ME709. Modern Approaches to Turbulence Victor Yakhot

Syllabus. Spring 2010.

Transition to turbulence. Probability; Random functions; Correlation and Structure functions; Energy spectra; Scaling exponents; Introduction to anomalous scaling;

Cascades; dissipation rate; energy fluxes; Burgers and 2D turbulence; Kolmogorov's theory

Renormalization; effective viscosity and heat transfer; derivation of turbulence models;

Balance equations; Mixing length; $K - \mathcal{E}$ and LES models; Numerical simulation of simple and complex lows; Heat transfer; Convection;

Industrial CFD and numerical design.