COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechanics of Gas and Fluid Flows

Course

Field of study

Transport

Year/Semester

3/6

Area of study (specialization)

Engineering of Pipeline Transport

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

9

Laboratory classes

9

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

PhD Łukasz Semkło

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Faculty of Environmental Engineering and Energy

phone : 61 6652213

Piotrowo 3 street, 60-965 Poznan

Responsible for the course/lecturer:

Prerequisites

The student knows the basics of thermodynamics and fluid mechanics. Strict use of terminology concepts in the field of mechanics, thermodynamics. Work in an interdisciplinary team. Ability to lead the team and expand team knowledge.

Course objective

Cognition: phenomena in the flow of incompressible and compressible real fluids through different geometric channels and in application to various tasks in technique, physical and mathematical description as a basis for calculations

Course-related learning outcomes

Knowledge

The student has an extended and deepened knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport

The student has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems

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.

The student is able to properly plan and conduct perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions

The student is able to assess the computational complexity of algorithms and transport problems

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

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

Description of phenomena in fluid flow. Numbers of flow similarities. Equations describing the flow in different channels. Flow continuity equations. Energy balance equations. Total pressure losses. Flows through supersonic and supersonic nozzles. Coefficients and indicators characterizing flow efficiency. Coefficients and indicators describing differences in the flow of perfect fluid and viscous fluid real. Methods and algorithms for calculating flows. Similarity of flows? flow similarity numbers. Improving flow in channels. Ability to solve flow problems in channels. Algorithmization of calculations.

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. Mechanika gazów : jednowymiarowe przepływy ustalone / Czesław Grabarczyk, Wydawnictwo WNT, 2012.

2. Mechanika płynów / Michał Ciałkowski, Wydaw. Politechniki Poznańskiej, 2000.

Additional

1. Mechanika płynów : zbiór zadań z rozwiązaniami / pod red. Michała Ciałkowskiego ; Wydawnictwo Politechniki Poznańskiej, 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	28	1,0
Classes requiring direct contact with the teacher	18	0,7
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	10	0,3

[1] delete or add other activities as appropriate