

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Pneumatic and Hydraulic Transportation of Crumbled Materials</b>		Code <b>1010631311010634092</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Engineering of Pipeline Transport</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>2</b> Classes: <b>1</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>3</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art		ECTS distribution (number and %)
<b>Responsible for subject / lecturer:</b>  dr inż. Łukasz Semkło email: lukasz.semklo@put.poznan.pl tel. 616652213 Faculty of Machines and Transport ul. Piotrowo 3 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	General technical issue of transporting materials particles. Mechanical transmission of liquids and gases. Knowledge of the characteristics of of particulate materials
2	<b>Skills</b>	The calculation of transfer of liquids and gases. Predicting risk for any transporting materials particles.
3	<b>Social competencies</b>	Working in an interdisciplinary team. Ability to lead a team and knowledge team.
<b>Assumptions and objectives of the course:</b> Knowledge of pipeline transport of particulate materials and hydraulic pneumatic transport by air and water media. Basis of design and the principles of construction and operation		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has a structured, theoretically founded knowledge in the field of operations research, including: discrete issues - problems of storage and sharing of resources, issues of transportation, graphs and networks ? suboptimal coloring, network flows, assignments, issues of mass service - priorities, group service - [K2A-W08] 2. Has a detailed knowledge of the transport systems modeling, models of transport systems, the distribution of streams in transport networks - [K2A-W10] 3. 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 ] 4. Has a structured, theoretically founded knowledge in the field of transport means, general characteristics and classification of transport, their functional properties and basic technical parameters - [K2A_W14]		
<b>Skills:</b>		
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 - [K2A_U01] 2. Has the preparation required in industrial environment, knows safety rules for the job, is able to use for technical standards on unification, safety and recycling of machinery and equipment - [K2A_U08] 3. Is able to estimate the materials and environmental cost and labor input to develop a logistics object of own design - [K2A_U09] 4. Is able draw by hand machine elements and schematics in accordance with the principles of engineering drawing and European standards - [K2A_U12]		
<b>Social competencies:</b>		

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 in short and long-term aspect - [K2A\_K02]
2. Has a sense of responsibility for one's own work and is willing to comply with the principles of teamwork and taking responsibility for collaborative tasks - [K2A\_K04]
3. Is able to identify and resolve the dilemmas associated with the profession, among others. problems at the technology/environment level - [K2A\_K06]
4. Is aware of the transfer of knowledge to society, takes steps to ensure that the information is understandable, presents different solutions and points of view - [K2A\_K08]

<b>Assessment methods of study outcomes</b>		
Exam, final test		
<b>Course description</b>		
-Pipeline transport of particulate materials: application examples, technical and operational requirements. Media: water and air. Pipelines: construction and technical equipment supplies. Compressor and pumping stations. Performance characteristics of the transport system. System failures of pipelines of bulk materials. Monitoring of operation of shredded transporting materials systems. Losses flow of hydraulic pneumatic conveying pipelines. Issues strength. Fundamentals of building. Diagnostics operating transport systems. Fundamentals of design calculations, transporting materials shredded .. The economics of exploitation. Erosion and corrosion of pipelines. Renovation of pipelines		
<b>Basic bibliography:</b>		
1. J. Szargut, A. Ziębik - Podstawy energetyki cieplnej, PWN, Warszawa 1998		
2. Korczak M., Rokita J.: Pompy i układy pompowe. Obliczenia i projektowanie. Wyd. II. Wydawnictwo Politechniki Śląskiej. 1997		
<b>Additional bibliography:</b>		
1. Wowk J.: Pompownie poradnik dla projektantów, inwestorów i użytkowników. Wydawnictwa Naukowo-Techniczne. Warszawa 2003		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in the lecture	30	
2. Consultation	3	
3. Preparing to pass	12	
4. Exam	3	
5. Participation in exercises	15	
6. consultations	3	
7. Preparing to pass	6	
8. Final test	2	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	74	3
Contact hours	56	2
Practical activities	0	0