COURSE DESCRIPTION CARD - SYLLABUS

Course name
Gaseous Fuels [N2EPiO1-TGiEO>PG]

Course

Field of study
Industrial and Renewable Energy Systems

Year/Semester
1/1

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
18

Laboratory classes
9

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Student has basic knowledge in the field of chemistry, physics, thermodynamics and geology. He has also skills required to solve engineering and scientific problems with scientifically valid methodologies. and can effectively acquire the information from various sources including datasheets, literature and Internet.

Course objective

To acquaint students with the theoretical and practical problems related to the mining and processing technology of natural gases, renewable gases and alternative gaseous fuels.

Course-related learning outcomes

Knowledge:
knows the basic processes occurring in the production process of gaseous fuels.
he knows the principles of industrial property protection and economic, norms and legislative acts related to the production and storage of fuels.
has knowledge of structures and processes for managing fuel extraction and processing enterprises.

Skills:

is able to notice the social aspects related to the impact of the fuel processing sector on society.
is able to make economic and legal assessment when formulating and solving engineering tasks in the field of gas extraction and processing.
he can conduct a debate on topics related to the fuel security of the country.

Social competences:
he is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the field of fuel production.
is ready to think and act in an entrepreneurial way.
is ready to perform responsible professional roles, taking into account changing social needs, including: developing the profession"s achievements, maintaining the ethos of the profession, compliance with and development of the principles of professional ethics and actions to comply with these principles.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: Knowledge acquired during the lecture is verified during the final test carried. Each test consists of 5 questions (open). 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 10 tasks differently scored depending on their level of difficulty. Passing threshold: 50% of points.
Tutorials - final test and rewarding knowledge necessary for the accomplishment of the problems in the area of the subject

Programme content

Lecture: Conventional sources of natural gases, non-conventional sources of natural gases, shale gas, tight gas, sources of natural gases in Poland, Europe and World, low calorific natural gases, methods of horizontal and vertical drilling, technical and economic aspects of the use of LNG, production process of LNG, transport and storage process of liquid natural gas , methods of diversification of gas supplies, major gas supplier in Poland and EU, gas hydrates, production of gaseous synthetic fuels, The technical and economic aspects of the recovery of helium and other trace gases from natural gas, Cryogenic process, low temperature processes of disintegration of gas, non-cryogenic process
Tutorials: calculation of main properties of gaseous fuels.
Laboratory: analysis of thermodynamic properties of gaseous fuels.

Course topics

Lecture: classification of gaseous fuels, methods of gaseous fuel production, gaseous fuel resources and reserves, the gas market in Poland, the LNG market, discussion of the basic physical and chemical properties of gaseous fuels, hydrogen as an energy carrier, production, application, ammonia as an energy carrier
Laboratories: measurement of basic thermodynamic parameters of gaseous fuels, study of the Joule-Thompson effect, flow coefficient, measurement of gaseous fuels
Auditorium exercises: solving tasks related to the production and use of gaseous fuels.

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board
Laboratory: multimedia presentation and performance of tasks given by the teacher - practical exercises.
Tutorials: multimedia presentation and performance of tasks given by the teacher.

Bibliography

Basic
Jacek Molenda, GAZ ZIEMNY Paliwo i Surowiec.
Molenda J. Steczko K. Ochrona środowiska w gazownictwie i użytkowaniu gazu
Additional
Wiliam Nuttall, Richard Clarke, Bartek Glowacki, The Future of Helium as a Natural Resource

Committee on Understanding the Impact of Selling the Helium Reserve; National Materials Advisory Board; National Research Council, Selling the Nation"s Helium Reserve

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,00
Classes requiring direct contact with the teacher	39	1,30
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	51	1,70