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)

Industrial Ventilation (PhD) ● Industrial air technology (PhD)

1.2. Neptun code

BMEGEÁT4A21

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	-	-
laboratory exercise	-	-

1.5. Type of assessments (quality evaluation)

exam

1.6. ECTS

3

1.7. Subject coordinator

name:	Vad János Gábor (71958341366)
post:	university professor
contact:	vad@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/BMEGEAT4A21/

1.10. Course language

hungarian

1.11. Primary curriculum type

komplex vizsga tárgycsoport PhD tárgy

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

The aim of the course is to acquire industrial ventilation knowledge and skills based on the studies of applied fluid flow and flow engineering machines in the undergraduate and master's programs, applying flow engineering knowledge in a way tailored to the doctoral program, developing it creatively and practically, taking into account research aspects, especially short-, medium- and long-term engineering and industrial applicability and utilization of research results.

2.2. Learning outcomes

Competences that can be acquired by completing the course:

A. Knowledge

- The student is familiar with the motives and basic knowledge of his / her own doctoral research program: industrial air technology (embedded in technological processes), gas working fluid flow machines.
- The student is familiar with the connection points of industrial ventilation research aspects with other disciplines related to doctoral research (eg acoustics).
- Based on his engineering approach, the student knows the practical aspects of the expected results of doctoral research, their applicability in technological processes affected by industrial ventilation.
- Based on his engineering approach, the student is informed about the engineering and industrial applications of the expected results of the doctoral research.
- The student is basically informed about the aeronautical motifs of the other doctoral programs cared for within the Doctoral School, and about the aspects of flow technology rotating machines, based on the information provided by his / her peers.
- The student identifies the characteristics of the current state of the art ("State of the Art") in the field of industrial ventilation and gas transport rotary machines.
- The student is informed about the basic criteria for the presentation of research results related to industrial ventilation.
- The student is aware of the basic connections and mathematical descriptive equations of industrial ventilation, with special regard to the cooperation between the applied machines and the system and technological process served.
- The student is aware of the basic principles of measurement technology used in industrial ventilation technology.
- The student is aware of the basic principles of mathematical modeling typical of industrial ventilation, which have become established in research.

B. Ability

- Use the concepts of subject and research topic area.
- Analyzes the available domestic and international literature sources in the field.

- It interprets the characteristics of the flow processes characteristic of the research topic area and the factors influencing them.
- Able to derive and calculate quantities related to the subject and research topic specific to the field of industrial ventilation and rotary machinery.
- It identifies the parameters related to the subject and the research topic, which are characteristic of the field of industrial ventilation, and the possibilities of their theoretical and practical modification.
- Apply physical modeling knowledge related to the subject and its research topic, which is important in the field of industrial ventilation.
- Apply flow-related mathematical modeling knowledge related to the subject and its research topic, which is important in the field of industrial ventilation.
- Is able to formulate key questions related to the subject and his / her research topic, related to important factors, parameters, physical characteristics in the field of industrial ventilation, important for modeling.
- Selects the appropriate methods for the specific ventilation problem.
- Outlines the current engineering solutions, key theoretical issues and state-of-the-art practical solutions of the subject and the research topic area.

C. Attitude

- He constantly monitors his work, results and conclusions.
- It expands your knowledge of industrial ventilation by continuously acquiring knowledge.
- Open to the use of information technology tools.
- It seeks to learn about and routinely use the tools needed to solve ventilation problems.
- It develops your ability to provide accurate and error-free problem solving, engineering precision and accuracy.
- It strives for demanding engineering work and makes a decision based on careful consideration.
- It monitors changes in the social, economic and political system.
- He publishes his results in accordance with his professional rules.
- It publishes its opinions and views without offending others.

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 a responsibility for the sustainable use of the environment and for present and future generations.
- He is committed to the principles and methods of systematic thinking and problem solving.

2.3. Teaching methodology

A) In the lectures of the subject held at a given time on a weekly basis, the student gives a summary lecture related to the individual research topic of the student. B) The lecturer, in cooperation with the fellow students, raises critical questions, by answering and elaborating in detail the student can deepen the air technical aspects and practical embeddedness of the doctoral research. C) The student conducts a detailed literature search based on the critical questions and develops answers to the critical questions. D) Based on the elaborated answers, the student further develops the previous presentation and presents the improved presentation in dance. E) Based on the improved presentation, the student develops a short essay that, even as an appendix to the future PhD dissertation, strengthens the dissertation from an industrial ventilation perspective. During the solution of individual tasks, within the framework of the lectures or beyond that, consultation is possible.

2.4. Support materials

a) Textbooks

Tamás Lajos: Fundamentals of Fluid Mechanics. (Tamás Lajos, 2015.) ISBN 978 963 12 2885 4.

b) Lecture notes

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c) Online materials

http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEAT4A21/

2.5. Validity of the course description

Start of validity:	2020. February 3.
End of validity:	2024. December 31.

II. SUBJECT REQUIREMENT

3. ACHIEVEMENT CONTROL AND EVALUATION

3.1 General rules

INTERIM PERFORMANCE EVALUATION: a) Presentation 1: summary presentation related to the student's individual research topic. Possible score: max. 20%. b) Presentation 2: an improved summary presentation related to the student's individual research topic, further developed based on the critical questions defined by the instructor. Possible score: max. 30%. EXAMINATION: c) Essay: a 1 ... 5 page written summary essay to be prepared outside the contact hours, which can be mapped in both format and content to the appendix of the future PhD dissertation, according to the needs of the research program. Possible score: max. 50%. At the end of the semester, the result of the exam consists of 2 presentation elements of the mid-year performance evaluation and 1 exam paper.

3.2 Assessment methods

A. Detailed description of mid-term assessments

1. Mid-term assessment

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

count: 1

purpose, description: A presentation lecture to be developed during the semester, linked to the PhD research, which helps to critically raise issues related to the doctoral topic, through theoretical and practical considerations. The aim of the partial achievement is to examine the existence of knowledge, ability, attitude, and learning outcomes belonging to the autonomy and responsibility competence group. Upon successful completion of the task, the student stabilizes and further develops the knowledge acquired before the start of the doctoral program in the field of industrial ventilation.

2. Mid-term assessment

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

count: 1

purpose, description: A presentation lecture to be developed during the semester, linked to the PhD research, which helps to critically raise issues related to the doctoral topic, through theoretical and practical considerations. The aim of the partial achievement is to examine the existence of knowledge, ability, attitude, and learning outcomes belonging to the autonomy and responsibility competence group. Upon successful completion of the task, the student stabilizes and further develops the knowledge acquired before the start of the doctoral program in the field of industrial ventilation. Particular attention should be paid to the development compared to the previous performance appraisal in the presentation, which should answer the critical questions.

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

Elements of the exam:

1. written partial exam

obligation: mandatory (partial) exam unit, failing the unit results in fail (1) exam result

description: Essay: a 1 ... 5 page written summary essay to be prepared outside the contact hours, which can be mapped in both format and content as an appendix to the future PhD dissertation, according to the needs of the research program. In order to develop the written examination task, the students taking the written examination may not use any aids not permitted by the instructor during the written examination and may write their answers only on the official examination sheet issued by the department.

2. oral partial exam

-

3. practical partial exam

-

4. inclusion of mid-term results

obligation: mandatory (partial) exam unit, failing the unit results in fail (1) exam result

description: The method of calculating the result of the mid-year task is as follows: The score that can be given for the presentation 1 summary presentation: max. 20%, the score for the presentation 2 improved summary presentation: max. 30%. The score obtained on these is 50% of the exam ticket. The elaboration of the mid-year task and its presentation in the form of presentations is a precondition for being eligible for the exam, so it is one of the preconditions for a successful exam. Beyond these, there is no other way to credit the mid-year assignment result to an exam ticket.

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

identifier	**weight**
1 . Mid-term assessment	40 %
2 . Mid-term assessment	60 %

The condition for signing is that the score obtained in the mid-year assessments is at least **40%**.

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

type	**weight**
written partial exam	50 %
oral partial exam	0 %
practical partial exam	0 %
inclusion of mid-term results	50 %

3.5 Determination of the grade

grade ● [ECTS]	**the grade expressed in percents**
very good(5) ● Excellent [A]	above 95%
very good(5) ● Very Good [B]	85% .. 95%
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.

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).

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 can be improved or repeated once up to the end of the repeat period

3.8 Study work required to complete the course

Activity	**hours / semester**
participation in contact classes	28
exam preparation	21
additional time required to complete the subject	41
summary	**90**

3.9. Validity of subject requirements

Start of validity: 2020. February 15.

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_sciences_PhD_programme

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

b) ability

c) attitude

d) independence and responsibility

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)	BSc and MSc level flow theory and flow engineering theory; knowledge of physical and numerical modeling of flows; comprehensive knowledge of the design, conduct and evaluation of flow simulation studies.

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)	Independent, creative engineering problem-solving ability, the ability to recognize and analyze the essential connections between complex flow phenomena and flow engineering processes.