

ESP- Intro to Fluid Mechanics/ Geophysical Fluid Dynamics 2012 SYLLABUS

LECTURE	THEME
1	Introduction to Fluid Mechanics and Properties of Fluids I
2	Properties of Fluids II and Statics
3	Scalars, Vectors, Tensors, Gradient, Divergence, Curl
4	Kinematics: Material derivative, streamline, streamfunction, strain rates, relative motion near a point, Vorticity and circulation
5	Conservation laws I: Mass, tracer, Advection-Diffusion Equation
6	Conservation laws II: Momentum and the Navier-Stokes Equations
7	Conservation laws II: Energy and Bernoulli equations
8	Boussinesq approximation and the Governing equations of Geophysical Fluid Dynamics
9	Dynamic similarity / Instabilities: Rayleigh-Benard Convection, Kelvin-Helmholtz instability
10	Geostrophic flow and Vorticity dynamics
11	Linear waves: Kelvin, Poincare', Rossby
12	Stratification and Internal waves

NOTE: THIS IS A TENTATIVE SCHEDULE AND MAY BE REVISED DURING THE COURSE.

TEXTBOOKS: any textbook on Fluid Mechanics, but particularly: 'Fluid Mechanics' by P. K. Kundu and 'Physical Fluid Dynamics' by D. J. Tritton.

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