

PhD program in Civil, Chemical and Environmental Engineering

Curriculum in Fluid Dynamics and Environmental Engineering

Academic year 2017/2018

1. Title of the course

Micro hydrodynamics

2. Contents

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. Structure of the course

The course will mainly consist of formal lectures. The students will be asked to work on 1 – 2 small projects, for approximately 4 hours.

4. Lecturers

Alessandro Bottaro and Rodolfo Repetto.

5. Duration and credits

20 hours and 4 credits.

6. Period and registration procedure

March 12th-16th 2017. The course will be activated only if at least 5 students will be registered to participate.

7. Deadline for registration

January 31st.

8. Final exam

The final exam will consist in a 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.