Final exam questions

Subject group name: **Fluid Mechanics elective**

Neptun code: ZVEGEÁTNW11

Credit points: 3

Subject(s) in this subject group:

- **Open Source Computational Fluid Dynamics** (BMEGEÁTNW11 or NW21)

Program: Mechanical Engineering Modelling, MSc (2N-MW0)

Specialization(s): Fluid Mechanics

Responsible person(s):

- Dr. Miklós Balogh, balogh.miklos@gpk.bme.hu, Department of Fluid Mechanics, Faculty of Mechanical Engineering

You can check the current subject forms at the Educational Portal of the Faculty of Mechanical Engineering.

https://oktatas.gpk.bme.hu/

Always check for updates at edu.gpk.bme.hu before preparing for the exam, especially if the subject group contains at least one subject from your final semester!

Valid from 1 September 2024

Dr. Miklós Balogh

assistant professor

1. Introduction to OpenFOAM simulations (and linux, Gnuplot, Paraview): Basic linux commands, about OpenFOAM, case structure, main steps of the analysis.
2. Installation on several Linux distributions and virtual systems: Ubuntu, OpenSuse, Fedora from packages and on other systems from source.
3. Solution of simple fluid dynamics problems using OpenFOAM: problem statement, required folders and files, steps of the analysis, example cases (lid driven cavity: meshing, solving, domain and mesh modifications, post processing).
4. Detailed introduction to OpenFOAM software components I: pre-processing (meshing tools and utilities, initial and boundary conditions).
5. Detailed introduction to OpenFOAM software components II: solving (standard applications, user applications, probing and monitoring).
6. Detailed introduction to OpenFOAM software components III: post-processing (sampling, integrating, visualization with Gnuplot, ParaView).
7. Single phase stationary and transient flows, turbulence, compressible flows: Introduction to models, boundary conditions and solvers required for the simulation of these problems. Examples.
8. Multiphase and reactive flows: general principles of multiphase simulations (methods, e.g. VOF), chemical reactions, multiphase and reactive flow solvers, example problem (breaking of the dam).