Basic Hydraulics - BMEEOVVPRE5

I. Subject Specification

1. Basic Data

1.1 Title

Basic Hydraulics

1.2 Code

BMEEOVVPRE5

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Midterm grade

1.6 Credits

0

1.7 Coordinator

name	Dr. Kálmán Gábor Szabó
academic rank	Associate professor
email	szabo.gabor@emk.bme.hu

1.8 Department

Department of Hydraulic and Water Resources Engineering

1.9 Website

https://epito.bme.hu/BMEEOVVPRE5
https://fiek2.mywire.org/course/view.php?id=654

1.10 Language of instruction

english

1.11 Curriculum requirements

Compulsory in Civil Engineering (Pre-engineering) programme

1.12 Prerequisites

1.13 Effective date

5 February 2020

2. Objectives and learning outcomes

2.1 Objectives

One objective of this class is to review/refresh some parts of the Hungarian grammar school physics curriculum for prospective civil engineering BSc students arriving from foreign coun-tries. The material concentrates specifically on crucial basic knowledge and skills which are in-dispensable for successfully studying Hydraulics andHydrologyand partly supports and so-lidifies the background knowledge of the students in basic mechanics in preparation for later subjects ofStatics, Dynamics, Strength of Materials etc.Besides the core knowledge of these selected topics in grammar school physics anotherobjec-tive is to develop certain skills necessary for the BSc studies and for good engineering practice. These include systematicandprecise work,proper usage of significant digits, systematic use of units in calculations, interpretation of tables and diagrams.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. understandsthe conceptof state of phase of continuous materials,
2. understandsthe physical quantities of density, specific volume, specific weight and specific grav-ity,
3. understandsrelative and absolute uncertainty, measurement error and the propagation of uncer-tainty in calculations,
4. understands the concept of pressure,
5. knows Pascal's Lawand the law of connected vessels,
6. is able to determine hydrostatic pressure at any given point of a liquid,
7. knows the lawsof Archimedes,TorricelliandBernoulli,
8. familiar with the SI units of the quantities involved in fluid mechanics.

B. Skills

1. properuse of units in calculations,
2. improved ability to identify the known input, the required output in simpler problems, to find the connection that relates them,
3. formulation of a problem in terms of equations,
4. setting up strategies to solve a set of equations,
5. proper use of units in calculations,
6. methods to identify mistakes, errors, omissions early in the process of problem solvingand calcu-lations,
7. ability to denote and interpret the uncertainty of quantities,
8. ability to keep control over the uncertainty throughout the whole process of calculations,
9. improved ability to interpret tables and diagrams.

C. Attitudes

1. regular and punctual attendance to classes,
2. attention and active positive participation during classes,
3. general curiosity and motivation to understand how systems work,
4. attempts to understand more and more apparatuses and methodsof problem solving,
5. diligence to master their efficient useby individual work and practice,
6. eagerness to use criticism for improvement,
7. attempts to be precise and careful,
8. desireto clarify his/her logic, reasoning, procedure and results.

D. Autonomy and Responsibility

1. tendency to carry out good quality work,
2. willingness for self-checking and critical analysis of his/her own work,
3. helpfulness toward fellow students.

2.3 Methods

Lectures and problem solving practices with detailed explanation, occasionally joint discussion of homework.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Measurementand notation of physical quantitiesand their uncertainties.
2.	Propagation of uncertainty.
3.	Solids, liquids and gases. Measuring the amount of materials.
4.	Weight, mass and volume of objects. Density, specific volume, specific weight, specific gravity.
5.	Problem solving.
6.	Problem solving.
7.	Midterm test 1.
8.	Equilibrium of liquids in containers. Pressure forces and pressure; mean pressure and local pressure.
9.	Equilibrium inside a static liquid. Static pressure. Pascal’s law.
10.	Connected vessels. U-tube manometers.Barometer.
11.	Flotation. Law of Archimedes.Problem solving.
12.	Flow of fluids. Discharge and flow velocity. Torricelli’s law.
13.	Bernoulli’s law. Problem solving.
14.	Midterm test 2.

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

As listed on the course website

2.6 Other information

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2.7 Consultation

The instructorisavailablefor consultation during hisoffice hours, as advertised on the depart-ment website.

This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

The assessment of the learning outcomes (c.f.2.2. above)viatwomidtermtests.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
midterm test1	ZH1	A.1-A.3, A.8; B.1-B.9; C.1-C.8; D.1-D.3
midterm test2	ZH2	A.4-A.8; B.1-B.9; C.1-C.8; D.1-D.3

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Abbreviation	Score
ZH1	50%
ZH2	50%
Sum	**100%**

3.4 Requirements and validity of signature

Not applicable.

3.5 Grading system

If the student has passed both retake tests, then his/her test scores are added and the final grades are determined as follows:

Grade	Points (P)
excellent (5)	80<=P
good (4)	70<=P<80%
satisfactory (3)	60<=P<70%
passed (2)	40<=P<60%
failed (1)	P<40%

3.6 Retake and repeat

1. Both midterm tests can be retaken once, usually in the retake week.
2. Better score on the retake testoverwrites the original test result, if any.

3.7 Estimated workload

Activity	Hours/semester
contact hours	14×2=28
homework and preparation for class	11×2=22

preparation for the tests	2×4=8
home studying of written material	2
Sum	**60**

3.8 Effective date

5 February 2020

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