

INDIAN INSTITUTE OF SCIENCE



EDUCATION AND RESEARCH - THIRUVANANTHAPURAM

Lecture Series on

NAVIER-STOKES EQUATIONS: *Solvability, Control and Stochastic Analysis*

from Feb 22, 2011 to Mar 4, 2011

by

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<http://www.nps.edu/Academics/Schools/GSEAS/index.html>

Theme: *In this series of lectures the speaker will give an introduction to the current literature on mathematical fluid dynamics with particular emphasis on probabilistic and control theoretic issues. Special effort will be taken to keep the level of the lectures to be accessible to MS and PhD students and all prerequisites in stochastic processes and control theory will be provided. Non-specialists are welcome to attend.*

Lecture-I: A Mathematical description of fluid dynamics –derivation of governing equations.

Lecture-II: Introduction to Sobolev spaces and semigroup theory: application to the Stokes problem.

Lecture-III: The Clay Institute Millennium Prize Problem for the Navier-Stokes equation.

Lecture-IV: Optimal control theory of Navier-Stokes equation-I: existence of optimal controls (exterior hydrodynamics example).

Lecture-V: Optimal control theory of Navier-Stokes equation-II: Pontryagin Maximum Principle.

Lecture-VI: Optimal control theory of Navier-Stokes equation-III: feedback analysis and dynamic programming.

Lecture-VII: Introduction to stochastic calculus of Brownian motion and Ito formula.

Lecture-VIII: Stochastic Analysis of Navier-Stokes equation with Gaussian noise.

Lecture-IX: Introduction to stochastic calculus of Levy “jump” processes and Ito formula.

Lecture-X: Stochastic Analysis of Navier-Stokes equation with Levy Noise.

Venue: IISER-TVM, Computer Science Building, CET Campus, Engineering College P.O., Thiruvananthapuram-695016.

Schedule of the lectures:

Tuesday, Feb 22	9:15 AM - 10:15 AM
Wednesday, Feb 23	10:30 AM - 11:30 AM
Thursday, Feb 24	11:30 AM - 12:30 PM
Friday, Feb 25	10:30 AM - 11:30 AM
Saturday, Feb 26	10:00 AM - 11:00 AM & 11:30 AM - 12:30 PM
Monday, Feb 28	9:15 AM - 10:15 AM
Tuesday, Mar 1	9:15 AM - 10:15 AM
Thursday, Mar 3	11:30 AM - 12:30 PM
Friday, Mar 4	10:30 AM - 11:30 AM

There is no lecture in the afternoon session. Students are free to visit the speaker in his office for discussion/clarification.

How to apply: Interested MS / PhD students may contact the co-ordinator Dr. Utpal Manna (manu.utpal@iisertvm.ac.in, Phone: 0471-2599414) via e-mail expressing their interests to attend the lecture series by 15th February, 2011. The letter of interest should be supported by a recommendation letter from the Head of the Department / PhD supervisor. Outstation candidates will be provided free boarding and lodging.