

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Physicochemistry of liquides		Code 1010631361010618506
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 6
Elective path/specialty Engineering of Pipeline Transport	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: -		No. of credits 1
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 1 100% 1 100%
Responsible for subject / lecturer: dr Edyta Janeba_Bartoszewicz email: edyta.janeba-bartoszewicz@put.poznan.pl tel. 616652497 Transport Engineering ul. Piotrowo 3, 60-965 Poznań		Responsible for subject / lecturer: dr hab. inż. Jarosław Bartoszewicz, prof. nadzw. email: jaroslaw.bartoszewicz@put.poznan.pl tel. +48616652215 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student knows the basics of physics and chemistry and the basics of thermodynamics and fluid mechanics
2	Skills	The student speaks terminology in mechanics, thermodynamics, physics and chemistry. Corrects description of observed phenomena, analysis of received results and drawing conclusions.
3	Social competencies	The student works in an interdisciplinary team. Ability to lead the team and expand team knowledge.
Assumptions and objectives of the course: Demonstration of dependencies describing physical and chemical properties of gases.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems - [T1A_W02] 2. has knowledge of ethical codes regarding transport engineering, is aware of threats related to environmental protection and understands the specificity of critical systems for security reasons (mission-critical systems - [T1A_W08])		
Skills: 1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, appropriate to integrate them, make their interpretation and critical evaluation, draw conclusions, and fully justify the opinions they formulate - [T1A_U01] 2. can design elements of transport using data on environmental protection - [T1A_U12]		
Social competencies: 1. understands that in technology, knowledge and skills quickly become outdated - [T1A_K01]		
Assessment methods of study outcomes		
Test		
Course description		

Characteristics of the liquid state. Phase equilibria in multicomponent systems. Osmotic phenomena in two-component systems. Liquid viscosity, pressure and temperature dependence. Osmosis, dialysis. Donnan diaphragm equilibrium. Diffusion. Kinetics and mechanism of phase transitions.		
Basic bibliography: 1. H. Buchowski, W. Ufnalski: Fizykochemia gazów i cieczy, Wydawnictwa Naukowo -Techniczne, Warszawa 2012 2. . H. Buchowski, W.Ufnalski: Roztwory, Wydawnictwa Naukowo -Techniczne, Warszawa 1995 3. J. Szargut: Termodynamika techniczna, PWN 1991		
Additional bibliography: 1. K. Pigoń, Z. Ruziewicz: Chemia fizyczna, PWN 2012		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lecture	15	
2. Consultations	1	
3. Preparation for test	2	
4. Participation in the test	1	
5. Participation in exercises	15	
6. Consultations	1	
7. Preparation in the test	1	
8. Participation in the test	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	37	1
Contact hours	34	1
Practical activities	0	0