COURSE DESCRIPTION CARD - SYLLABUS

Course name

Applied Thermodynamics

Course

Field of study

Year/Semester

Area of study (specialization)

Profile of study

Level of study

Course offered in

english

Form of study

Requirements

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

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Faculty of Environmental Engineering and Energetic

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

The knowledge of the thermodynamics (the basic engineering course), fluid mechanics, heat exchange, physics, mathematics.

Course objective

The course introduces basic concepts of thermodynamics and applies them to technological problems. The student gains the knowledge enabling him to study and optimize thermodynamic processes in energy machines.

Course-related learning outcomes

Knowledge

Student has the knowledge to analyze, design and optimize the thermodynamic processes. Has knowledge of the environmental protection.

Student has the knowledge of mathematical description of the thermodynamic processes.

Student knows how to use the new energy-saving technology in power plants.

Skills

Student knows how to find a source of knowledge that enables him to analyze and solve the considered problem.

Student knows how to formulate the hypotheses concerning the studied problem.

Student knows how to use the results of experimental studies carried out in power plants to optimize them.

Social competences

Student is able to critically assess knowledge and received information.

Student is able to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert opinions in case of difficulties in solving the problems.

Student is able to fulfill social obligations as well as inspire and organize activities for the social environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture and exercises - written exam. Obtaining credit from a minimum of 51% of the points possible to get. There is a possibility of an oral question to raise the grade.

Programme content

Processes and cycles. Basic consideration in the analysis of power cycles. The vapor power cycles (energy balance, efficiency, losses). Maxwell's thermodynamic equations. The basic processes of humid air. The theoretical and actual combustion processes. The heat exchange: conduction (in materials with an internal heat source), free and forced convection, radiation.

Teaching methods

The lecture will be conducted using a multimedia presentation. Classes will be conducted at the blackboard (chalk or white), the student is required to have a calculator.

Bibliography

Basic

Wiśniewski, S., Wiśniewski, T., Wymiana ciepła, WNT, 2002

Szargut, J. Termodynamika, PWN, Warszawa, 2000

Furmański, P., Domański, R., Wymiana ciepła, Przykłady obliczeń i zadania, Oficyna Wydawnicza Politechniki Warszawskiej, 2002

Additional

Cengel, Y., Boles, M.A., Thermodynamics, an engineering approach, Mc Graw Hill, 2008

Incropera, F., DeWitt, D., Fundamentals of heat and mass transfer, Wiley, 2008

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for tests, preparing for the laboratory, preparation the laboratory reports, consultation) [1]	115	5,0

[1] delete or add other activities as appropriate