NE231 August 3:0

Microfluidics

Instructor

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Teaching Assistant

Email:

Department: Centre for Nano Science and Engineering

Course Time:

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

The course discusses various theoretical fundamentals relevant to fluid-flow in micro-nano scale. It further discusses the issues required for design of various micro-nano fluidic devices. I believe that it will be a good starting point for students interested to pursue more specialized topics in micro-nano fluidics.

Prerequisites

Basic understanding in mechanics and fluid mechanics will be helpful.

Syllabus

Transport in fluids, equations of change, flow at micro-scale, hydraulic circuit analysis, passive scalar transport, potential fluid flow, stokes flow,

Electrostatics and electrodynamics, electroosmosis, electrical double layer (EDL), zeta potential, species and charge transport, particle electrophoresis, AC electrokinetics

Surface tension, hysteresis and elasticity of triple line, wetting and long range forces, hydrodynamics of

interfaces, surfactants, special interfaces

Suspensions, rehology, nanofluidics, thick-EDL systems, DNA transport and analysis.

Course outcomes

Students will learn to design various microfluidic devices required for tackling real life applications.

Grading policy

30% for assignments, 30% for final and 40% for project

Assignments

Resources