

STUDY MODULE DESCRIPTION FORM			
Name of the module/subject Machines for Liquids and Gases Transportation			Code 1010631371010632832
Field of study Transport		Profile of study (general academic, practical) (brak)	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) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1			No. of credits 4
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			ECTS distribution (number and %)
Responsible for subject / lecturer: dr inż. Łukasz Semkło email: lukasz.semklo@put.poznan.pl tel. 616652213 Faculty of Working Machines and Transportation ul. Piotrowo 3 60-965 Poznań			
Prerequisites in terms of knowledge, skills and social competencies:			
1	Knowledge	Students have an understanding of the basics of machine design, basics of thermodynamics, fluid mechanics and economics	
2	Skills	Strict use of terminology concepts of mechanics, thermodynamics.	
3	Social competencies	Knowledge and understanding of the general technical energy processes transporting liquid and gas	
Assumptions and objectives of the course:			
Extension of knowledge construction and basic theory of compressors, blowers, fans and pumps. Understanding the characteristics of machines and exploitation bases			
Study outcomes and reference to the educational results for a field of study			
Knowledge:			
1. Has a detailed knowledge of the transport systems, including: the importance of transport in the socio-economic system of the country, region and city, forecasting the movement of people and goods - [K1A_W10] 2. Has a structured, theoretically founded knowledge in the area of transport infrastructure, including: transport networks, the overall characterization and classification of transport infrastructure - [K1A_W12] 3. Has a structured, theoretically founded knowledge in the field of transport means, general characteristics and classification of transportation machines, their functional properties and basic technical parameters - [K1A-W14]			
Skills:			
1. Is able to obtain information from the literature, internet, databases and other sources in Polish and English. Can integrate the information to interpret and learn from them, create and justify opinions - [K1A_U01] 2. Has the ability to self-educate using modern teaching tools such as remote lectures, webpages and databases, educational software, electronic editions - [K1A_U06]			
Social competencies:			
1. Understands the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development - [K1A_K01] 2. 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 in short and long-term aspect - [K1A_K02] 3. Is able to identify and resolve the dilemmas associated with the profession, among others. problems at the technology/environment level - [K1A_K06]			

Assessment methods of study outcomes		
Exam, project, report laboratory exercises		
Course description		
Klasyfikacja sprężarek, dmuchaw, wentylatorów i pomp (SDWiP). Podstawy wspólnej teorii przepływu w tych maszynach. Sposoby regulacji SDWiP. Charakterystyki eksploatacyjne i regulacyjne sprężarek, dmuchaw, wentylatorów i pomp. Pompaż i kawitacja. Wymagania układów napędowych. Zabezpieczenia eksploatacyjne. Warunki współpracy z siecią rurociągową. Racjonalizacja i doskonalenie eksploatacji SDWiP. Rozruch i zatrzymanie maszyn. Układy szeregowe i równoległe SDWiP. Monitoring eksploatacyjny energetyczny i wibroakustyczny SDWiP		
Basic bibliography:		
1. Tuliszka E.: Sprężarki, dmuchawy, wentylatory. Wydawnictwa Naukowo-Techniczne. NT Warszawa 1976		
2. Jędral W.: Pompy wirowe. Wydawnictwa Naukowo-Techniczne. NT Warszawa 2002		
3. Fortuna St.: Wentylatory. Podstawy teoretyczne, zagadnienia konstrukcyjno-eksploatacyjne I zastosowanie. Wydawnictwo TECHWENT s.c. Kraków 1999		
Additional bibliography:		
1. Szargut J., Ziębik A., Kozioł J., Jabczek R., Kurpisz K., Chmielniak T., Wilk R.: Racjonalizacja użytkowania energii w zakładach przemysłowych. Poradnik audytora energetycznego. Biblioteka Fundacji Poszanowania Energii. Fundacja Poszanowania Energii. Warszawa 1994		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in the lecture	30	
2. Consultation	3	
3. Preparing to pass	12	
4. Exam	3	
5. Preparation for laboratory	5	
6. Participation in laboratory exercises	30	
7. The consolidation exercise report content	10	
8. Preparation of project activities	12	
9. Participation in the project activities	15	
10. Project preparation	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	140	4
Contact hours	70	2
Practical activities	70	2