

**Overview - Numerical methods for fluid-structure interaction
(Winter term 2015)**

Technicalities:

- Homepage: http://people.ricam.oeaw.ac.at/t.wick/fsi_ws_15_16_engl.html
- Lecture each Monday from 13.45 - 15.15 in room S2 044
- Exercises each Monday from 15.30 - 16.15 in room S2 044 (starting today!)
 - Exercise sheets will be handed-out (i.e., published on the above webpage) on which everybody works on. Discussion will be in the subsequent exercise meeting.
- (Hint: Even so that I do not plan to correct individually all exercises, I strongly recommend to work on them for all who consider to obtain the 'Schein/ECTS points'.)
- There are no lectures and no exercises on Oct 26 and Nov 2. If necessary we can catch up these missing lectures on other days
- On Jan 11, 2016 we have a fluid-structure interaction conference including winter school at RICAM. Maybe we can combine our regular lecture with that event.

Exam (Schein/ECTS points): Oral exam at the end of the course.

- ECTS credit points: 3
- Duration: 25-40 minutes
- Proposed dates: in the week Jan 25-29, 2016 or Feb 1-5, 2015. Please make individual appointments with me.

Alternatively (for those who are interested in programming):

- I provide a small piece of FSI code (in C++ based on deal.II) and a specific task.
- You work on this task including a small write-up (of about 10 pages) and we meet end of February 2016 or beginning of March 2016 to have a presentation of your results.

Please turn page.

Contents of this class:

- Challenges of fluid-structure interaction (to sharpen the sense for typical difficulties)
 - Continuum mechanics (can be short depending on the prerequisites of everybody)
 - Modeling of variational-monolithic fluid-structure interaction (FSI) in arbitrary Lagrangian-Eulerian (ALE) coordinates
 - Discretization: Time, space (FEM), nonlinear and linear solvers
 - A posteriori error estimation and mesh adaptivity (if time permits)
 - Sensitivity analysis and optimization (if time permits)
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