

<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 <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>3 100%</b> <b>3 100%</b>
<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 [PRK6]
2	<b>Skills</b>	The calculation of transfer of liquids and gases. Predicting risk for any transporting materials particles. [PRK6]
3	<b>Social competencies</b>	Working in an interdisciplinary team. Ability to lead a team and knowledge team. [PRK6]
<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 advanced and in-depth knowledge in the field of transport engineering, theoretical foundations, tools and means used to solve simple engineering problems - [T2A_W01 [P7S_WG]]		
2. has a structured and theoretically founded general knowledge related to key issues in the field of transport engineering - [T2A_W02 [P7S_WG]]		
<b>Skills:</b>		
1. can acquire information from literature, databases and other sources (in Polish and English), integrate them, make their interpretation and critical evaluation, draw conclusions and formulate and fully justify opinions - [T2A_U01 [P7S_UW]]		
2. can communicate in Polish and English using different techniques in a professional environment and in other environments, also using transport engineering issues - [T2A_U12 [P7S_UK]]		
<b>Social competencies:</b>		
1. understands that in the field of transport engineering, knowledge and skills quickly become obsolete - [T2A_K01 [P7S_KK]]		
2. understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems - [T2A_K02 [P7S_KK]]		
<b>Assessment methods of study outcomes</b>		
Exam, final test		

<b>Course description</b>		
<p>-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</p>		
<p><b>Basic bibliography:</b></p> <p>1. J. Szargut, A. Ziębik - Podstawy energetyki cieplnej, PWN, Warszawa 1998</p> <p>2. Korczak M., Rokita J.: Pompy i układy pompowe. Obliczenia i projektowanie. Wyd. II. Wydawnictwo Politechniki Śląskiej. 1997</p>		
<p><b>Additional bibliography:</b></p> <p>1. Wowk J.: Pompownie poradnik dla projektantów, inwestorów i użytkowników. Wydawnictwa Naukowo-Techniczne. Warszawa 2003</p>		
<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	18	1