



## SUBJECT DATASHEET

<b>Semester:</b>	2009/10/1
<b>Subject:</b>	Water Management
<b>Code:</b>	VEMKKVB212G
<b>Responsible department:</b>	Department of Environmental Engineering
<b>Responsible department code:</b>	MKKV
<b>Responsible lecturer:</b>	dr. Árpád Kárpáti

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### Educational objectives:

To have some practice in raw water purchase, water pre-treatment, water distribution and supply, and quality control.

### Detailed content of the subject:

1. Global water resources and the water cycle. Energy supply of the water cycle. Regional water cycle; storage of rain water, reuse, sewage collection and self purification in the recipients. 2. Water management, protection of surface and soil water from the contamination. Raw water qualities and quantities. 3. Water quality standards, and regulation. Influence of EU Guidelines for the national regulation. Health safety, and economical considerations. 4. Influence of the decrease of water resources, and potable water supply for water pre-treatment. 5. Raw water sources, forms of water output. Wells, springs, river bank filtration, surface water output. 6. Settling of heavy suspended parts and coarse filtration of the non settling fraction from river and lake water. 7. Lime- carbon- dioxide equilibrium. Water softening and demineralization. Ion exchange and RO in water treatment. 8. Removal of methane hydrogen-sulphide and ammonia. Possibility of removal of nitrate from raw water. 9. Removal of dissolved metals, AS humic components and organic micro-pollutants from raw water. 10. Drinking water disinfection. 11. Potable water distribution to the users. 12. Scaling and corrosion in water tubes and different water uses. 13. Water supply for industrial use. Requirements of the different industrial branches according to the water use. 14. Design of water supply in highly populated areas. Industrial examples. 15. Pre-treatment and Stabilization of the boiler water for separated heating water production and supply. Salt load of the sewage system from such municipal supply.

### Requirements:

Knowledge of lime - carbon dioxide equilibrium, technologies of water softening, demineralization, disinfection and quality safety.

### Required and suggested references:

AWWA: Water Quality and Treatment, A Handbook of Community Water Supply 4th Ed., McGraw-Hill, Inc. 1990. Barótfi I. Környezettechnika kézikönyv. Környezettechnikai szolgáltató Kft., Budapest, 1991. Benedek P.- Litheráthy P.: Vízminőség szabályozás a környezet-védelemben. Műszaki Könyvkiadó, Budapest, 1979. Benedek P. - Valló S.: Vízisztítás, szennyvíztisztítás. Zsebkönyv 4. átdolgozott kiadás, MK, Budapest 1990. Benedek P.:



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### Required and suggested references:

Biotechnológia a környezetvédelemben. Műszaki Könyvkiadó, Budapest, 1990. Chovanetz T.: Az ipari víz előkészítése. Műszaki Könyvkiadó, Budapest, 1979. Förstner U.: Környezetvédelmi technika. Springer, Budapest, 1993. pp. 155-237. Illés I. - Kelemen L. - Öllös G.: Ipari vízgazdálkodás. Műszaki Könyvkiadó, Budapest, 1983. Öllös G.: K+F eredmények - Vízellátás. VIZDOK, Budapest, legújabb kiadás