Modeling approaches of Nanoscale filtration processes of solutions and Suspensions

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Overview

Nowadays, nanotechnology in particular, and nanoscience in the whole, are very promising branches of science to improve every day's live of modern society and state. Nanoscience acts on the interface of different disciplines and in order to learn it anyone should be acquainted with mathematics, colloid chemistry, and physicochemical mechanics at least.

The course covers some important problems connected with transport phenomena through different porous media. These are: viscous flows through a porous body taking into account boundary conditions of non-sleeping, sleeping and a jump of shear stresses; modeling of hydrodynamic permeability of complex porous media; calculation of diffusional and electroosmotic permeability of membranes, asymmetry effects in nano and ultrafiltration, and electrodialysis; interactions of micro- and nanosized colloidal particles with the walls of the pores; surface and spatial modification of membranes with inorganic nanoparticles and nanotubes and characterization of synthesized hybrid nanocomposites; influence of surface hydrophobicity/hydrophilicity on mass and charge transfer, and many others. After learning this course a person will be able to construct own physicochemical and mathematical models in various fields of science and technology.

Modules	**A: Basic Equations for Transfer of Mass, Heat and Electric Charge** **B: Classification and Modeling of Membrane Processes for Separation of Solutions and Suspensions** **C: Classification of Disperse (Colloid) Systems. Non-equilibrium Thermodynamics and Electrokinetic Phenomena in Porous Media** **D: Modeling of Hydrodynamic Permeability of a Porous Medium (Membrane) using Cell Method** **July 13 - July 20 Number of participants for the course will be limited to fifty (50).**
You Should Attend If…	▪ you are a chemical engineer or research scientist interested in Nanoscale filtration processes of solutions and Suspensions. ▪ you are a mechanical engineer interested in interdisciplinary study of nanomaterials. ▪ you are a student or faculty from academic institution interested in learning some aspects of mathematical modeling phenomena in colloid and interface chemistry and physicochemical mechanics.
Fees	The participation fees for taking the course is as follows: **Participants from abroad: US $400** **Industry: Rs. 7000/-** **Student: Rs 1000/-** **Faculty: Rs. 3000/-** The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Prof. Anatoly Filippov is Professor and Deputy Dean for Research at Gubkin Russian State University of Oil and Gas (National Research University), Moscow. Prof. Filippov is Corresponding Fellow of the Russian Academy of Natural Sciences. His research interests lie in surface interactions of colloidal particles and membranes, interface and electrokinetic phenomena, membrane processes (reverse osmosis, nano-, ultra-, microfiltration, electrodialysis), transport in porous media, physicochemical mechanics, nanotechnology, atomic force microscopy. He is the author and co-author of more than 300 scientific publications, four monographs and three patents. Prof. Filippov is a holder of more than 30 national and international scientific grants.

Dr. Amit Kumar Verma is an Assistant Professor at Indian Institute of Technology, Patna. His research interest is Analysis of Nonlinear Differential Equations (Nonlinear Singular Two Point and Multi Point Boundary Value Problems), Numerical Solutions of nonlinear ODEs and PDEs.

Prof. Manabendra Pathak is an Associate Professor at Indian Institute of Technology, Patna. His research interest is Computational Fluid Dynamics, Turbulent flows, Two-phase flow, Micro-fluidics, non-Newtonian fluid flow.

Course Co-ordinator

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