SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 5th December 2013

BUILDING AERODYNAMICS

ÉPÜLET AERODINAMIKA

1	Code	Semester Nr. or fall/spring	Contact hours/week (lect.+semin.+lab.)	Requirements p / e / s	Credit	Language
	BMEGEÁTMW08	**4.(3.)fall**	**2+0+1**	**p**	**3**	**English**

2. Subject's responsible:

Name:	Title:	Affiliation (Department):
Dr. Jenő Miklós SUDA	assistant professor	Dept. of Fluid Mechanics

3. Lecturer:

Name:	Title:	Affiliation (Department):
Prof. Tamás LAJOS	professor	Dept. of Fluid Mechanics
Márton BALCZÓ	assistant professor	Dept. of Fluid Mechanics
Miklós BALOGH	assistant professor	Dept. of Fluid Mechanics
Gergely SZABÓ	invited lecturer	Pont-Terv Zrt.
Péter SEBESTYÉN	invited lecturer	Telenor Magyarország Zrt.
Gabriella FLÓRI	invited lecturer	Span Systems International Inc.
Dr. Máté Márton LOHÁSZ	invited lecturer	GEA EGI Co. Ltd.

4. Thematic background of the subject: Basics of Fluid Mechanics

5. Compulsory / suggested prerequisites:
Compulsory:-
Suggested: -

6. Main aims and objectives, learning outcomes of the subject: To extend the knowledge in Aerodynamics in general and in Building Aerodynamics and transport of pollutants in particular as well as to contribute to development of skills of students in practical use of theoretical knowledge.

7. Method of education: lecture 2h/w, seminar 0h/w, laboratory 1h/w. Lectures and project work including literature survey or wind tunnel measurements or numerical simulation of problems in building and environmental aerodynamics. Special focus is laid on industrial case studies.

8. Detailed thematic description of the subject:

- Basics of meteorology: characteristics of atmospheric boundary layer and its modelling.

- Arising of wind forces, bluff-body aerodynamics: boundary layer separation, characteristics of separated flows, vortices, their effects on the flow description of complex 3-dimensional flow fields.
- Wind comfort, dispersion of pollutants in urban environment / Numerical simulation of dispersion of pollutants in urban environment by using MISKAM code
- Numerical simulation of dispersion of pollutants in urban environment using the MISKAM code
- Usage of wind tunnels in determination of wind loading
- Flow visualization around buildings in wind tunnel
- Static wind load on buildings and structures, prediction of static wind load by using EUROCODE and ASCE standards. Fundamentals and philosophy.
- Wind and structure interaction, aero-elasticity. Aerodynamics of bridges, prediction of dynamic wind load on buildings, structures by using EUROCODE, basics of numerical simulation using solid-fluid interaction
- Design of cooling towers. Design and wind load of water spheres
- Wind load on telecommunication masts - aerodynamic and related design issues, developments
- Aerodynamics of membrane structures
- CFD and wind tunnel case studies (large buildings, stadium roofs)

9. Requirements and grading

a) in term-period

Successful accomplishment of 2 mid-term exams during the semester and a report (worked out in frame of a project, based on a literature survey and/or laboratory measurement and/or numerical simulation of flow. Projects should be presented at the end of semester.

mid-term exam 1. 8th week max.30points (min.40% =min.12points) 30% in final grade

mid-term exam 2. 14th week max.30points (min.40% =min.12points) 30% in final grade

project presentation and report 12th week max.40points (min.40% =min.16points) 40% in final grade

Totally max. achievable 100 points equal to 100% as base of the final grading. Minimum 40 points (=40%) obtained out of the parts, for each item separately is obligatory.

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

b) in examination period

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.

11. Consulting opportunities:

Consultation hours: by email appointments and as it is indicated on the department's website. Selected extra seminars serve as consulting opportunity for the project work.

12. Reference literature (compulsory, recommended):

- Books:
  - Simiu, E. & Scanlan, RH.: Wind Effects on Structures: Fundamentals and Applications to Design, Wiley-Interscience, 1996
  - Lawson, T.: Building Aerodynamics, ISBN 1-86094-187-7, Imperial College Press, 2001
- Lecture notes, hand-outs
- Downloadable materials: www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATMW08

13. Home study required to pass the subject:

Contact hours	42	h/semester
Home study for the courses	14	h/semester
Home study for the mid-semester checks	6	h/check
Preparation of mid-semester homework	15	h/homework
Home study of the allotted written notes	7	h/semester
Home study for the exam	-	h/semester
Totally:	**90**	**h/semester**

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

Name:	Title:	Affiliation (Department):
Prof. Tamás LAJOS	professor	Dept. of Fluid Mechanics

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