



## COURSE DATASHEET

<b>Semester:</b>	2016/17/1
<b>Course:</b>	Water-intake, sewer system, public services
<b>Code:</b>	NKMKKVT213V
<b>Responsible department:</b>	
<b>Department code:</b>	MKNK
<b>Responsible instructor:</b>	dr. Árpád Kárpáti

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### Course objectives:

Lectures will discuss the methods of water collection, the water supply systems, building and operation of municipal sewage collection and the regular control of the sewage pipes. Design, construction and operation of industrial pre-treatment plants will be also discussed.

### Course content:

Unit 1. (3 lecture hours with 45 minute length / hour) (Kárpáti Á. – 3 hours)

Water collection from ground layers near the surface, deep layers and surface waters: wells, galleries, bank filtration and their construction. Basics of geodesy. Sampling of the soil with drilling and evaluation of the samples. Collection of water from surface water. Drinking water production from surface water. Coarse filtration, coagulation, flocculation, clarification with sedimentation, sand filtration, AC filtration and safety chlorination. Visit of a water treatment plants producing drinking water from different raw waters (deep layer, and surface water).

Unit 2. (3 hours as above, Kárpáti Á. - 1,5 hour, Gáspárné – 1.5 hour)

Water supply systems for settlements: reservoirs, water distribution and its control. Drinking water quality control: raw water sources and drinking water quality at the user. Accreditation of the laboratories of Water Works (Gáspárné, head of the laboratory in Water works of Nagykanizsa)

Unit 3 (3 hours) (Kárpáti Árpád – 2 hours, Fazekas B. - 1 hour)

Water consumption of the population and some special industrial branches. Contamination of the drinking water during its use. Ground water protection from illegal discharges. Water protection from leakage of the canalization. Municipal sewage collection – building and operation of such systems. Operation of free flow and pressure systems. Sewage collection and purification in urban areas. Treated water disposal to the soil at lowly populated areas.

Change of the sewage in the channels of the highly populated areas, big towns: digestion, smell, erosion, nitrate addition. Dilution of the sewage with groundwater, nitrate infiltration.



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### Course content:

Regular control of the sewage pipes, necessary improvements with digging and without it. Decrease of the contaminant load of the municipal sewage collection system and the publicly owned treatment plant. Efficiency of physical and chemical pre-treatment – coagulation, flocculation flotation-. Design, construction and operation of industrial pre-treatment plants to fulfil the local sewage discharge limits of the canalization system.

### Requirements, evaluation and grading:

Students must write two papers in a semester, one paper during the semester and one at the end of it. The final mark is the weighed mean value (rounded) of the two marks received for the two papers. The mark of the second (at the end of the semester) paper is multiplied by two. The mark of the second paper is strictly required to be at least 2, and the mean value of the two papers must be better than 2.00.

### Required and recommended readings:

- Barótfi, I. (2003) Környezettechnika. Mezőgazdasági Kiadó, Budapest
- Benedek, P. (1990) Biotechnológia a környezetvédelemben. MK, Budapest, p. 283.
- Benedek, P. – Valló, S. (1982) Vízisztítás – Szennyvíztisztítás zsebkönyv. Műszaki Könyvkiadó, Budapest
- Czakó, L.; Miháltz P. (1993) Trendek és szemléletváltás a szennyvíztisztításban. Magyar Kémikusok Lapja, XLVIII, (10-11) 453-462.
- Förstner, U. (1993) Környezetvédelmi technika. Springer – Verlag, Budapest