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: **Jakab Márton**		ID: **78924032293**
Code of the Curriculum: 2N-MW0	Specialisation: 2N-MW0-FM	Document ref. number: GEÁT:2023-2:2N-MW0:ETBUDA
Curriculum: Gépészeti modellezés mesterképzési szak		
Final Project issued by: Department of Fluid Mechanics	Final exam organised by: Department of Fluid Mechanics	
Supervisor: Dr. Horváth Csaba (71949162105), associate professor		

Project Description

Title	**Thermal numerical simulation of ECU cooling. Comparison of finite volume method simulation and finite element method simulation coupled with HTC mapping** ECU hűtésének numerikus szimulációja. Véges térfogat módszer és HTC mappolással alkalmazott végeselem módszer összehasonlítása.
Details	1. Overview and summary of available literature of ECUs (Engine Control Units). 2. Overview and summary of thermal numerical simulations of ECUs using finite volume method. 3. Overview and summary of thermal numerical simulations of ECUs using finite element method. 4. Overview of HTC (Heat Transfer Coefficient) mapping methods. 5. Overview of PCB (Printed Circuit Board) modelling methods, picking the most suitable one for the problem at hand. 6. Simulation of existing ECU using finite volume method. 7. Simulation of existing ECU using finite element method and different HTC mapping methods (homogeneous and inhomogeneous HTC mapping method). 8. Comparison of the results of different simulation methods. 9. Recommendation of possible further development of the methods. 10. Recommendation of ways to enhance the cooling effectiveness of the ECU. 11. Summary of the work in the required document format of the MSc Thesis.
Advisor	Advisor's Affiliation: Robert Bosch Kft., 1103 Budapest, Gyömrői út 104. Advisor: Zoltán KÓRÁDI,

Final Exam

1st subject (group)	2nd subject (group)	3rd subject (group)	4th subject (group)
ZVEGEÁTNW02 Computational Fluid Dynamics	**ZVEGEÁTNW03** Fluid Mechanics Measurements	**ZVEGEÁTNW22** Aero-Elasticity	**ZVEGEÁTNW19** Vehicle Aerodynamics

Authentication

Handed out: 27 February 2023		Deadline: 2 June 2023
Compiled by: Dr. Horváth Csaba (71949162105) 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.

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Jakab Márton