COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physicochemistry of gases [N1MiBP1>FG]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
18

Laboratory classes
0

Other (e.g. online)
0

Tutorials
9

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: The student knows the basics of physics and chemistry as well as the basics of thermodynamics and fluid mechanics Skills: The student use of terminology terms in the field of mechanics, thermodynamics, physics and chemistry. Correct description of the observed phenomena, analysis of the obtained results and drawing conclusions. Social competences: Work in an interdisciplinary team. Ability to lead a team and expand team knowledge.

Course objective

Getting to know the basic relationships showing the physical and chemical properties of gases.

Course-related learning outcomes

Knowledge:
Has knowledge in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems.
Has basic knowledge in the field of chemistry, in the construction of the periodic table of elements and

their properties, the theory of chemical bonds, organic and inorganic compounds, types of chemical reactions, chemical analysis: in the scope enabling understanding of lectures on metal and non-metal materials, protection sciences environment, fuels and lubricants, building materials and soil, biomechanics and biological materials processed by agricultural and food machinery.
Has basic knowledge of technical thermodynamics, ie the theory of thermodynamic changes, heat flow, thermal machines and heating, drying and cooling devices.

Skills:
Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.
Can use learned mathematical theories to create and analyze simple mathematical models of machines and their elements, and simple technical systems.
Can develop a safety instruction for a simple and medium complex machine.
Has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books.

Social competences:
Is ready to critically assess his knowledge and received content.
Is willing to think and act in an entrepreneurial manner.
Is ready to fulfill professional roles responsibly, including:
- observing the rules of professional ethics and requiring this from others,
- caring for the achievements and traditions of the profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The knowledge acquired during the lecture is verified on the basis of a written exam in the form of a test.
The skills acquired during the exercises are verified on the basis of a final test in the form of a written test.

Programme content

Thermodynamic properties: ideal, semi-perfect and real gas equations of state, compressibility factor, standard equations of natural gases. Viscosity of gases and liquids, depending on pressure and temperature. Effect of gases on pipeline materials, thermodynamic and chemical potential. Influence of aggressive ingredients, anti-corrosion and anti-erosion protection. Combustion.

Teaching methods

Information and problematic lecture with a multimedia presentation. Exercises - solving problems.

Bibliography

Basic
1. J. Szargut: Termodynamika techniczna, PWN 1991
2. J. Molenda: Gaz ziemny, PWN 1999
3. H. Buchowski, W. Ufnalski „ Fizykochemia gazów i cieczy”, Wydawnictwa Naukowo -Techniczne, Warszawa 2012
Additional
1. K. Pigoń, Z. Ruziewicz: Chemia fizyczna, PWN 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	27	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	48	2,00