

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)

SUBJECT DATA SHEET AND REQUIREMENTS
(TANTÁRGY ADATLAP ÉS TANTÁRGYKÖVETELMÉNYEK)
Last modified / Utolsó módosítás: 2011.07.19.

Aerodynamics and its Application for Vehicles (Aerodinamika és alkalmazása járművekre)

<i>I.</i>	<i>Code (kód)</i>	<i>Semester (szemeszter)</i>	<i>Requirements (követelmények)</i>	<i>Credit (kredit)</i>	<i>Language (nyelv)</i>
	BMEGEÁTMW09	4.	lect./sem./lab. (exam / pract. / signat.) 2/0/0 (p)	3	English (angol)

2. Responsible person and department (A tantárgyfelelős személy és tanszék):

<i>Name (név):</i>	<i>Status (beosztás):</i>	<i>Department (tanszék):</i>
Prof. Tamás LAJOS	professor	Dept. Fluid Mechanics

3. Lecturer (A tantárgy előadója):

<i>Name (név):</i>	<i>Status (beosztás):</i>	<i>Department (tanszék):</i>
Prof. Tamás LAJOS	professor	Dept. Fluid Mechanics
Eszter LUKÁCS	research fellow	Dept. Fluid Mechanics

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

Basics of Fluid Mechanics

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

	<i>Subject name (tárgynév)</i>	<i>Code (tárgykód)</i>
Compulsory pre-requisites:	-	-
Suggested pre-requisites:	-	-

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

To extend the knowledge of students in Aerodynamics in general and in Vehicle Aerodynamics in particular as well as to contribute to development of skills of students in practical use of theoretical knowledge.

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

Streamlined body aerodynamics: theory of airfoils, streamlined bodies of revolution, streamlined bodies of finite extension. Compressibility effects, flows with variable air density. Impact of aerodynamics on aircrafts at subsonic and supersonic speeds.

Bluff body aerodynamics: boundary layer separation, characteristics of separated flows, vortices, their effects on the flow and their detection techniques, description of complex 3-dimensional flow fields. Principles of aerodynamic design and optimization of passenger car bodies, trucks and buses.

Basics of flow control: control techniques without flow separation (turbulators, boundary layer blow down and suction), and with flow separation (high lift devices, vortex generators, winglets). STOL aircraft, delta wing aircraft, Formula 1 race car aerodynamics

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

Lectures and a visit of wind tunnel laboratory, individual work on a project

9. Requirements (Követelmények):

Successful accomplishment of 2 mid-term exams (7. and 14. week) and a report (worked out in frame of an individual project, based on a literature survey and numerical simulation and/or measurement) during the semester.

10. Consulting opportunities (Konzultációs lehetőségek):

Lecturer of the subject is available weekly in a defined time.

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

– Website of the subject: <http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATMW09>

1. A.M. Keuthe, C-Y Chow: Foundations of Aerodynamics. John Wiley & Sons, Inc. 1998. ISBN 0-471-12919-4
2. W. H. Hucho: Aerodynamik des Automobils. Springer-Verlag, 1999. ISBN: 3-540-62160-1
3. T. Lajos: Az áramlástan alapjai (2008) ISBN: 9789630663823
4. Web page: www.aerodyn.org
5. Web page: <http://www.aeromech.usyd.edu.au/aero/aerodyn.html>

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

2×10 hours preparation for 2 mid-term exams and 20 hours work to prepare the study

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

<i>Name (név):</i>	<i>Status (beosztás):</i>	<i>Department (Tanszék):</i>
Prof. Tamás LAJOS	professor	Dept. Fluid Mechanics