COURSE DESCRIPTION CARD - SYLLABUS

Course name
Biogas Plants and Thermal biomass processing

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 student has basic knowledge In the field of chemistry, physics and thermodynamics

Course objective

To acquaint students with theoretical and practical problems related to biogas production, including batch preparation, principle of operation and processes occurring in the biogas production process, types of biogas plants. In addition, to familiarize students with the processes of thermal biomass processing, including municipal waste.

Course-related learning outcomes

Knowledge

Has expanded knowledge necessary to understand profile subjects and specialist knowledge about construction, methods of designing, manufacturing, operating, security systems, and impact on the economy, society and the environment in the field of industrial and renewable energetic sectors

Has knowledge of the latest design of machinery and equipment for the transport and processing of gaseous and renewable fuels
Knows the basic processes occurring in the life cycle of devices, facilities and technical systems used in the gas industry

Skills

Is able to notice systemic and non-technical aspects, including ethical ones when formulating and solving engineering tasks in the field of Industrial Energy

Is able to make a preliminary economic assessment when formulating and solving engineering tasks in the application of Industrial Power
Is able to communicate on topics related to industrial energy with diverse audiences

Social competences

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert opinions in the event of difficulties in solving the problem yourself

He is ready to initiate actions for the social interest
Is ready to think and act in an entrepreneurial way

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Lecture - final test, the pass condition is to obtain a minimum of 51% of the maximum number of points

Exercises - final test and rewarding the knowledge necessary to implement problems in the subject

Programme content

Basic theory of the gasification process, synthesis gas combustion in internal gas engines, new gasification process technology, synthesis fuel combustion, prospects for gasification development in Europe and Poland, chemical reactions in the gasification process, methane number, knocking,

compression ratio, construction of installations for the gasification process, flame stability, flashback, formaldehyde emission, cost-effectiveness of the installation

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board

Exercises: Calculation examples shown on the board

Bibliography

Basic

1. Gasification, Second edition. Christopher Higman, Maarten van der Burgt, Gulf Professional Publishing, 2008

2. Biomass Gasification, Pyrolysis and Torrefaction. Prabir Basu, Elsevier, 2013

Additional

1. Synthesis gas combustion. Fundamentals and applications. Tim Lieuwen, Vigor Yang, Richard Yetter, CRC Press, 2009

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]	125	5,0

[1] delete or add other activities as appropriate