

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Gas storage and transportation		Code 1010632211010636292
Field of study Mechanika i budowa maszyn	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Gas technology and renewable energy	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: 1 Laboratory: - Project/seminars: -		No. of credits 2
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 %) 2 100% 2 100%
Responsible for subject / lecturer: dr inż. Rafał Ślefarski email: rafa.slefarski@put.poznan.pl tel. 616652218 Faculty of Machines and Transport ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge in the field of physics, thermodynamics and fluid mechanics.
2	Skills	Student should have skills required to solve engineering problems with scientifically valid methodologies. Can effectively acquire the information from various sources including datasheets, literature and Internet.
3	Social competencies	Student knows restrictions of the own knowledge and the skill; understands the need for lifelong education
Assumptions and objectives of the course: To acquaint students with the theoretical and practical aspects related to the transportation and storage of natural gas		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has comprehensive knowledge about thermodynamics and fluid mechanics in transportation process of natural gas, necessary for solving engineering and scientific problems ? [K2A_W04] - [-]		
2. . Has a basic knowledge of specific machine work technologies in transport and storage process of gaseous fuels. ? [K2A_W18] - [-]		
3. Has an extended knowledge of modern production technologies used gas industry ? [K2A_W10] - [-]		
Skills:		
1. Is able to obtain information from the literature, internet, databases and other sources. Can integrate the information to interpret and learn from them, create and justify opinions. - [K1A_U03] - [-]		
2. Can successfully communicate both with specialists and non-specialists about problems within his or her area of study.- [K2A_U01] - [-]		
3. .3 Is able to develop technical description, market offer and design documentation for a complex machine from the selected equipment group.- [K2A_U016] - [-]		
Social competencies:		
1. 1. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions. - [K2A_K02] - [-]		
2. 2. Is able to set priorities for realization of undertaken tasks. ? [K2A_02] - [-]		

Assessment methods of study outcomes		
Lecture ? the written examination The evaluation of student knowledge will be held based on an answers on 5 questions from the material presented during the lectures. Classes - - final test and rewarding knowledge necessary for the accomplishment of the problems in the area of the subject,		
Course description		
Construction of high and low pressure network for natural gas transportation, construction of natural and synthetic natural gas storage facilities, calculation of the basic operating parameters of pressure reduction and metering stations, policy of diversification of natural gas supply, construction of strategy pipeline system, corrosion, safety, manganese, underground holders, drying process, control process, decompression of gas, pressure loses on gas pipelines , compressor stations engine and gas turbine, International systems of network gas lines, LNG		
Basic bibliography:		
1. Dobski, T.: Combustion Gases in Modern Technologies, 2scd Ed., Wydawnictwo Politechniki Poznańskiej 2. Andrzej Osiadacz: Stacje gazowe. Teoria, projektowanie, eksploatacja 3. Bąkowski K.: Sieci i instalacje gazowe		
Additional bibliography:		
1. Witalis Ratasiewicz: Stacje gazowe w systemach dostawy gazu, Poradnik; Polskie Zrzeszenie Inżynierów i Techników Sanitarnych 2. Rybicki Cz., Łuczyński S.: Pomiary natężenia przepływu. Wiertnictwo Nafta Gaz, t. 24 z.2, 2007. 3. Grabowski H.: Poradnik techniczno-budowlany dla użytkowników sieci gazowej w systemie dystrybucyjnym. SITPNIg Ośrodek Szkolenia i Rzecoznawstwa, Grupa Terenowa Rzecoznawców w Poznaniu, 2011		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation for the lecture	5	
2. Participation in the lecture	15	
3. Fixing the lecture	15	
4. Consultation for the lecture	2	
5. Preparing to pass the lectur	10	
6. Participation in the completion of the lectur	2	
7. Preparation of practical classes	5	
8. Participation in the classe	15	
9. Consultation for the classes	5	
10. Preparing to pass the classes	5	
11. Participation in the completion of the classe	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	81	2
Contact hours	36	0
Practical activities	0	0