UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2015/16/1
Course:	Water Management, Waste Water Treatment
Code:	VEMKKVM423V
Responsible department:	Department of Environmental Engineering
Department code:	MKKV
Responsible instructor:	dr. Árpád Kárpáti

Course objectives:

Information about the potable water production and safety of supply and the necessary wastewater purification unit processes before discharge to natural recipients.

Course content:

1. Protection of raw water quality. Raw water collection, and uptake with proper quality control. Regulation of raw water use for drinking water production.
2. Safety handling and chlorination for distribution of carstic and bank filtered waters. Protection of water quality in reservoirs.
3. Drinking water production and supply from surface waters around Balaton and in case of the capital. Removal of organic micro pollutants of surface waters in this processes (treatment with peroxide or ozon, AC filtration). Use of chemical and electrochemical methods in the treatment line.
4. Water softening and demineralization. UV disinfection in drinking water production and wastewater treatment. Water distribution and diagnostics of water supply pipeline system. Organization of pipeline renewals.
5. Characterization of contamination of drinking waters and sewage wit laboratory control and monitoring. Control of the harmful industrial influences, decision about the necessity of pre-treatment before biological wastewater treatment.
6. Different possibilities for pre-treatment for protection of the biological system from SS overload, and toxic contamination
7. Biological wastewater treatment: oxidation of organic matter, biological growth, P and N accumulation in the bioproduct, oxidation of excess ammonium, reduction of nitrite or nitrate to elemental nitrogen, and extra biological phosphorus removal with the biomass.
8. Development of the AS and biofilm processes in wastewater treatment. Fixd and moving support and biofilm, hybrid systems.
9. Calculation of removal of organic matter an biomass growth for different reactor types (Plug flow, CMSR). Possibility of combining biofilm to AS systems.
10. Calculation of the oxygen requirement of the carbon and nitrogen removal, design of the air input with proper DO control.
11. Denitrification control with the nitrate containing mixed liquid recycle using the ORP set in the control.
12. Mathematical modelling and simulation of the AS systems.
13. Enhanced N and P removal through MAP precipitation and ion exchange.

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Course content:

14. Material and energy balance calculation for the anaerobic sludge digestion.
15. Design of sludge composting with and without structuring material.

Requirements, evaluation and grading:

According to the requirements of fulfillment.

Required and recommended readings:

Letölthető anyagok a Környezetmérnöki és Kémiai Technológia Tanszék honlapjáról.
A szennyvíztisztítás általános minőségbiztosítása és a gyökérteres szennyvíztisztítás. Tanulmány-gyűjtemény No. 7. Domokos Endre - Kárpáti Árpád - Pásztor István, VE, KmKT Tanszék (2003), pp. 92.
A víz és a szennyezők hatása a szennyvíztisztítás lehetőségeire távlataira. Tanulmánygyűjtemény No. 9. Kárpáti, Á. – Pásztor, I. – Pulai, J. – Thury, P. VE, KmKT Tanszék (2003), pp. 92.
Szennyvíztisztítás hazai tapasztalatai, s a szennyvíziszap kezelés, hasznosítás lehetőségei. Tanulmány-gyűjtemény No. 10. Horváth A. - Juhász E. - Kárpáti Á. - Pásztor I. – Pulai J. - Radács A. - Szentgyörgyi H - Taxner Gy. – Thury P. VE, KmKT Tanszék (2003), pp 99