

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Dynamics of gas transportation proceses		Code 1010634371010633272
Field of study Transport	Profile of study (general academic, practical) general academic	Year /Semester 4 / 7
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) part-time	
No. of hours Lecture: 9 Classes: 9 Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: prof. dr hab. inż. Michał Ciałkowski email: michal.cialkowski@put.poznan.pl tel. 616652205 Faculty of Working Machines and Transportation ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has a basic knowledge of mathematics, physics and fluid mechanics The student knows and understands the basic phenomena of fluid mechanics. [PRK4]
2	Skills	The student is able to use the concepts and methods in the description of the phenomena associated with the movement of ideal gases. Students can use their knowledge to analyze specific events and processes related to the gas flow. Students are able to solve specific problems related to the ideal gas flow. [PRK4]
3	Social competencies	Students can work together in a group, taking the different roles. The student is able to prioritize important in solving the tasks posed in front of him. The student demonstrates self-reliance in solving problems, acquire and improve their knowledge and skills. [PRK4]
Assumptions and objectives of the course: To familiarize students with basic knowledge of theoretical governing the movement of ideal gases		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. has an extended and deep knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport - [T1A_W01 [P6S_WG]]		
2. 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 [P6S_WG]]		
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 - [T1A_U01 [P6S_UW]]		
2. can properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them - [T1A_U03 [P6S_UW]]		
3. can assess the computational complexity of algorithms and transport problems - [T1A_U08 [P6S_UW]]		
Social competencies:		

1. understands that in technology, knowledge and skills quickly become obsolete - [T1A_K01 [P6S_KK]]
 2. is aware of the importance of knowledge in solving engineering problems and knows examples and understands the reasons for malfunctioning transport systems that led to serious financial and social losses or to serious health and even life - [T1A_K02 [P6S_KK]]

Assessment methods of study outcomes		
Exam		
Course description		
Bernoulli's equation. Critical parameters of gas. Classification of the gas flow. Wave phenomena in one-dimensional flow. Oblique shock wave. Polar shock wave. The shock wave in a flat opływie wedge. Some problems of the theory of linear. Linearization equation velocity potential. Transformation Prandtl and Glauerta. Some analytical solutions.		
Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lecture	15	
2. Consultation	5	
3. consolidation of the lecture	20	
4. Preparing to pass	15	
5. Exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	2
Contact hours	30	1
Practical activities	70	1