COURSE DESCRIPTION CARD - SYLLABUS

Course name
Fuel transport and storage [N2EPiO1-TGiEO>TiMP]

Course

Field of study
Industrial and Renewable Energy Systems

Year/Semester
1/2

Area of study (specialization)
Gas Technology and Renewable Energy

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
9

Laboratory classes
0

Other
0

Tutorials
9

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Michał Gołębiewski
michal.golebiewski@put.poznan.pl

Lecturers

Prerequisites

Basic knowladge in the field of physics, thermodynamics and fluid mechanics. Student should have skills required to solve engineering problems with scientifically valid methodologies. Can effectively acquire the information from various sources including datasheets, literature and Internet. Student knows restrictions of the own knowledge and the skill; understands the need for lifelong education

Course objective

To acquaint students with the theoretical and practical aspects related to the transportation and storage of fuels

Course-related learning outcomes

Knowledge:
1.student has expanded knowledge about the development trends of fuel transport and storage
2.student has deep knowledge of operational parameters impact on the efficiency of energy machines and functioning of fuel transport and storage
3.student has knowledge of structures and processes for management of fuels extraction and their processing facilities

Skills:
1.student is able to notice systemic and non-technical aspects, including ethical ones when formulating and solving engineering tasks in the field of fuel transport and storage
2.student is able to critically analyze the functioning of existing technical solutions in fuel transport and storage and evaluate solutions solving attained problems
3.student can independently plan and implement their own lifelong learning in the field of fuel transport and storage and guide others in this regard

Social competences:
1.student is ready to fulfill social obligations as well as inspire and organize activities for the social environment
2.student is ready to initiate actions of social interest
3.student is ready to perform responsible professional roles, taking into account changing social needs, including:
− developement of the profession"s achievements,
− maintainance the profession ethos,
− compliance of professional development with ethics principles and introduce actions to comply with these principles

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture - the written examination
The evaluation of student knowledge will be held based on an answers on 5 questions from the material presented during the lectures.
Classes - final test and rewarding knowledge necessary for the accomplishment of the problems in the area of the subject

Programme content

Construction of natural and synthetic natural gas storage facilities, policy of diversification of natural gas supply, corrosion, safety, manganese, underground holders, control process, pressure, compressor stations engine and gas turbine, LNG

Course topics

Lecture:
1.Theory of compression machines
2. Natural gas compression systems
3. Regulation of compressing machines
4. Natural gas storage facilities

Exercises:
1. Calculation of the basic parameters of the compression process
2. Calculation of multi-stage systems
3. Determining adjustment points for compressing machines
4. Calculation of natural gas storage parameters

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.
Exercises: performing theoretical calculations on the board.

Bibliography

Basic
1. Andrzej Osiadacz: Stacje gazowe. Teoria, projektowanie, eksploatacja
2. Bąkowski K.: Sieci i instalacje gazowe
3. Dobski, T.: Combustion Gases in Modern Technologies, 2scd Ed., Wydawnictwo Politechniki

Poznańskiej
4. Tuliszka E.: Sprężarki, dmuchawy i wentylatory. WNT, Warszawa 1976
5. Chmielniak T. Maszyny Przepływowe. Wydawnictwo Politechniki Śląskiej, Gliwice 1997
Additional
1. Witalis Ratasiewicz: Stacje gazowe w systemach dostawy gazu, Poradnik; Polskie Zrzeszenie Inżynierów i Techników Sanitarnych
2. Rybicki Cz., Łuczyński S.: Pomiary natężenia przepływu. Wiertnictwo Nafta Gaz, t. 24 z.2, 2007.
3. Grabowski H.: Poradnik techniczno-budowlany dla użytkowników sieci gazowej w systemie dystrybucyjnym. SITPNiG Ośrodek Szkolenia i Rzeczoznawstwa, Grupa Terenowa Rzeczoznawców w Poznaniu, 2011

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	21	0,70
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	39	1,30