Course offered for the PhD program
in Civil, Chemical and Environmental Engineering
a.y. 2024/2025 (XL cycle)
(course is open for participation of students from other PhD cycles or programs)

1. Title
Micro hydrodynamics

2. Course Objectives and Description

The aim of the course is to discuss methods and solutions for flows at low values of the Reynolds number. In particular, the following topics will be addressed:
- scaling and linearisation of the equations of motion;
- Stokes flows (flow around a cylinder and a sphere);
- mathematical techniques for solving Stokes flows;
- motion of micro organisms at low values of the Reynolds number;
- lubrication theory;
- peristaltic flow;
- flow in porous media, Darcy law, homogenisation theory.

3. Course Organization
The course will mainly consist of formal lectures. Lectures will also be given online, upon request of students from other Universities. The students will be asked to work on a couple of small projects during the course, for approximately 4 hours.

4. Teacher
Alessandro Bottaro and Rodolfo Repetto.

5. Duration and credits
25 hours and 5 credits.

6. Activation mode and teaching period
January-February 2025. The course will be activated only if at least 5 students will be registered to participate.

7. Deadline for registration
December 15th, 2024.

8. Final exam
The final exam will consist in a small project that the students will have to work on. At the end of the course the students will be asked to give a presentation and to write a written report on their work.