Tantárgy adatlap és követelményrendszer | Subject data sheet and requirements

2009.01.05.

Budapesti Műszaki és Gazdaságtudományi Egyetem
Gépészmérnöki Kar
Áramlástan Tanszék
Mechanical Engineering Modelling (MSc)
Fluid Mechanics major (MSc)

Budapest University of Technology and Economics
Faculty of Mechanical Engineering
Department of Fluid Mechanics
Mechanical Engineering Modelling (MSc)
Fluid Mechanics major (MSc)

Advanced Fluid Mechanics
(Az áramlástan válogatott fejezetei)

1.	*Code (kód)*	*Semester (szemeszter)*	*Requirements (követelmények)*	*Credit (kredit)*	*Language (nyelv)*
	BMEGEÁTMW01	1.	lect./sem./lab. (**e**xam / **p**ract. / **s**ignat.) 3/0/0 (e)	4	English

2. Responsible person and Department (Tantárgyfelelős személy és Tanszék):

Name (név):	*Status (beosztás):*	*Department (tanszék):*
Dr. Gergely KRISTÓF	associate professor	Dept. Fluid Mechanics

3. Lecturer (A tantárgy előadója):

Name (név):	*Status (beosztás):*	*Department (tanszék):*
Dr. Gergely KRISTÓF	associate professor	Dept. Fluid Mechanics

4. Thematic background of the subject (A tantárgy az alábbi témakörök ismeretére épít):

Fluid mechanics

5. Compulsory / suggested pre-requisites (Kötelező/ajánlott előtanulmányi rend):

	Subject name (tárgynév)	*Code (tárgykód)*
Compulsory pre-requisites:	-	-
Suggested pre-requisites:	Fluid mechanics	BMEGEÁTAG01 or BMEGEÁTAE01 or BMEGEÁTAM01 or BMEGEÁTMF03

6. Main objectives of the subject (A tantárgy célkitűzései):

Understanding the physical phenomena occurring in various flow categories of technical relevance.
Practical knowledge in analyzing flow phenomena.

7. Detailed thematic description of the subject (A tantárgy részletes tematikája):

1. Overview of the fundaments of fluid mechanics. Vorticity transport equation.
2. Potential flows, solution methods based on analytical solutions.
3. Percolation, Darcy flow. Wells.
4. Boundary layers. Similarity solutions for laminar and turbulent boundary layers.
5. Transition. Turbulent boundary leyers. BL control.
6. Overview of computational fluid dynamics (CFD). Turbulence models.
7. Fundaments of gas dynamics. Wave phenomena. Izentropic flow.
8. Normal shock waves.
9. Oblique shock waves, wave reflection. Prandtl-Meyer expansion, Supersonic jets.
10. Atmospheric flows.
11. Aerosoils.
12. Aeroacoustics.
13. Pipe networks.
14. Case studies.

8. Mode of education of the subject (A tantárgy oktatásának módja):

Theoretical lectures with quantitative analyses of practical problems.

9. Requirements (Követelmények):

Written examination.

%	Mark
0-39	1
40-54	2
55-69	3
70-84	4
85-100	5

10. Consulting opportunities (Konzultációs lehetőségek):

Weekly consulting hours will be provided. The consultation time can be enquired at the department administration after the registration week of the active semester.

11. Reference literature (Jegyzet, tankönyv, felhasználható irodalom):

– Website of the subject: http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATMW01

– Lecture handouts.

For further reference:
– Lamb, H.: Hydrodynamics, 1932.
– Schlichting, H.: Boundary Layer Theory, 1955.
– Shapiro A. H: The Dynamics and Thermodynamics of Compressible Fluid Flow, 1953.
– Streeter V. L, Wylie E. B: Fluid Mechanics, McGraw-Hill, 1975.
– Ferziger, J. H. & Peric, M,: Computational Methods for Fluid Dynamics, Springer, ISBN 3-540-42074-6, 2002.

12. Home study required to pass the subject (A tantárgy elvégzéséhez szükséges tanulmányi munka):

Estimated time for home studies: 2 hours/week.

13. The data sheet and the requirements are prepared by (A tantárgy tematikáját kidolgozta):

Budapest, 5th of January 2009

Name (név):	*Status (beosztás):*	*Department (Tanszék):*
Dr. Gergely KRISTÓF	associate professor	Dept. Fluid Mechanics