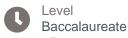


UE Microscale mechanics and fluidics II: Fluidics





Component
UFR PhITEM
(physique,
ingénierie, terre,
environnement,
mécanique)



> Teaching language(s): English

Open to exchange students: Yes

> Code d'export Apogée: PAX7NFAI

Presentation

Description

Goal: Microfluidics studies the transport of liquids at the scale of some micrometer to the hundred of micrometer, such as the flow of red blood cells in a blood vessel, the transport of polymer chains in a porous medium, or the locomotion of micro-organisms. Nanofluidics studies the flow of liquids at the colloidal scale, that is at distance of the nanometer to the micrometer from a surface. This course introduces the concepts of low Reynolds number flows and surface-driven flows and describes the main properties of flows and transport at the sub-millimeter scale.

Objectives

Content:

- Simple deformations, definition of viscosity
- Lubrication flows ; applications
- Stokes equations; general properties of low Reynolds number flows
- Diffusion and mixing; hydrodynamic dispersion; Peclet number
- Capillary flows; moving contact lines
- Surface driven flows and coupled transport: Marangoni flows; electro-osmosis; Helmoltz-Shmolukovski velocity *Exercise session*:

Viscous flow around a sphere; Oseen tensor; notions on locomotion at low Re





Bibliography:

Guyon, Hulin, Petit "Physical Hydrodynamics" de Gennes, Brochard, Quéré "Bubbles, drops, pearls and waves" Tabeling "Introduction to microfluidics"

Course parts

TP Practical work (TP) 10h

UE Microfluidics - CM Lectures (CM) 14h

Period: Semester 9

Useful info

Place

> Grenoble

Campus

> Grenoble - University campus

