



FINAL PROJECT ASSIGNMENT

CLASSIFIED

Identification	Name: Ahmadli Kamran		ID: 73482400836		
	Code of the Curriculum: 2NAMW0		Specialisation:	Document ref. number:	
	Curriculum: Master Program in Mechanical Engineering Modelling		2NAMW0-FM	GEÁT:2022-1:2NAMW0:FNX6C0	
	Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Fluid Mechanics		
	Supervisor: Dr. Joshua Patrick Davidson (71569852589), research fellow				

Project Description	Title	Development of energy harvesting technology for pump condition monitoring wireless sensors Energia-hasznosító technológia fejlesztése a szivattyú állapotfigyelő vezeték nélküli érzékelőkhöz
	Details	<p>Data collected from industrial equipment is very important for monitoring both performance and health condition of an asset. The gathered data can be post-processed by an advanced analytic method to more accurately identify or even predict the outcomes and thus to help operators make a more informed decision. This generally requires a greater number of sensors or a higher sampling rate, both of which results in an increased amount of power consumption. This can have a significant effect on battery life of wireless sensors, which customers prefer for retrofit installations. Various ambient energy sources are readily available in the pump system and surroundings. Examples include, but are not limited to, vibration, pressure fluctuation, temperature gradient, sunlight, and rotating body. This waste energy can be scavenged through many available techniques using piezoelectrics, thermoelectrics, photo-voltaic cells, magnets, etc. The harvested energy can be used to charge batteries so that the wireless sensors can operate for a longer duration or even semi-indefinitely.</p> <p>A thesis can be either computational or experimental, or both. Target deliverables can include the following:</p> <ol style="list-style-type: none"> 1. One or more proposed designs for pump applications 2. The analytic calculation for maximum energy or power (density) of proposed EH system. 3. Comparison of different energy harvesting technologies based on criteria (which also needs to be developed), if applicable. 4. Computational results (e.g. FEA) 5. Prototype development and testing.
	Advisor	<p>Advisor's Affiliation: FLOWERVE Corporation 92590 Temecula, CA, United States, Tierra Alta Way # C, 27455</p> <p>Advisor: Dr. Hwan Ryul Jo, simulation engineer</p>

Final Exam	1 st subject (group)	2 nd subject (group)	3 rd subject (group)	4 th subject (group)
	ZVEGEÁTNW03 Fluid Mechanics Measurements	ZVEGEÁTNW02 Computational Fluid Dynamics	ZVEGEÁTNW19 Vehicle Aerodynamics	ZVEGEÁTNW08 Building and Environmental Aerodynamics

Authentication	Handed out: 6 September 2021		Deadline: 10 December 2021		
	Compiled by: Dr. Joshua Patrick Davidson (71569852589) Supervisor		Verified by: <i>Dr. János Vad (signed)</i> Head of Department		Approved by: <i>Dr. Gábor Györke (signed)</i> Vice-Dean
	<p>The undersigned declares that all prerequisites of the Final Project have been fully accomplished. Otherwise, the present assignment for the Final Project is to be considered invalid.</p> <p>..... <i>Ahmadli Kamran</i></p>				