COURSE DESCRIPTION CARD - SYLLABUS

Course name
Gas engineering [S1IŚrod2>Gaz]

Course

Field of study
Environmental Engineering

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
30

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of thermodynamics, fluid mechanics, environmental protection and thermal equipment design. Can solve simple engineering problems using scientific methods, scientific literature, daych databases, norms and technical standards. The student knows the limitations of his knowledge and skills and understands the need to constantly update and expand them.

Course objective

To familiarize students with theoretical and practical knowledge of the design, construction and operation of gas networks and the use of gas fuels in households and industrial installations.

Course-related learning outcomes

Knowledge:
1. The student knows the basic properties of flammable gases, their sources of origin, supply chains and the risks associated with their use.
2. Has expanded knowledge necessary to understand the technical and legal issues related to the construction and operation of low, medium and high pressure gas networks in the area of municipal and industrial applications.

3. Has an expanded knowledge of the latest technologies and materials used in the construction and operation of low, medium and high pressure gas networks.

Skills:
1. Student is able to use the theoretical knowledge possessed to carry out analytical thermal-flow calculations of selected elements of the gas transmission system.
2. Is able to develop a gas network design and select appropriate materials for its construction in accordance with the latest industrial technologies.
3. Is able to use standards, engineering norms and legal acts related to the design and operation of gas networks and uses specialized terminology related to the subject matter.

Social competences:
1. Student is ready to recognize the importance of knowledge in solving cognitive and practical problems, and to consult experts in case of difficulties in solving a problem on his own in the subject of advanced gas transmission systems.
2. He is ready to fulfill social obligations, inspire and organize activities for the benefit of the social and natural environment.
3. Understands the need for teamwork in solving theoretical and practical problems in the aspect of the use of gaseous fuels in households and industrial installations.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures:
Evaluation of the student's knowledge and skills on the basis of a written exam, 6 questions from the content presented during the didactic classes. Questions scored in the range of 0-1 points. Pass threshold 51%. Continuous assessment in each class of skills and competencies through discussion of current problems related to the construction of gas networks and use of gaseous fuels.
Project:
A complete project must be submitted for evaluation. The final grade takes into account the completion of the project, its defense and continuous evaluation during the class.

Programme content

Lectures
1. types and properties of gaseous fuels.
2. construction of the natural gas transmission system in Poland and Europe
3. appliances fuelled by gaseous fuels
4. hazards associated with the use of gaseous fuels.
5. heat and flow calculations of low and medium pressure gas networks, types and construction of stations
6. gas connections of buildings.

Project:
Design task carried out individually or in teams. Issues relating to the construction and design of: domestic installations, industrial installations, first and second stage gas stations and metering equipment.

Course topics

Lectures:
1. parameters of gaseous fuels and methods of their calculation (calorific value, Wobe number, flammability limits), sources of natural gas, hydrates, LNG market
Characteristics of the transmission and distribution system, types of gas storage, characteristics of entry and exit points. 4,
Construction of gaseous fuel appliances, characteristics of combustion processes, basic thermodynamic parameters describing the combustion process, operation of gaseous fuel appliances, determination of gaseous fuel demand
4 Explosive atmospheres, methodology for determining explosive atmospheres, factors influencing explosive atmospheres, division of explosive atmospheres, passive and active methods of mitigating the effects of an explosion
5. types and construction of gas stations, construction and operation of selected gas network equipment

such as: piping, metering equipment, gas regulators, blow-off valves, gas heaters, odorisation equipment, control and shut-off valves.
6. legal requirements of gas connections to buildings, algorithms for calculating the construction elements of internal gas installations

Project:
Design task carried out individually or in teams. Issues related to the construction and design: domestic installations, industrial installations, first and second stage gas stations and metering equipment.

Teaching methods

Lectures:
Informative lecture with elements of a conversational lecture; Multimedia presentation; Discussion
Project:
Individual or teamwork on projects; Consultations; Interactive task completion

Bibliography

Basic:
[1] Bąkowski K.: Sieci i instalacje gazowe, Wydawnictwo naukowe PWN, 2014
[2] Osiadacz A.: Stacje gazowe. Teoria, projektowanie, eksploatacja, Fluid , 2010
[3] Guzik J.: Instalacje i sieci gazowe,
[4] Vademecum Gazownika Tom 1,2,3,4 Kraków, 2014

Additional:
[1] Łaciak M.: Bezpieczeństwo eksploatacji urządzeń instalacji sieci gazowych, Rarbonus, 2010
[2] Dobski, T.: Combustion Gases in Modern Technologies, 2scd Ed., Wydawnictwo Politechniki Poznańskiej, 2015
[3] Kowalski Cz.: Kotły gazowe centralnego ogrzewania, Wydawnictwa Naukowo Techniczne, 1994
[4] Normy techniczne i zakładowe

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50