SUBJECT DATASHEET

I. SUBJECT SPECIFICATION

1 BASIC DATA

1.1 Title

BASIC HYDRAULICS

1.2 Code

BMEEOVVPRE5

1.3 Type

Module with/without associated contact hours

1.4 Contact hours

type	hours/week
lectures/classes	2

1.5 Evaluation

midterm grade

1.6 Credits

0

1.7 Coordinator

name: K. G. Szabó
academic rank: associate professor
email: szabo.gabor@epito.bme.hu

1.8 Department

Department of Hydraulic and Water Resources Engineering
(vit.bme.hu/node/1252?language=en)

1.9 Website

edu.epito.bme.hu/course/view.php?id=654&lang=en

1.10 Language of instruction

English

1.11 Curriculum requirements

Compulsory in Civil Engineering (Pre-engineering) programme

1.12 Prerequisites

Required parallel subjects (that need to be registered in the same semester)

Basic Mathematics II. (BMETETOPB23)

Basic Mechanics (BMEEOTMPRE3)

1.13 Effective date

February 1, 2019.

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 countries. The material concentrates specifically on crucial basic knowledge and skills which are indispensable for successfully studying Hydraulics and Hydrology and partly supports and solidifies the background knowledge of the students in basic mechanics in preparation for later subjects of Statics, Dynamics, Strength of Materials etc.

Besides the core knowledge of these selected topics in grammar school physics another objective is to develop certain skills necessary for the BSc studies and for good engineering practice. These include systematic and precise 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. understands the concept of state of phase of continuous materials,
   2. understands the physical quantities of density, specific volume, specific weight and specific gravity,
   3. understands relative and absolute uncertainty, measurement error and the propagation of uncertainty in calculations,
   4. understands the concept of pressure,
   5. knows Pascal's Law and the law of connected vessels,
   6. is able to determine hydrostatic pressure at any given point of a liquid,
   7. knows the laws of Archimedes, Torricelli and Bernoulli,
   8. familiar with the SI units of the quantities involved in fluid mechanics.

B. Skills
   1. proper use 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 solving and calculations,
   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 methods of problem solving,
   5. diligence to master their efficient use by individual work and practice,
   6. eagerness to use criticism for improvement,
   7. attempts to be precise and careful,
   8. desire to 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.	Measurement and notation of physical quantities and 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 material

As listed on the course website

2.6 Other information

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2.7 Consultation

The instructor is available for consultation during his office hours, as advertised on the department website.

II. SUBJECT REQUIREMENTS

3 ASSESSEMENT AND EVALUATION OF THE LEARNING OUTCOMES

3.1 General rules

The assessment of the learning outcomes (c.f. 2.2. above) via two midterm tests.

3.2 Assessment methods

Evaluation form	abbrev.	**assessed learning outcomes**
midterm test 1	ZH1	A.1–3,A.8; B.1–9;C7–8;D1–2
midterm test 2	ZH2	A.4–8; B.1–9;C7–8;D1–2.

The dates of midterm tests can be found in the detailed course schedule on the course website.

3.3 Evaluation system

abbreviation	**score**
ZH1	50%
ZH2	50%
Sum	**100%**

A midterm test is unsuccessful if the student cannot solve at least 40% of the problems correctly. One needs to pass both tests to pass the course.

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 test overwrites 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
Total	**60**

3.8 Effective date

February 1, 2019.