

## Tárgytematika / Course Description

### Hydrology

EKNB\_KETA024

Tárgyfelelős neve /

Teacher's name: dr. Bene Katalin

Félév / Semester: 2022/23/2

Beszámolási forma /

Assesment: Vizsga

Tárgy heti óraszám /

Teaching hours(week): 1/2/0

Tárgy féléves óraszám /

Teaching hours(sem.): 0/0/0

### OKTATÁS CÉLJA / AIM OF THE COURSE

The course is an introduction to the science of hydrology, focusing on the field of technical hydrology. In technical hydrology, we deal in detail with the elements of the hydrological cycle (precipitation, evaporation, runoff) and the basic hydrometeorological phenomena. In the field of hydrometry the students learn about the methods of measuring hydrological cycle and hydrometeorological elements. Several methods are used to determine the peak discharge and hydrographs from the catchment area. The dimensioning of detention ponds and water storage reservoirs is part of the class as well. Finally, the classification of the groundwater and the description of water movement follows. The study and statistical characterization of hydrological data will be introduced. The classification of watercourses, the characterization of the water flows in the riverbed, the examination of lakes is studied. Finally, water resource management, water demand, water use, water balance will be discussed.

Goals: After completing the course, the student will be able to understand the following concepts and perform the following tasks:

colors are the minimum requirements for grade (red = 2, green = 3, purple = 4, black = 5)

- Description of the hydrology cycle and the use and calculation of water balance for simple hydrology systems.
- Knowledge of different meteorological elements, calculation of evaporation, humidity.
- Describing the formation of precipitation, knowledge of the types of precipitation and precipitation curves, describing and applying intensity curves.
- To describe the process of infiltration, Horton, to apply uniform, SCS infiltration methods.
- Description of runoff processes, and determination of each element of runoff; rainfall, runoff volume, catchment area,

land cover, time of concentration.

- Calculation of peak flow rate by rational method with one or more watersheds.
- Knowledge of hydrological statistical methods; description of data series, density function, distribution function. Probability of occurrence, interpretation of return time. Risk concept.
- Application and interpretation of distribution functions (normal, lognormal, PearsonIII).
- Description of groundwater systems, knowledge of groundwater types.
- Applying the Darcy equation to describe movement in confined aquifers.
- Knowledge of instruments needed to measure elements of the hydrology cycle.
- Determination of runoff hydrographs using the unit hydrograph method, and Clark unit hydrograph.
- Use of synthetic hydrographs. Applying the SCS method and rational method. Determining unit hydrograph based on measured runoff hydrograph.
- Sizing of reservoirs and detention ponds.
- Characterization of watercourses, and lakes.
- Water management, water resource management components.
- Basics of hydrological modeling.

**3. Students**                  **specialty:**                  **civil**  
  
   **program:**                  **BSc**

**4. Professor**                  **:**                  **dr. Katalin Bene**

Teaching Assistant: Máté Chappon

Faculty: Architecture, Civil Engineering and Transport  
Sciences Department: Transportation Infrastructure and Water resources Engineering

room: C406 / C409

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## TANTÁRGY TARTALMA / DESCRIPTION

### Presentation:

### Practice:

1. week	Introduction, Hydrologic cycle
2. week	Components of hydrologic cycle: Rainfall
3. week	Components of hydrologic cycle: Losses
4. week	Components of hydrologic cycle: Runoff
5. week	Hydrographs
6. week	Hydrograph
7. week	Statistics
8. week	Statistics

9. week	Peak Flow
10. week	Hec HMS
11. week	Detention ponds, and reservoir design
12. week	Groundwater movement
13. week	Application of Darcy-s law
14. week	Hydrometry

**Office hours:** Tuesday, Wednesday 9-12, or ask for appointment.

## 6. Academic dishonesty

A student who submits the work of another student as her/his own or deliberately fails to properly credit words or ideas borrowed from another source is guilty of plagiarism. A student who uses notes without permission, takes an exam for another student, copies answer from another student's exam, copies drawings in any manner, or engages in any other similar conduct aimed at making false representation with respect to a student's academic performance is guilty of cheating.

## 7. Appropriate use of electronic information resources

Users shall be responsible for messages they transmit through the Internet and shall obey the acceptable use policies of the Internet and any rules of discussion forums in which they participate.

Study materials, homeworks, quizzes, will be on MOODLE-<https://szelearning.sze.hu/>.

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## SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESSMENT'S METHOD

### 8. Homework

Homework is due usually before the next class. Late homework (1 week) is accepted with 10 % penalty.

## 9. Project

There will be 1 group project, with 2-3 student each. Each group will have an overall grade, and based on the group evaluation I will differentiate, but nobody will get a better grade than the overall group grade.

## 10. Behavior

Please, do not use your cell, and/or read your e-mail during class, at ANY time!!!

## 11. Testing and grading

Each grade will be weighted as follows:

5 quizzes                      30%

Homework I                    30%

Homework project            10%

Final exam                    30%

**Sinature requirements: 60% of homeworks, and quizzes**

**Final course grades:**

5 = 90 – 100

4 = 80 – 90

3 = 70- 80

2 = 60-70

1 = Below 60

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## KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

### 8. Required text

Student handouts

Recommended

McCuen, R.H. Hydrologic Analysis and Design (3<sup>rd</sup> Edition). Pearson Prentice Hall. 2005. ISBN 0-13-142424-6.

<http://ponce.sdsu.edu/onlinenewsprofiles34.php>