

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 technical sciences Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: PhD 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 [PRK4]
2	Skills	Strict use of terminology concepts of mechanics, thermodynamics. [PRK4]
3	Social competencies	Knowledge and understanding of the general technical energy processes transporting liquid and gas [PRK4]
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 structured, theoretically founded general knowledge in the field of technology, transport systems and various means of transport - [T1A_W03 [P6S_WG]]		
2. has a structured and theoretically founded general knowledge in the field of key technical issues and detailed knowledge in the field of selected guesses of this discipline of transport engineering - [T1A_W04 [P6S_WG]]		
3. knows the basic techniques, methods and tools used in the process of solving transport tasks, mainly of an engineering nature - [t1A-W07 [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, by formulating and solving tasks in the field of transport, apply properly selected methods, including analytical, simulation or experimental - [T1A_U04P6S_UW]]		
3. can communicate in Polish and English using specialized terminology, using various techniques, both in a professional environment and in other environments, also using tools in the field of transport engineering - [T1A_U15 [P6S_UK]]		
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]]
3. can think and act in an entrepreneurial way, including finding commercial applications for the system being created, bearing in mind not only business but also social benefits of the business - [T1A_K03 [P6S_KO]]

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 szeregowy i równoległe SDWiP. Monitoring eksploatacyjny energetyczny i wibroakustyczny SDWiP		
Basic bibliography:		
<ol style="list-style-type: none"> 1. Tuliszka E.: Sprężarki, dmuchawy, wentylatory. Wydawnictwa Naukowo-Techniczne. NT Warszawa 1976 2. Jędrał 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., Ziębiak 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	81	2
Practical activities	92	2