BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
FACULTY OF MECHANICAL ENGINEERING

SUBJECT DATASHEET

I. SUBJECT DESCRIPTION

1. GENERAL DATA

1.1. Subject name (in Hungarian, in English)

Selected Chapters of Fluid Mechanics ● Selected Chapters of Fluid Mechanics

1.2. Neptun code

BMEGEÁTNP01

1.3. Type

study unit with contact hours

1.4. Course types and number of hours (weekly / semester)

course type	number of hours (weekly)	nature (connected / stand-alone)
lecture (theory)	2	-
exercise	1	coupled
laboratory exercise	-	-

1.5. Type of assessments (quality evaluation)

mid-term grade

1.6. ECTS

4

1.7. Subject coordinator

name:	Dr. Benedek Tamás (76511246251)
post:	adjunct
contact:	benedek@ara.bme.hu

1.8. Host organization

Department of Fluid Mechanics (http://www.ara.bme.hu)

1.9. Course homepage

http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNP01

1.10. Course language

hungarian

1.11. Primary curriculum type

mandatory

1.12. Direct prerequisites

Strong prerequisite: -

Weak prerequisite: -

Parallel prerequisite: -

Milestone prerequisite: -

Excluding condition: -

(the subject cannot be taken if you have previously completed any of the following subjects or groups of subjects)

2. AIMS AND ACHIEVEMENTS

2.1. Aim

To acquaint students with the following topics, with special regard to their application in building engineering and process engineering: Fluid dynamics measurements. Time averaged measurements: static, dynamic, total pressure. Pressure measuring devices: probes, methods. Manometers. Pressure-based measurement of velocity magnitude and direction. Anemometers, heat probes. Temperature measurement. Measurement of time-varying pressures. Mass flow measurement back to speed measurement and reducer; comparison. Special flow meters. Selected chapters of fluid dynamics in the fields of building engineering and process engineering: examples: atmospheric flows as processes determining the external air condition of buildings; ventilation technology; acoustics; technological processes involved in flow engineering processes, including gaseous and liquid working media. Practical examples. Creative, interactive industry case studies.

2.2. Learning outcomes

Competences that can be acquired by completing the course:

A. Knowledge

- Knows the theoretical foundations of flow measurement technology, especially for civil engineering and process applications.
- He was informed about the flow technical aspects of building engineering and process engineering equipment, their needs and critical operating characteristics, diagnostic needs and methods, for both gaseous and liquid working media.
- He was informed about the legal regulations setting the energy requirements of building engineering and process engineering (eg fan efficiency).
- He was informed about the basic flow measurement and modeling test methods of building engineering and process equipment and systems.
- He knows the fluid dynamics of atmospheric phenomena, especially with regard to building engineering aspects.
- It provides insight into the factors that determine urban air quality in relation to building engineering aspects.
- Understands the acoustic aspects of building engineering and process engineering processes.
- Understands the working principle of special (non-differential pressure) flow meters.
- Knows the principle of operation of instruments for measuring rapidly changing pressures.
- It recalls the principle of differential pressure and different measuring probes.

B. Ability

- Able to select instruments for a given flow measurement task.
- Develops his / her skills in organizing flow technology industrial projects, expressing critical opinions, communicating, proposing solutions, and presenting solution variants in the framework of interactive industrial case studies.
- Capable of comparative analysis of technical data, preparation of decision making.

- Apply an approach to conforming to standards.
- He makes a proposal to solve the technical problems that arise during the practical project.
- Able to study and interpret the phenomena involved in fluid flow in building engineering and process engineering.
- Develops the ability to comprehensively evaluate flow processes, establish an intervention, prepare for decision-making, in connection with building engineering and process engineering applications.
- He makes a proposal for the establishment of a physical model, the basic selection of solving equations, in connection with the flow modeling to be applied in civil engineering and process engineering.
- It analyzes the determinants of urban air quality.
- He makes a proposal for the preparation of decision-making, in connection with building engineering and process engineering procurements and investments affected by flow technology.

C. Attitude

- He constantly monitors his work, results and conclusions.
- It expands your knowledge of energy management and sustainability through continuous learning.
- Open to the use of information technology tools.
- It strives to get to know and routinely use the tools needed for energy management and economic problem solving.
- It develops your ability to provide accurate and error-free problem solving, engineering precision and accuracy.
- It applies the principles of energy efficiency, sustainability and environmental awareness in solving energy management tasks.
- It monitors changes in the social, economic and political system.
- He publishes his results in accordance with his professional rules.
- It is in line with the expectations and requirements of engineering ethics. It publishes its opinions and views without offending others.
- He takes a critical and self-critical approach in his engineering work.

D. Independence and responsibility

- Collaborates with the instructor and fellow students to expand knowledge.
- Accepts well-founded professional and other critical remarks.
- In some situations, as part of a team, you work with your fellow students to solve tasks.
- With his knowledge, he makes a responsible, informed decision based on his analyzes.
- He feels responsible for energy, the problems of energy management and the sustainable use of the environment, as well as present and future generations.
- He is committed to the principles and methods of systematic thinking and problem solving.
- He feels a responsibility to pass on engineering knowledge to younger generations in terms of professional education.
- He defends his position in professional debates on the basis of rational arguments and counter-arguments.
- He feels responsible for the responsible execution of engineering tasks, occasionally for the creation of long-term engineering jobs.
- It is committed to an entrepreneurial approach that goes beyond task execution, adapting to the integration of engineering tasks into innovative R & D & I activities (basic research, applied research and development-innovation) and the competitive sector.

2.3. Teaching methodology

The teaching of the subject takes place in the framework of lectures and classroom practice. The lectures basically introduce the students to the information determined by the knowledge competence elements using the technique of frontal education. The application and skill-level acquisition of knowledge takes place in classroom exercises, where computational tasks and industrial problem-solving case studies have to be solved in groups in an interactive way with the instructor, which also develops teamwork skills, quick decision-making, critical and self-critical approaches.

2.4. Support materials

a) Textbooks

Tamás Lajos: The basics of fluid dynamics. 2015. ISBN 978 963 12 2885 4.

b) Lecture notes

Vad, J., Advanced flow measurements. Technical University Publisher, 2008. Reference: 45085. ISBN 978 963 420 951 5.

c) Online materials

http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNP01

2.5. Validity of the course description

Start of validity:	2021. May 31.
End of validity:	2024. December 31.

II. SUBJECT REQUIREMENT

3. ACHIEVEMENT CONTROL AND EVALUATION

3.1 General rules

The evaluation of the study results is based on the following: 1) Interactive industrial problem-solving case studies, developed on questionnaires. 2) Closed dissertation (Fluid measurement technology; industrial case studies). Project-type mid-term assignment (Additional selected chapters from the applications of fluid engineering in building engineering and process engineering). 4) Closed dissertation (Further selected chapters from the applications of fluid engineering in building engineering and process engineering). The minimum requirement, for ALL of the above performance evaluation items [1), 2), 3) 4)], is to meet 40% of the maximum sub-score that can be awarded.

3.2 Assessment methods

A. Detailed description of mid-term assessments

1. Mid-term assessment

type: summative assessment

count: 2

purpose, description: Aim: to assess subject knowledge and its ability to apply it creatively, as follows. "Flow measurement technology; industrial case studies" course part: Theoretical and application in-house dissertation, referring to the jointly processed industrial case studies. Maximum score: 35. "Additional selected chapters from the applications of fluid engineering in building engineering and process engineering" course part: Theoretical indoor dissertation. Maximum score: 35.

2. Mid-term assessment

type: formative assessment, project-based, complex

count: 1

purpose, description: The basic aim of the partial performance assessment is to examine the existence of attitudes and learning outcomes belonging to the autonomy and responsibility competence group. The way to do this is to develop a mid-term project assignment to be prepared in groups, to document it in the form of a dissertation, and then to present it to the practical group in the "Additional selected chapters on the applications of fluid engineering in building engineering and process engineering". The content and form requirements and evaluation principles of the project dissertation to be prepared, as well as the presentation, are included in the terms of reference. Maximum score: 15.

3. Mid-term assessment

type: formative assessment, point-in-time personal act

count: 1

purpose, description: Aim: a series of creative problem-solving industry case studies developed in a small group in collaboration with the instructor, and a series of questionnaires documenting it. This is an examination of the existence of learning outcomes belonging to the competence group of skill, attitude, autonomy and responsibility. Topic: "Fluid measurement; industrial case studies". Rapid decision-making, development of a critical practical approach. Maximum score: 15.

B. Detailed description of assessments performed during the examination period (if relevant)

Elements of the exam:

1. written partial exam

-

2. oral partial exam

-

3. practical partial exam

-

4. inclusion of mid-term results

-

3.3 The weight of mid-term assessments in signing or in final grading

identifier	weight
1 . Mid-term assessment	70 %
2 . Mid-term assessment	15 %
3 . Mid-term assessment	15 %

3.4 The weight of partial exams in grade (if relevant)

type	weight
written partial exam	0 %
oral partial exam	0 %
practical partial exam	0 %
inclusion of mid-term results	0 %

3.5 Determination of the grade

grade ● [ECTS]	the grade expressed in percents
very good(5) ● Excellent [A]	above 90%
very good(5) ● Very Good [B]	85% .. 90%
good(4) ● Good [C]	70% .. 85%
satisfactory(3) ● Satisfactory [D]	55% .. 70%
sufficient(2) ● Pass [E]	40% .. 55%
insufficient(1) ● Fail [F]	below 40%

The lower limit specified for each grade already belongs to that grade.

3.6 Attendance and participation requirements

Must be present at at least **70%** (rounded down) of lectures.

At least **70%** the exercises (rounded down) must be actively attended.

3.7 Special rules for improving, retaken and replacement

The special rules for improving, retaken and replacement shall be interpreted and applied in conjunction with the general rules of the CoS (TVSZ).

Need mid-term assessment to individually complete?

yes

Can the submitted and accepted partial performance assessments be resubmitted until the end of the replacement period in order to achieve better results?

NO

The way of retaking or improving a summary assessment for the first time:

each summative assessment can be retaken or improved

Is the retaking-improving of a summary assessment allowed, and if so, than which form:

retake or grade-improving exam not possible

Taking into account the previous result in case of improvement, retaken-improvement:

new result overrides previous result

The way of retaking or improving a partial assessment for the first time:

partial assesment(s) in this group cannot be improved or repeated, the final result is assessed in accordance with Code of Studied 122. § (6)

3.8 Study work required to complete the course

Activity	**hours / semester**
participation in contact classes	42
mid-term preparation for practices	7
preparation for summary assessments	32
elaboration of a partial assessment task	30
additional time required to complete the subject	15
summary	**126**

3.9. Validity of subject requirements

Start of validity: 2021. April 26.

End of validity: 2024. December 31.

4. ADDITIONAL INFORMATION

4.1 Primary course

The primary (main) course of the subject in which it is advertised and to which the competencies are related:

mechanical engineering

4.2 Link to the purpose and (special) compensations of the Regulation KKK

This course aims to improve the following competencies defined in the Regulation KKK>

a) knowledge

- Student is familiar with the general and specific mathematical, scientific and social principles, rules, contexts and procedures needed to operate in the field of engineering.

b) ability

- Student has the ability to apply the general and specific mathematical, scientific and social principles, rules, relationships and procedures acquired in solving problems in the field of engineering.

c) attitude

- Student is open and receptive to learning, embracing and authentically communicating professional, technological development and innovation in engineering.

d) independence and responsibility

- Student shares her acquired knowledge and experience through formal, non-formal and informal information transfer with those in her field.

4.3 Prerequisites for completing the course

Knowledge type competencies

(a set of prior knowledge, the existence of which is not obligatory, but greatly facilitates the successful completion of the subject)	-

Ability type competencies

(a set of prior abilities and skills, the existence of which is not obligatory, but greatly contributes to the successful completion of the subject)	-