


FLUID AND PARTICLE MECHANICS

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INTENDED AUDIENCE: Any interested Learners

INDUSTRY SUPPORT : Chemical process industries

COURSE OUTLINE :
This course introduces the concepts of fluid and particle mechanics and demonstrates their applications.

ABOUT INSTRUCTOR :

Prof. Madivala G. Basavaraj Before joining IIT-Madras in February 2011, he spent 3 months as visiting fellow at KULeuven (Belgium) in Prof. Jan Vermant's group. he was a postdoctoral researcher with Prof. Norman J. Wagner at the University of Delaware (USA). he studied chemical engineering at SIT, Tumkur (Bangalore University), and received my M.S (Research) from IISc, Bangalore, by working on - the determination of local dispersion coefficient and local holdup in a packed bed using X-rays. his PhD in chemical engineering is from KULeuven, Belgium (Prof. Jan Vermant). his PhD thesis was on - Tailoring colloidal gel rheology in bulk and at interfaces: Exploiting shape and surface chemistry effects.

Prof. Sumesh is interested in understanding soft and living (or active) fluids. This categorisation of matter is relatively recent, but it offers new and exciting physics that often leads to novel and unconventional engineering applications. Now I am working as Assistant Professor at Indian Institute of Technology Madras . 2007-2012 Doctor of Philosophy JNCASR Bangalore 2002-2004 Master of Technology IIT Kanpur. 1998-2002 Bachelor of Technology, Government Engineering College, Thrissur

COURSE PLAN :

Week 1**:** Introduction to Navier Stokes (NS) equations and their exact solutions, Poisuelle flow

Week 2**:** Taylor Couette flow, Rheology

Week 3**:** Dimensional analysis

Week 4**:** Turbulent Flow

Week 5**:** Friction losses, Moody's chart

Week 6**:** Boundary layer theory

Week 7**:** Introduction to Particles, their characterization

Week 8**:** Particulate Phenomena – Brownian motion and phoresis

Week 9**:** Motion of particles in a fluid, terminal velocity, particle separation

Week 10**:** Sedimentation of dilute, concentrated and flocculated dispersions

Week 11**:** Packed and Fluidized Beds

Week 12**:** Filtration