COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric power machines and technologies

Course

Field of study

Power Engineering

Year/Semester

3/5

Area of study (specialization)

-

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

10

Other (e.g. online)

0

Tutorials

10

Projects/seminars

0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

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The Faculty of Environmental Engineering and Energy

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

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. Albe to use theoretical knowledge to balance of energy technology systems.

4. Can describe and compare the basic thermal cycles.

Social competences

Able to work in a group in the performance of laboratory tests and jointly present the effects of the work.

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.

Tutorials:

Energy analysis of the steam power plant's technological system. Turbine operation in the action and reaction stage, heat exchange surface in the steam boiler, power demand for supplying the plant's own needs.

Laboratory classes:

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

1.Measurement of centrifugal pumps.

2.Radial fans test.

3.Determining the operational characteristics of a wind turbine.

4.Determining the operational characteristics of a water turbine.

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	50	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) [1]	75	3,0

[1] delete or add other activities as appropriate