

<b>Title of the course:</b> <b>Hydrology and hydraulics</b>	<b>NEPTUN-code:</b> RKWHH1EBNE	<b>Teaching hours:</b> 2+2+0 Semester: 5	<b>Credit: 5</b> <b>Exam type:</b> midterm grade
<b>Course leader:</b> Lóránt Szabó PhD	<b>Position:</b> assistant professor	<b>Required preliminary knowledge:</b> RKXKE1ABNE -Environmental Elements Protection I. RKXFT1ABNE -Earth Science RKXFI1ABNE - Physics I.	
<b>Curriculum:</b>			
<p>The hydrographical conditions of the country, the natural water provision and the variability of water resources based on location and time. Domestic water management practices, the environmental effects which influence the natural waters. The hydrological basics of the water resource management. The water balance. The main elements of the hydrological cycle: rainfall, evaporation, infiltration, procession; measurement, adaptation and forecast of the previously mentioned factors. The hydrology of the diffuse and concentrated pollution in natural waters (assembling of the catchment, mixing and pollution spread). Stream laws, under pressure flow and the gravitational flow. Statics of the fluids – communicating vessels, Pascal’s thesis. Fluid pressure on plane surfaces. The dynamical basics of movement of the fluids, flow line, streamline, humid coupon, fluid output, middle speed, hydraulic radius, continuity. Bernoulli’s equation and equation of continuity, speed measurement with Pitot tube. Laminar and turbulent flow, the Reynolds number. The oozing low of Darcy.</p>			
<b>Professional competencies:</b>			
<p>Knowledge of water appearance forms, the characteristic of these in our country and their proportion. The students will be able to enumerate the elements of the water balance, also able to apply the water balance equation. Knowledge of the elements of the hydrological cycle and the principles of their measurement. The students will learn the main sources of pollutions in the natural waters, also the main processes of the spread of these pollutants. Knowledge of applying the energy equations for ideal and real fluids in simple calculation examples.</p> <p>The students will know the characteristics of the laminar and turbulent water flows and will be able to interpret and characterize the local and frictional energy losses. They will determine the pressure loss in a simple pipe system, furthermore the speed of the water and the water flow.</p>			
<b>Bibliography:</b>			
<p>Prof. Dawei Han: Concise Hidrology, 2010, DaweiHan&amp;bookboon.com (download free eBooks at bookboon.com)</p> <p>Raymond A. S., John W. J.: Physics for Scientists and Engineers with Modern Physics, 2004 6<sup>th</sup> and 9<sup>th</sup> edition</p> <p>Prasuhn, Alan L. Fundamentals of Hydraulic Engineering. Holt, Rinehart, and Winston: New York, 1987.</p> <p>Cassidy, John J., Chaudhry, M. Hanif, and Roberson, John A. "Hydraulic Engineering", John Wiley &amp; Sons, 1998</p> <p>E. John Finnemore, Joseph Franzini "Fluid Mechanics with Engineering Applications", McGraw-Hill,2002</p> <p>Lóránt Szabó: Physics for students of engineering (electronic book)</p>			
Further reading can be used: Vincent J. Zipparro, Hans Hasen (Eds), Davis' Handbook of Applied Hydraulics, Mcgraw-Hill, 4th Edition (1992)			