



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Pneumatic and hydraulic transport of shredded materials

### Course

Field of study

Year/Semester

Transport

1/1

Area of study (specialization)

Profile of study

Engineering of Pipeline Transport

general academic

Level of study

Course offered in

Second-cycle studies

polish

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

Tutorials

Projects/seminars

15

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

PhD Łukasz Semkło

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Faculty of Environmental Engineering and Energy

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Piotrowo 3 street, 60-965 Poznan

### Prerequisites

General and technical problem of shredded and loose materials transport. Mechanics of liquid and gas transmission. Knowledge of the characteristics of crushed and loose materials. Calculations of liquid and gas transfers. Predicting hazards for any transport of crumbled and loose materials. Work in an interdisciplinary team. Ability to lead the team and expand team knowledge.

### Course objective

Understanding transport in pneumatic (air) and hydraulic (liquids) pipelines when transporting particulate materials. Basics of design and principles of construction and operation



### Course-related learning outcomes

#### Knowledge

has advanced and in-depth knowledge of transport engineering, theoretical foundations, tools and resources used to solve simple engineering problems

has ordered and theoretically founded general knowledge related to key issues in the field of transport engineering

#### Skills

is able to obtain information from literature, databases and other sources (in Polish and English), integrate them, perform their interpretation and critical assessment, draw conclusions and formulate and comprehensively justify opinions

is able to communicate in Polish and English using various techniques in a professional environment and in other environments, also using transport engineering issues

#### Social competences

understands that in the field of transport engineering, knowledge and skills are rapidly becoming obsolete

understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture and exercises - written exam. Obtaining credit from a minimum of 51% of the points possible to get. There is a possibility of an oral question to raise the grade.

### Programme content

Pipeline transport of particulate materials: examples of applications and technical and operational requirements. Carriers water and air. Pipelines: construction and technical operational equipment. Compressor stations and pumping stations. Operational characteristics of transport installations. Failures of pipeline transport systems for loose materials. Monitoring the operation of shredded material transport systems. Flow losses of pneumatic hydraulic transport pipelines. Strength issues. Basics of construction technique. Operational diagnostics of transport systems. Basics of design calculations for shredded materials transport. Economics of operation. Erosion and corrosion of pipelines. Pipeline renovation

### Teaching methods

Informative lecture (conventional) (information transfer in a systematic way)

Exercise method (subject exercises, exercises) - in the form of auditorium exercises (the application of acquired knowledge in practice - can take a different nature: solving cognitive tasks or training psychomotor skills; transforming conscious activity into a habit through repetition)



## Bibliography

### Basic

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

### Additional

1. Wowk J.: Pompownie ? poradnik dla projektantów, inwestorów i użytkowników. Wydawnictwa Naukowo-Techniczne. Warszawa 2003

## Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests) <sup>1</sup>	30	1,0

<sup>1</sup> delete or add other activities as appropriate