COURSE DESCRIPTION CARD - SYLLABUS

Course name
Gas Turbine

Course

Field of study

Year/Semester

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
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

Basic knowledge from thermodynamics, fluid mechanics, mechanics, and construction of energetic engines. Can use the scientific method for problem solving, experimenting, and making conclusions .

Course objective

To acquaint students with the theoretical and practical problems related to the construction and exploatation of energetic systems based on gas turbine.

Course-related learning outcomes

Knowledge

Student has expanded knowledge about construction, methods of designing, manufacturing and operating of energetic systems based on gas turbines

Student has extended and deep knowledge in the field of gas engines Student has deep knowledge of operational parameters impact on the efficiency of gas turbine and functioning of energy systems

Knows the main development trends in the field of gas turbine power plants .

Knows the main materials and construction types of GT used in power and electricity generation.

Skills

Student is able to use his knowledge to find right sources and interpret founded information in order to solve both standard and non-standard problems related with gas turbine.

Student is able to solve research and engineering tasks requiring the use of engineering standards and norms as well as the use of technologies appropriate for gas turbines, using experience gained in an professional environment engaged in engineering activities

Is able to critically analyze the functioning of existing technical solutions in the gas turbine power plants and evaluate these solutions in terms of system efficiency as well as environmental impact.

Is able to perform basic calculation of gas turbine energy balance.

Social competences

Student is ready 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 on field of gas turbines

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

He is ready to critically assess his knowledge and received content, also in terms of the impact of technology on the natural environment

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified by 45-minutes test carried out during the last lectures. Each test consists of 5 questions (open), variously scored. 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 will be verified basis on the final test, consisting of 5-7 tasks differently scored depending on their level of difficulty and based on the developed reports from laboratory tasks. Passing threshold: 50% of points.

Programme content

Construction and operation of gas turbines, Cooling systems, combustion chamber, methods of flame stabilization, The operating parameters of gas turbines, TIT temperature, cooling gas turbine elements, Gas power plant, CCGT units, simple cycle efficiency, manganese, Trends of development of gas turbines: industrial units and small units, Combined Heat and Power plants (CHP), CO2-zero power cycles.

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board

Laboratory exercises: multimedia presentation and performance of tasks given by the teacher - practical exercises.

Bibliography

Basic

Arthur H. Lefebvre, Dilip R. Ballal, Gas turbine. Combustion. Alternative Fuels and Emissions

Meherwan P. Boyce: Gas Turbine Engineering Handbook

Chmielniak T. Maszyny Przepływowe. Wydawnictwo Politechniki Śląskiej

Miller A.: Gas turbine and combined cycle gas turbine

Additional

Dobski, T.: Combustion Gases in Modern Technologies, 2scd Ed., Wydawnictwo Politechniki Poznańskiej

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