Budapest University of Technology and Economics
Faculty of Mechanical Engineering
Department of Fluid Mechanics
http://www.ara.bme.hu/

FINAL PROJECT ASSIGNMENT

CLASSIFIED

Identification			
Name: **Dosmukhametova Ayazhan**		ID: **73612251781**	
Code of the Curriculum: 2NAMW0		Specialisation:	Document ref. number:
Curriculum: Master Program in Mechanical Engineering Modelling		2NAMW0-FM	GEÁT:2022-2:2NAMW0:YVF0ME
Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Fluid Mechanics	
Supervisor: Dr. Benedek Tamás (76511246251), assistant professor			

Project Description	
Title	**Model-based optimization of the blade-shape and side channel profile of a side channel pump** Oldalcsatornás szivattyú lapátalakjának és oldalcsatorna-szelvényének modell alapú optimalizálása
Details	1. Provide a literature review of side channel pump hydraulics, blade and side channel design, and CFD modeling of side channel pumps. 2. Based on the given sectional drawings, create the baseline geometric model of a pump segment containing a single blade in Solidworks 2017. Establish 3D model parametrization to allow for scaling the model. 3. Construct a steady state CFD model of the baseline design in ANSYS Fluent system, calculate the gradH-Q charac-teristic curve and compare the results with the available experimental data and other CFD results. Calculate the hydraulic efficiency of the pump segment as a function of volume flow (eta-Q). 4. Based on the model results of the baseline design, determine the geometrical parameters and design variants. 5. Create a hydraulic model for machines with modified geometry and examine how the modifications affect the vortex in the pump and the hydraulic efficiency of the pump. Perform the optimization of the blade and side channel for maximum pump efficiency, detailing the flow pattern and hydraulic characteristics of the machine with the optimized geometry. Investigate the effect of roughness of the side channel surface. 6. Prepare your MSc thesis document according to the formal requirements.
Advisor	Advisor's Affiliation: Flowserve Corp. Sterling Industry Consult GmbH; D-25524 Itzehoe, Lindenstraße 170. Advisor: Dr. Heiner KÖSTERS, director of technology and development

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

Authentication		
Handed out: 14 February 2022		Deadline: 20 May 2022
Compiled by: Dr. Benedek Tamás (76511246251) Supervisor	Verified by: *Dr. János Vad* (signed) Head of Department	Approved by: *Dr. Gábor Györke* (signed) Vice-Dean
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. …….. *Dosmukhametova Ayazhan*		