Course title: Hydrodynamics	**Neptun code: GEAHT403-a**
Course coordinator: Prof. László Baranyi, emeritus professor, Candidate of Technical Science, Dr. habil	
type and number of lesson: lecture, **2 hrs / week**	
method of accountability: colloquium	
curriculum location of the subject: autumn	
pre-study conditions: -	
The task and purpose of the subject:	
To make students familiar with advanced level fluid mechanics as well as areas not covered in previous courses; to encourage students to explore the technical literature in this field.	
Course description:	
Properties of fluid. Fundamental laws of Fluid Mechanics for viscous and inviscid fluid: equation of motion, different forms of Euler equations, Navier-Stokes equations. Equations of continuity; differential forms of continuity equations, continuity equation for a stream tube. Energy equation. Laminar and turbulent flows. Prandtl's boundary layer (BL) theory. Integral parameters of BL theory: boundary layer thickness, displacement thickness, momentum thickness, energy thickness. Kármán's momentum law. Application for laminar flow around a flat plate without incidence and pressure gradient; Blasius equation. The relationship between drag coefficient and momentum thickness. Shear stress distribution along a flat plate. Approximate solutions of BL equations for the flow past a flat plate. Transition to turbulence. Turbulent flow past a flat plate. Flow separation**.**	
Required literature:	
1. White, F.M.: Fluid Mechanics. McGraw-Hill, 4th ed., Boston, 1999. 2. Streeter, V.L. and Wylie, E.B.: Fluid Mechanics. McGraw-Hill, First SI ed., Boston, 1987. 3. Roberson, J.A. and Crowe, C.T.: Engineering Fluid Mechanics, 3rd ed., Houghton Mifflin Company, Boston, 1985.	
Recommended literature:	
1. Fox, R.W. and McDonald, A.T.: Introduction to Fluid Mechanics, 3rd ed., John Wiley & Sons, New York, 1985. 2. Kundu, P.K., Cohen, I.M. and Dowling, D.R.: Fluid Mechanics, 5th ed., Elsevier, Amsterdam, 2012. 3. Finnemore, E,J. and Franzini, J.B.: Fluid Mechanics with Engineering Applications, 10th ed., McGraw-Hill, Boston, 2002.	