



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Machines for Liquids and Gases Transportation

### Course

Field of study

Year/Semester

Transport

3/5

Area of study (specialization)

Profile of study

Engineering of Pipeline Transport

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

part-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

18

9

0

Tutorials

Projects/seminars

0

0

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr inż. Łukasz Semkło

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tel. 616652213

Piotrowo 3, 60-965 Poznan

### Prerequisites

Students have an understanding of the basics of machine design, basics of thermodynamics, fluid mechanics and economics Strict use of terminology concepts of mechanics, thermodynamics. Knowledge and understanding of the general technical energy processes transporting liquid and gas

### Course objective

Extension of knowledge construction and basic theory of compressors, blowers, fans and pumps. Understanding the characteristics of machines and exploitation bases

### Course-related learning outcomes

Knowledge

The student has an ordered, theoretically founded general knowledge of technology, transport systems and various means of transport



The student has ordered and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues in this discipline of transport engineering

The student knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature engineering

#### Skills

The student is able to obtain information from various sources, including literature and databases (both in Polish and in English), integrate it properly, interpret it and critically evaluate it, draw conclusions, and comprehensively justify his/her opinion.

Student is able, when formulating and solving tasks in the field of transport, to apply appropriately selected methods, including analytical, simulation or experimental methods

The student can communicate in Polish and English using specialized terminology, using various techniques, both in the professional environment and in other environments, also with the use of tools in the field of transport engineering

#### Social competences

The student understands that in technology, knowledge and skills very quickly become obsolete

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

The student can think and act in an entrepreneurial way, incl. finding commercial applications for the created system, taking into account not only business benefits, but also social benefits of the conducted activity

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - 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.

Laboratories - credit based on reports.

#### Programme content

Classification of compressors, blowers, fans and pumps (SDWiP). Fundamentals of the common theory of flow in these machines. Ways to regulate SDWiP. Operating and control characteristics of compressors, blowers, fans and pumps. Pump and cavitation. Drive system requirements. Operating safeguards. Terms of cooperation with the pipeline network. Rationalization and improvement of SDWiP operation. Starting and stopping machines. SDWiP serial and parallel systems Energy and vibroacoustic operational monitoring SDWiP

#### Teaching methods



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

### Bibliography

Basic

1. Pompy wirowe odśrodkowe : teoria : podstawy projektowania : energooszczędna eksploatacja / Waldemar Jędrał. Oficyna Wydawnicza Politechniki Warszawskiej, 1996.

Additional

1. Polish and European norms and standards

### Breakdown of average student's workload

	Hours	ECTS
Total workload	72	4,0
Classes requiring direct contact with the teacher	27	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	45	2,0

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