

Introduction to Water Engineering

Code: MK3VIZ2S6SX17-EN

ECTS Credit Points: 6

Evaluation: exam

Year, Semester: 3rd year, 5th semester

Its prerequisite(s): Hydraulics & Hydrology I.

Further courses are built on it: No

Number of teaching hours/week (lecture + practice): 4+2

Topics:

Water engineering refer to water management and hydraulic structures. Hydraulic structures are engineering structures constructed for the purposes of harnessing and using water resources (groundwater, surface water, lakes, sea, etc.) or for the prevention of the negative and destructive actions (floods, shore erosion, etc.) of water on the surrounding environment. There are a large variety of hydraulic structures to serve the many water management purposes for which water resources are put to use. Main topics are Classification of hydraulic structures by purpose and types; Site selection factors; design of gravity dams; classification of reservoirs. Also case studies in different water management issues - water resources management, excess water problems, flood management, settlement-scale water management issues, thermal water management, water quality control management, etc. - are discussed.

The series of lectures are based on the relevant standards.

This course presents basic technical parameters of water public work, water consumption and its features. Water resources in Hungary (in Europe). Water quality and water classification. Physical, chemical and biological parameters. Water supply system. Water distribution system, network. Types of sewers. Estimating wastewater flow. Sewer design. Storm water inlets. Manholes.

The basic designing instructions are presented for public utilities (pressure water system, sewer system).

Literature:

Compulsory:

- P. Novak, A.I.B. Moffat, C. Nalluri, R. Narayanan, Hydraulic Structures, Fourth Edition, ISBN 13:978-0-415-38625-8
- Jonathan T. Ricketts, M. Kent Loftin, Frederick S. Merritt, Standard Handbook for Civil Engineers, McGraw-Hill Publishing Company, 2003; ISBN 0-07-136473-0
- Downloaded course material

Recommended:

- WFD (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy)

Schedule

1st week Registration week

2nd week:

Lecture: the aim of water management; the impacts of climate change on water management; the relation between water management and hydraulic structures; the aim and technical measures of harnessing and using water resources

Practice: issuing the task: study of one specific river basin management plan from given aspects

3rd week:

Lecture: the aim and technical measures of the prevention of negative water related events in plain areas; the aim and technical measures of irrigation

Practice: examples for technical measures of harnessing and using water resources; examples for technical measures of prevention of floods and excess

4th week:

Lecture: the aim and technical measures for the prevention of negative water related events in hilly areas

Practice: examples for technical measures for erosion and flood control in hilly areas; issuing the task 4: check dam design

6th week:

Lecture: classification of hydraulic structures by purpose and types

Practice: examples and case studies for purposes and types of hydraulic structures

8th week: 1st drawing week**9th week:**

Lecture: The main features of public works. Water resources group. The water consumption.

Practice: issuing the task 1: Designing the pressure water system and sewer system. Drawing the general plan. Consultation.

11th week:

Lecture: Modelling of the water system. General prescriptions for dimensioning, choosing basis surfaces. Conventional dimensioning methods.

Practice: Applying the dimensioning methods to dimensioning parts. Longitudinal profile.

13th week:

Lecture: Dimension methods of the waste water system.

Practice: Applying the dimensioning methods to dimensioning parts.

15th week: 2nd drawing week

water in plain areas; issuing the task 2: open channel design

5th week:

Lecture: urban water management issues; technical measures of artificial recharge of groundwater

Practice: examples for special cases like thermal water management, sewerage of small settlements, storm water management, etc.

7th week:

Lecture: environmental impacts of water management measures; sustainability issues

Practice: examples for environmental impacts of existing water management measures; submission of tasks

10th week:

Lecture: Water quality and classification, water treatment-purification process. Designing (dimension) the pressure water system.

Practice: Longitudinal section. Practicing the presentation methods.

12th week:

Lecture: Group the sewer systems. Combined sewer system and separated sewer system. Pressure sewer system, vacuum sewer system.

Practice: Consultation.

14th week:

Lecture: Building of water supply system, sewer system. Manholes in the sewer system.

Practice: Consultation and submission of drawing tasks.

Requirements**A, for a signature:**

Attendance at **lectures** is recommended, but not compulsory.

Participation at **practice** is compulsory. Students must attend the practice classes and may not miss more than three times during the semester. Students can't make up a practice class with another group. Attendance at practice will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Missed practice classes should be made up for at a later date, to be discussed with the tutor. Students are required to bring the drawing tasks and drawing instruments for the course to each practice. Active participation is evaluated by the teacher in every class. If a student's behaviour or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as an absence due to the lack of active participation in class.

Students have to **submit all the two drawing tasks** as scheduled minimum at a sufficient level.

Students have to **submit the task** on time at a sufficient level.

During the semester there is one test in the 7th week. Students have to sit for the tests. If the score of the test is below 30%, the student once can take a retake test covering the whole semester material.

B, for a grade:

The course ends in a colloquium. Based on the average of the marks of the drawings and the test results, the grade is calculated as an average of them:

- average grade of the two drawing tasks
- the grade of one test

The minimum requirement for the test is 60%. Based on the score of the test, the grade for the test is given according to the following table:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)
90-100	excellent (5)

If the score of the test is below 60, the student once can take a retake test covering the whole semester material.