermal elements and their impact on power, efficiency power machines.

Skills:
1. is able to obtain information from literature, databases and other sources; is able to integrate the information obtained, interpret it, as well as to infer and formulate and justify opinions.
2. is able to develop documentation regarding the implementation of an engineering task using appropriate methods and tools, including advanced information and communication techniques (ict); is able to prepare a text discussing the results of this task.
3. is able to use known analytical, simulation and experimental methods and mathematical models to analyze and evaluate the operation of energy elements and systems.

Social competences:
1. understands the need and knows the possibilities of continuous training, raising professional, personal and social competences (e.g. through second and third cycle studies, postgraduate studies, courses); and is ready to critically assess knowledge, recognizes its importance in solving cognitive and practical problems.
2. is aware of the responsibility for own work and readiness to comply with the principles of team work and to bear the responsibility of the professional role in jointly implemented tasks.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
- Knowledge acquired as part of the lecture is verified by a final exam consisting of 6 to 9 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 tutorials are verified on the basis of the final test, consisting of 3 to 4 tasks differently scored 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 laboratory classes are verified on the basis of short input colloquia and reports from classes. Passing threshold: 50% of points. Issues are first discussed on the blackboard and then implemented in groups - practical exercises.

Programme content

Fluid-flow machines used in thermal energy, heat exchangers in power systems, boilers, condensers, steam, gas and combined thermal circuits.
- Brayton Joule"s cycle;
- Real gas turbine circuits
- Euler"s law
- Power, unit work, efficiency, energy losses in turbines
- Forced convection, geometrical similarity, kinematic and dimensional units.

Teaching methods

1. Lecture: blackboard with multimedia presentation.
2. Exercises: solving tasks on the board.
3. Laboratory classes: discussing the theory and assumptions for classes on the board and performing tasks given by the teacher.

Bibliography

Basic
1. S. Perycz – Turbiny parowe i gazowe, Wyd. Pol. Gdańskiej,1982

2. T. Chmielniak – Technologie energetyczne, Wyd. Pol. Śląskiej, 2004
3. R. Janiczek – Eksploatacja elektrowni parowych, WNT W-wa 1980,
4. S. Wiśniewski, Termodynamika Techniczna
5. S. Wiśniewski, Wymiana ciepła
Additional
1. T. Chmielniak – Turbiny cieplne, Wyd. Pol. Śląskiej, 2004

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	65	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,00