AME 530a: Dynamics of Incompressible Fluids

Fall 2015

2:00-3.20pm Monday and Wednesday, OHE 100C

Instructor: Prof. Mitul Luhar (luhar@usc.edu)

Preliminary Schedule

W	Date	Lectures	Notes
1	08/24/15	M: Preliminaries, Continuum Hypothesis W: Fluid Statics, Vector Calculus Review	HW1 out
2	08/31/15	M: Fluid Kinematics, Eulerian vs. Lagrangian descriptions W: Conservation of Mass and Momentum (Integral Form)	
3	09/07/15	M: Labor Day W: Conservation of Mass and Momentum (Examples, Bernoulli)	HW1 due, HW2 out
4	09/14/15	M: Conservation Laws in Differential Form, Newtonian Fluids W: Navier-Stokes Equations	
5	09/21/15	M: Boundary Conditions, Fully-developed steady flows W: Dimensional Analysis	HW2 due, HW3 out
6	09/28/15	M: Reynolds Number, Asymptotic Limits of Navier-Stokes W: Viscous Flow: Startup and Unsteady Flow	
7	10/05/15	M: Viscous Flow: Lubrication Theory W: *Review*	HW3 due
8	10/12/15	M: Potential Flow Theory (Ideal Flows) W: Forces on 2D Bodies, Kutta-Jouwkowski Theorem	**Midterm out**
9	10/19/15	M: Potential Flow Solution Techniques W: Gravity Waves I	**Midterm due**, HW4 out
10	10/26/15	M: Gravity Waves II W: Vorticity and Circulation, Rotational vs. Irrotational Flow	
11	11/02/15	M: Vortex Dynamics and Viscous Effects W: Introduction to Boundary Layers	HW4 due, HW5 out
12	11/09/15	M: Laminar Boundary Layer Solution W: Flow Separation (Boundary Layers, Bluff Bodies)	
13	11/16/15	M: Flow Instability W: Introduction to Turbulence	HW5 due, HW6 out
14	11/23/15	M: Fluid Dynamics Films W: Thanksgiving	
15	11/30/15	M: Turbulent Shear Flows: Jets, Wakes and Boundary Layers W: *Review*	HW6 due