SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 5th December 2013

ADVANCED TECHNICAL ACOUSTICS AND MEASUREMENT TECHNIQUES

ALKALMAZOTT MŰSZAKI AKUSZTIKA ÉS MÉRÉSI MÓDSZEREK

1	Code	Semester Nr. or fall/spring	Contact hours/week (lect.+semin.+lab.)	Requirements p / e / s	Credit	Language
	BMEGEÁTMW10	4.(3.*)fall	2+0+0	p	3	English

*: in case of enrolment in fall

2. Subject's responsible:

Name:	Title:	Affiliation (Department):
Dr. János VAD	associate professor	Dept. of Fluid Mechanics

3. Lecturer:

Name:	Title:	Affiliation (Department):
Dr. Gábor KOSCSÓ	hon. associate professor	Dept. of Fluid Mechanics

4. Thematic background of the subject: Mathematics, Mechanics, Fluid Mechanics

5. Compulsory / suggested prerequisites:
Compulsory: -
Suggested: Technical Acoustics and Noise Control (BSc level) BMEGEÁTAG05, -AG15

6. Main aims and objectives, learning outcomes of the subject:
Presentation of acoustic design and measurement methods, common in the engineering practise.

7. Method of education: lecture 2h/w, seminar 0h/w, laboratory 0h/w. The theory and solved problems will be presented at the lectures, extra visit to the acoustic laboratory.

8. Detailed thematic description of the subject:
1. 3D homogeneous wave equation and the general solution
2. The 3D solution of the wave equation in bounded space, room modes.
3. The sound propagation in tubes, the sudden cross-sectional area change and tube termination.
4. The simple expansion chamber silencer, and the sound propagation in horns.
5. **1st mid-term test**. Sound propagation in duct and higher order modes.
6. The ray theory, sound propagation in non-homogeneous media.
7. Spherical waves, and the point monopole, dipole and quadrupole sound sources, model laws.
8. The flow generated sound, Lighthill's acoustic analogy and the inhomogeneous wave equation.
9. The attenuation of sound waves.
10. **2nd mid-term test**. Acoustic measurements, microphones, analysers, calibrators.
11. Anechoic and reverberating chambers.
12. Basic acoustic measurement problems.
13. The sound intensity measurement, the microphone array.

Budapest University of Technology and Economics
Faculty of Mechanical Engineering
Department of Fluid Mechanics

Hungary, 1111 Budapest, Bertalan L. u. 4-6.
Telefon: (36-1) 463-4072 Fax: (36-1) 463-3464
http://www.ara.bme.hu

14. **3rd mid-term test**.

9. Requirements and grading

a) in term-period:

Attending the lectures, and acquiring at least a passing grade on the 3 mid-term tests. The 1st and 2nd mid-term test contain 10 minutes length written exams, the 3rd mid-term test contains a 100 minutes length written exam, and, depending on the Department's opinion, oral part. The maximum score at the 1st and 2nd mid-term test is for max.5 + max.5 points, and at the 3rd mid-term test is for max. 90 points. The result of the oral part is "pass" or "fail", and optionally maximum 15 extra points. The total test result will be the sum of the points of the 1st, 2nd and 3rd mid-term tests, and the oral examination point.

Totally maximum achievable 100 points equal to 100% as base of the final grading.

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

In a case of a failed mid-term tests, the students can repeat the test on the 15th week (week for retakes). The retake test will contain a 120 minutes length written exam (for max. 100 points), and, depending on the Department's opinion, oral part ("pass" with optional max. 15 extra points, or "fail").

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):

- Books:

A.P. Dowling, J.E.Foowcs Williams: Sound and Sources of Sound, Ellis Horwood Limited, 1983, ISBN 0-85312-400-0

Leo L. Beranek: Noise and Vibration Control, Institute of Noise Control Engineering, 1988, ISBN 0-9622072-0-9

- Downloadable materials: www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATMW10

13. The approximate home study required to pass the subject:

Contact hours	28	h/semester
Home study for the courses	14	h/semester
Home study for the mid-semester checks	5,5,38	h/check
Preparation of mid-semester homework	-	h/homework
Home study of the allotted written notes	-	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):
Dr. Gábor KOSCSÓ	hon. associate professor	Dept. of Fluid Mechanics

Budapest University of Technology and Economics
Faculty of Mechanical Engineering
Department of Fluid Mechanics

Hungary, 1111 Budapest, Bertalan L. u. 4-6.
Telefon: (36-1) 463-4072. Fax: (36-1) 463-3464
http://www.ara.bme.hu