



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Energy machines and technologies

Course

Field of study

Year/Semester

Power Engineering

3/5

Area of study (specialization)

Profile of study

- common courses

general academic

Level of study

Course offered in

First-cycle studies

polish

Form of study

Requirements

part-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

20

10

Tutorials

Projects/seminars

10

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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The Faculty of Environmental Engineering and Energy

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Prerequisites

Basic knowledge of mechanics, thermodynamics and fluid mechanics and electrical engineering. Ability to effectively self-education in a field related to the chosen field of study. Is aware of the need to broaden their competence, willingness to work together as a team

Course objective

The skills and competencies of machinery and power equipment, energy system design and evaluate its performance

Course-related learning outcomes

Knowledge



1. Has theoretically founded basic knowledge of primary energy conversion technologies to work, heat and electricity and also has a basic knowledge of mechanical and thermal energy facilities.
2. He knows the basic conditions and technical problems associated with the use of different technologies and sources of energy

Skills

1. Able to analyze of operation of the machine, describe the characteristic phenomena in the flow channels, design and installation of the machine to choose.
2. Able to analyze basic and complex energy conversion systems.
3. Able to use theoretical knowledge to balance of energy technology systems.
4. Can describe and compare the basic thermal cycles.

Social competences

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,

Tutorials

- credit on the basis of the current check messages and one written tests of the accounting tasks

Laboratory classes

- assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment of report of performed exercise,
- obtaining additional points for the ability to work within a team practice performing the task detailed in the laboratory and developed aesthetic diligence reports.

Programme content

Lecture

Primary and processed forms of energy. The structure of energy resources. Engines and working machines, basic types, working rules, ranges of applications. The main technologies of primary energy conversion to work, heat and electricity: internal combustion engines, steam technologies, gas technologies, gas-steam technologies. Comparative and real circuits. Construction of internal



combustion engines, boilers, turbines, pumps, heat exchangers. Turbine operation in the action and reaction stage, heat exchange surface in the steam boiler, power demand for supplying the plant's own needs. Promising energy technologies.

Tutorials

Energy analysis of the steam power plant's technological system.

Laboratory classes

During the course the following laboratory exercises will be carried out:

- 1.Measurement of centrifugal pumps.
- 2.Radial fans test.
- 3.Testing pressure gauges.
- 4.Determination of the value of the thermal conductivity coefficient of insulating materials.
- 5.Measure the temperature of the medium by various methods.
- 6.Heat pump test.

Teaching methods

Lecture

Lecture with multimedia presentation supplemented with examples given on the board.

Tutorials

Tasks counted on the board.

Laboratory classes

Measurements of device working parameters at the teaching stands.

Bibliography

Basic

1. M. Pawlik, F. Strzelczyk: Elektrownie, WNT W-wa 2012, 2017
2. T.Chmielniak: Technologie energetyczne, WNT W-wa 2014
3. W.R. Gundlach: Podstawy maszynprzepływowych i ich systemów energetycznych, WNT W-wa 2016

Additional

1. W. M. Lewandowski - Proekologiczne źródła energii odnawialnej, WNT W-wa 2012



2. J. Marecki: Podstawy przemian energetycznych, WNT W-wa 2014
3. P. Orłowski, W. Dobrzański, E. Szwarc - Kotły parowe. Konstrukcja i obliczenia, WNT W-wa 1979
4. B. Ceran, K. Sroka: Planning the operation of hybrid generation system in the power system in a multi-faceted approach, ACTA ENERGETICA numer 1/30 (2017) s.4-

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	42	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	83	3,0

¹ delete or add other activities as appropriate