# Schedule of the course

| Mo 07.10 | Tue 8.10<br>$9^{30}$ - $14^{00}$ | Wed 9.10 | Thu 10.10<br>$9^{30}$ - $14^{00}$ | Fri<br>11.10 |
|---|---|---|---|---|
| **Opening meeting**<br><br>**Introduction, what is OpenFoam, Linux commands**<br><br>**Overview of OpenFOAM**<br>Documentation, code structure, directory organization of a case (fundamentals of case structure)<br><br>**Finite volume method**<br><br>**First OpenFOAM exercise**<br>Lid-driven cavity (setting a case, boundary and initial conditions, solver and control parameters)<br><br>**Check list for cavity**<br>(what we learnt!) | **Zoom Meeting for questions and discussion** | **Introduction to 3D laminar flow in a circular pipe**<br><br>**Meshing tools:**<br>○ **blockMesh + m4-script** Mesh generation with parameters<br>○ **Snappy Hex Mesh (SHM)**<br><br>**Exercises**<br>• 3D flow in a circular pipe<br>  • Study of various BCs<br>  • Post-processing<br>• Generation of geometry and mesh (pipe) with m4 parametrization<br>• Example for SHM<br><br>**Check lists**<br>(what we learnt!) | **Zoom Meeting for questions and discussion** | **Open issues/ questions can be sent per email** |
| <span style="color:red">**Part1**</span> | | <span style="color:blue">**Part2**</span> | | |
| <span style="color:red">**Day1-P1**</span> | <span style="color:red">**Day2-P1**</span> | <span style="color:blue">**Day1-P2**</span> | <span style="color:blue">**Day2-P2**</span> | |

| Mo 14.10 | Tue 15.10<br>$9^{30}$ - $14^{00}$ | Wed 16.10 | Thu 17.10<br>$9^{30}$ - $14^{00}$ | Fri<br>18.10 |
|---|---|---|---|---|
| **Meshing tools:**<br>○ Adaptive mesh refinement (AMR)<br>○ External tools and conversion to OF format<br><br>**Kármán vortex street**<br>(theory)<br><br>**functionObjects**<br>(e.g. time averaging, calculation of forces)<br><br>**Exercises**<br>Kármán vortex street (transient flow)<br>○ Structured mesh (blockMesh)<br>○ AMR<br>→ Comparison of results with two grid generation methods<br><br>**Check list for Kármán vortex street**<br>(what we learnt!) | **Zoom Meeting for questions and discussion** | **Programming**<br>• Implementing the temperature equation in a solver<br>• Implementing a new time-dependent boundary condition<br><br>**Exercises**<br>Application of new BC and solver with T-equation<br><br>**Turbulent flow**<br>(theory and exercises)<br><br>**Summary & Best practice guidelines** | **Zoom Meeting for questions and discussion**<br><br>**Closing meeting** | **Further questions can be sent per email** |
| <span style="color:red">**Part3**</span> | | <span style="color:blue">**Part4**</span> | | |
| <span style="color:red">**Day1-P3**</span> | <span style="color:red">**Day2-P3**</span> | <span style="color:blue">**Day1-P4**</span> | <span style="color:blue">**Day2-P4**</span> | |

## Organisation

- Each part is organized as follows:
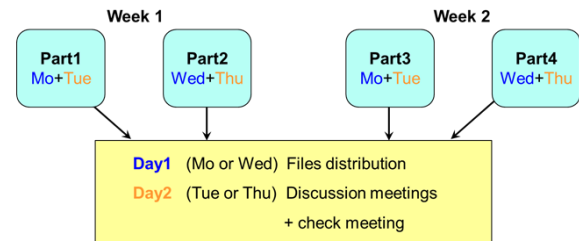
  - **Day1 (Monday and Wednesday)**
    - Files for the course are provided:
      1. Lectures (videos, *.mp4)
      2. Slides of lectures (pdf)
      3. Exercises (pdf)
  - No common meeting is foreseen (send email if you need support!)

  - **Day2 (Tuesday and Thursday)**: 9:30am – 2pm, discussion with teachers via Zoom meeting (Link, Meeting ID, Passcode will be send per email)

Week 1 — Part1 (Mo+Tue), Part2 (Wed+Thu)
Week 2 — Part3 (Mo+Tue), Part4 (Wed+Thu)
Day1 (Mo or Wed) Files distribution
Day2 (Tue or Thu) Discussion meetings + check meeting

> Use the one-to-one discussion on Day2!
> Enter the meeting **whenever** you have an issue or a question!

> ➔ If you have problems on Day1 of each part send an email to chiara.mistrangelo@kit.edu or biao.lyu@kit.edu