



subject of PhD studies

Géza Pattantyús-Ábrahám  
Doctoral School of Mechanical Engineering

## SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 20<sup>th</sup> May 2016

### ENVIRONMENTAL TECHNOLOGY II. (PhD)

### KÖRNYEZETTECHNIKA II. (PhD)

1	Code	Semester Nr. or fall/spring	Contact hours/week (lect.+semin.+lab.)	Requirements p / e / s	Credit	Language
	BMEGEÁT4A15	1.(2.*) fall/spring	2+0+0	e	3	English

\*: in case of enrolment in fall

2. Subject's responsible:

Name:	Title:	Affiliation (Department):
Prof. János VAD	professor, head	Dept. of Fluid Mechanics

3. Lecturer:

Name:	Title:	Affiliation (Department):
Prof. Mihály PARTI	ret. professor	Dept. of Fluid Mechanics
Dr. Jenő M. SUDA	assistant professor	Dept. of Fluid Mechanics

4. Thematic background of the subject:

physics, fluid dynamics, environmental protection

5. Compulsory / suggested prerequisites:

Compulsory: -

Suggested: -

6. Main aims and objectives, learning outcomes of the subject:

The course aims to introduce students to the PhD-level areas of environmental technology, according to the individual doctoral research topic and interest, with respect to the following (ch.8.) thematic description, in consultation with the lecturer.

7. Method of education:

lecture 2h/w, and private consultation

8. Detailed thematic description of the subject:

Student may select among A, B or C part according to the research topic of the PhD.

A: Treatment of gaseous components: Absorption, equilibrium, equilibrium curve. Selection of solvent. Material balances, operating line, minimum liquid-gas ratio. Flow sheet for sulphur dioxide absorption. Adsorption, equilibrium, adsorbents, adsorption plant, packed beds, regeneration of adsorbents. Application of adsorption. Chemical waste gas treatment. Decreasing nitrogen-oxides content. Gas diffusion and membrane contactors. Advantages and disadvantages.

B: Particle removal from gases: Aerosols. Particle dynamics. Momentum equation for particles in gas flow. Mass balance of a separator, overall efficiency, penetration, fractional efficiency. Mean particle concentration,



measurement of particle concentration, sampling process. Particle removal from gases: main forces/effects. Settling chambers or pre-separator louvers, Venturi-scrubbers, cyclones, electrostatic precipitators, depth/surface filters.

C: Waste Water Treatment: Wastewater characteristics, pre-treatment (primary, secondary, tertiary treatment). Primary separation or clarification wastewater treatment techniques. Physical-chemical wastewater treatment techniques. Biological treatment techniques for biodegradable waste water. Wastewater sludge treatment techniques, sludge disposal..

9. Requirements and grading

a) in term-period

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b) in examination period

Written and/or oral exam. Totally max. achievable 100 scores equal to 100% as base of the final grading. Minimum 40 %.

Grading: 0%-39%: fail(1); 40%-54% pass(2), 55%-69%: satisfactory (3), 70%-84%: good(4), 85%-100%: excellent (5)

c) The students are subject to disciplinary measures against the application of unauthorized means at mid-terms, term-end exams and homework and the application of the 1/2013. (I.30.) Dean's Order must be followed.

10. Retake and repeat

Due to the Code of Studies and Exams of BME. Any further movements are due to the Code of Studies and Exams of BME.

11. Consulting opportunities:

Consultation hours: by email appointments and as it is indicated on the department's website.

12. Reference literature (compulsory, recommended):

- Downloadable materials: [www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEAT4A15](http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEAT4A15)

13. Home study required to pass the subject:

Contact hours	28	h/semester
Home study for the courses	28	h/semester
Home study for the mid-semester checks	-	h/check
Preparation of mid-semester homework	-	h/homework
Home study of the allotted written notes	20	h/semester
Home study for the exam	28	h/semester
Totally:	90	h/semester

14. The data sheet and the requirements are prepared by:

Name:	Title:	Affiliation (Department):
Prof. Mihály PARTI	ret. professor	Dept. of Fluid Mechanics

