



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Computer support in the transport of liquids and gases

### Course

Field of study

Year/Semester

Transport

2/2

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

part-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

9

18

Tutorials

Projects/seminars

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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Faculty of Environmental Engineering and  
Energy

Piotrowo 3 street, 60-965 Poznan

### Prerequisites

Knowledge of various issues from the basics of pipeline transport engineering and the basics of thermodynamics, fluid mechanics and fluid physics. Performing calculations and solving tasks in Excel, learning new programs. Group (team) performance of tasks.

### Course objective

Understanding specialized algorithms and procedures. Solving selected examples

### 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

can - when formulating and solving engineering tasks - integrate knowledge from various transport areas (and, if necessary, also knowledge from other scientific disciplines) and apply a systemic approach, also taking into account non-technical aspects

can - using, among others conceptually new methods - solve complex tasks in the field of transport engineering, including atypical tasks and tasks containing a research component

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 - 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 - final project (computer program)

#### Programme content

- Calculation procedures for physical parameters of water, steam, natural gas and other gas solutions.
- Calculation procedures for flow in pipelines.
- Calculation procedures for flow in flow machinery channels.
- Calculation of operating parameters of pumps, compressors and gas turbines on the basis of operational characteristics in variable conditions.
- Computer aided calculations of thermal properties of gases and liquids in transport conditions.



- Support in the design of transmission pipelines.
- Computer aided analysis of monitoring of pipeline transport parameters
- Simulation of stationary flows in pipelines using the ANSYS Fluent program.
- Simulation of transient flows using ANSYS Fluent

### Teaching methods

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

### Bibliography

Basic

1. Ufnalski Waldemar: Obliczenia fizykochemiczne na Twoim PC. {Problemy, algorytmy, programy, zajęcia wspomagane mikrokomputerem. Podstawy termodynamiki}. Wydawnictwa Naukowo-Techniczne. Warszawa 1997 {[www.wnt.com.pl](http://www.wnt.com.pl)}
2. Ufnalski Waldemar, Mądry Kazimierz: Excel dla chemików ... i nie tylko. Wydawnictwa Naukowo-Techniczne. Warszawa 2000 {[www.wnt.com.pl](http://www.wnt.com.pl)}
3. Kuciński Krzysztof: abc... Excela 2001. Wydawnictwo ?Edition 2000?. Kraków 2001 {[www.EDITION2000.COM.PL](http://www.EDITION2000.COM.PL)}
4. Bernard V. Liengme: Microsoft Excel w nauce i technice. Wydawnictwo RM. Warszawa 2002 {[www.rm.com.pl](http://www.rm.com.pl); <http://www.stfx.ca/people/bliengme>}
5. Bernard V. Liengme: Microsoft Excel w biznesie i zarządzaniu. Wydawnictwo RM. Warszawa 2002 {[www.rm.com.pl](http://www.rm.com.pl); <http://www.stfx.ca/people/bliengme>}

Additional

1. Szapiro Tomasz (redakcja; praca zbiorowa) i inni: Decyzje menedżerskie z Excelem. Polskie Wydawnictwo Ekonomiczne. Warszawa 2000. {[www.pwe.com.pl](http://www.pwe.com.pl)}

### Breakdown of average student's workload

	Hours	ECTS
Total workload	83	4,0
Classes requiring direct contact with the teacher	27	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests) <sup>1</sup>	55	3,0

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