

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Pneumatic and Hydraulic Conveyor Systems		Code 1010612331010632256
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty Railway Transport	Subject offered in: Polish	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: 1 Project/seminars: -		No. of credits 3
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:		
mgr 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	General technical issue of transport of gases and liquids. Some aspects of thermodynamics.
2	Skills	Calculations transmissions liquids and gases. Predicting risk for any transporting materials transferred pneumatically and hydraulically
3	Social competencies	Working in an interdisciplinary team. Ability to lead a team and knowledge team
Assumptions and objectives of the course:		
Understanding transport in pipelines: pneumatic (air) and hydraulic (water). Basis of design and the principles of construction and operation		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
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]		
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 - [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]		
Social competencies:		

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]

Assessment methods of study outcomes		
Final test		
Course description		
Pneumatic and hydraulic Transportation, examples of applications and technical and operational requirements. Media: water and air. Pipelines: construction and technical equipment supplies. Compressor and pumping stations. Performance characteristics of the transport system. Failures pneumatic conveying systems and hydraulics. Monitoring of operation of pneumatic conveying systems and hydraulics. Loss of flow in pipelines. Issues strength. Fundamentals of building. Diagnostics operating transport systems. Fundamentals of design calculations and hydraulic pneumatic transport. The economics of exploitation. Erosion and corrosion of pipelines. Renovation of pipelines.		
Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. 1 Participation in the lecture	15	
2. Consultation	3	
3. Preparing to pass	12	
4. Final test	3	
5. Participation in exercises	15	
6. consultations	3	
7. Preparing to pass	6	
8. Final test	2	
9. Participation in laboratory exercises	15	
10. The consolidation exercise report content	3	
Student's workload		
Source of workload	hours	ECTS
Total workload	77	3
Contact hours	56	2
Practical activities	18	1