POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Kinetics of liquids and gases

Course

Field of study	Year/Semester
Transport	1/2
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30		
Tutorials	Projects/seminars	
15		

Number of credit points
2

Lecturers

Responsible for the course/lecturer:

dr Edyta Janeba-Bartoszewicz

email: edyta.janeba-bartoszewicz@put.poznan.pl

tel. 616652497

Responsible for the course/lecturer:

Faculty of Civil Engineering and Transport

Prerequisites

Knowledge: The student knows the basics of physics and chemistry as well as the basics of thermodynamics and fluid mechanics

Skills: 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.

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Course-related learning outcomes

Knowledge

The student has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems

Skills

The student is able to properly plan and conduct perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions

The student is able to design elements of means of transport using data on environmental protection

Social competences

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

Methods for verifying learning outcomes and assessment criteria

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

Characteristics of the gas and liquid state. Thermodynamic properties: ideal, semi-perfect and real gas equations of state, compressibility factor. Viscosity of gases and liquids, depending on pressure and temperature. Influence of gases and liquids on pipeline materials. Influence of aggressive ingredients, anti-corrosion and anti-erosion protection. Combustion. Phase equilibria in multicomponent systems. Osmotic phenomena in two-component systems. Osmosis, dialysis. Donnan's membrane equilibria. Diffusion. Kinetics and mechanism of phase changes.

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

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Additional

1. K. Pigoń, Z. Ruziewicz: Chemia fizyczna, PWN 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	0,5

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[1] delete or add other activities as appropriate