



COURSE DATASHEET

Semester:	2016/17/1
Course:	Municipal Sewage Treatment
Code:	NKMKKVT113V
Responsible department:	
Department code:	MKNK
Responsible instructor:	dr. Árpád Kárpáti

Course objectives:

Students will get to know the technological process of the wastewater treatment, and the appropriate application of the special processing steps. They will be able to operate the wastewater treatment plant, and they will know the recycling methods of sewage sludge.

Course content:

Water consumption of the population – sewage production. Population or person equivalent (PE) and composition of the sewage. Forms and ratios of the contaminants in the sewage. Measuring the parameters necessary for the design of the treatment plants.

Regulation of the discharge limits of the POTWs, and prescriptions for the discharge control frequencies. Limitation for discharges to the sewage collection system and to living waters.

Differentiation of the sewage treatment steps: primary or mechanical treatment, secondary or biological treatment and tertiary treatment (perfect nutrient removal –P and N-). Design of primary and secondary sewage treatment to fulfil the actual discharge limits. Design and operation of the mechanical separation steps: grit removal, sand separation, fine filtration.

Microbiological contaminant transformations. AS, biofilms and the hybrid processes. Composition of the biomass growing according the food supply (BOD/TKN ratio). Nitrification rate depending from pH, T and toxic components of the sewage.

Possibility and control of denitrification in AS systems. Importance of COD/TKN ratio of the primarily clarified sewage. Aeration control in some Hungarian AS POTWs (Veszprém, Zalaegerszeg, Szombathely, Debrecen).

Removal of the excess P from the sewage in main line and side streams. Calculation of chemical requirement for precipitation of phosphate.

Sludge yield and possibilities for its decrease (hydrolysis, ultrasound, ozone, etc.). Reuse of the sludge for methane production. Preliminary sludge thickening before the fermentation. Operation of the anaerobic



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Course content:

digesters. Gas treatment and utilization for energy production.

Dewatering of the digested sludge and separate N removal from the sludge water. Operation of such treatment unit sin Zalaegerszed and at the central POTW of Budapest.

Composting of the dewatered digested sludge and its reuse in agriculture. Examples for the compost reuse in Hungary.

Requirements, evaluation and grading:

The whole content of lectures is included in the written examination.

Required and recommended readings:

- Öllös G. (1991) K+F eredmények. II. Szennyvíztisztítás. AQUA Kiadó, Budapest, p. 1299.
Öllös G. (1992-1993) Szennyvíztisztítás I-II., BME MTI Kézirat, Budapest, p. 264, p. 265.
Somlyódy, L. (Szerk.) (2002) A hazai vízgazdálkodás stratégiai kérdései. MTA Kiadvány, Budapest
Kárpáti, Á. (Szerk.) (2007) A szennyvíztisztítás alapjai. Elektronikus jegyzet, HEPOP, 2007. pp. 173.
Fazekas, B., Kárpáti, Á., Kovács, Zs. (2013) Szennyvíztisztítás korszerű módszerei. Elektronikus jegyzet. Környezetmérnöki Tudástár. Sorozat szerkesztő: Domokos, E. XXXII. kötet pp. 256.