ME EN 3710 Fluid Mechanics Schedule (Spring 2024)

Week	Lecture	Date	Topic	Lecture Content	Reading	Homework Due
1	1	9-Jan	Fluid Properties	Syllabus, Schedule, Textbook, fluids apps; Def of Fluid; Fundamental Concepts		
	2	11-Jan		Newtonian Fluid, No-slip condition, Viscosity, Viscometer problems	1.1-1.4	
2	3	16-Jan	Hydrostatics	Density, ideal gas law, compressibility, surface tension	1.5-1.7	
	4	18-Jan		Pressure, Equation of Hydrostatics,Barometer	2.1-2.5	HW 1
3	5	23-Jan		Manometry, Multifluid Manometers, Buoyancy	2.6,2.11	
	6	25-Jan		Plane and Curved Submerged Surfaces	2.8-2.10	HW 2
4	7	30-Jan	Fluid Kinematics	Eulerian/Lagrangian Descriptions of motion; Velocity field	4.1-4.2	
	8	1-Feb		Streamlines, Streaklines, and Pathlines; Intro to Moving fluids	4.3-4.4	HW 3
5	9	6-Feb		Reynolds transport theorem, Integral Conservation of Mass	5.1	
	10	8-Feb	Int Analysis/Review	Integral Momentum Equation; Review for Exam 1	5.1-5.2	HW 4
6		13-Feb	Exam 1	Fluid Properties, Hydrostatics, Fluid Kinematics		
	11	15-Feb	Integral Analysis	Integral Momentum in Non-Inertial Reference Frame	5.2	
7	12	20-Feb		Integral Conservation of Energy	5.3	
	13	22-Feb		Solving Integral Energy Problems	5.3	HW 5
8	14	27-Feb	Bernoulli's Equation	Bernoulli's Equation Derivation	3.1-3.6	
	15	29-Feb	Dimensional Analysis	Dimensional Analysis and Buckingham Pi Theorem	7.1-7.6	HW 6
9		5-Mar	Spring Break			
		7-Mar				
10	16	12-Mar	Dimensional Analysis	Similarity and Model Studies	7.9-7.10	
	17	14-Mar	Pipe Flow	Internal flows	8.1-8.4	HW 7
11	18	19-Mar		Pipe Flows (Major and Minor Losses)	8.4-8.5	
		21-Mar	Exam 2	Integral Analysis, Bernoulli's Equation, Dimensional Analysis		
12	19	26-Mar	Pipe Flow	Pipe Flow Problems	8.5	HW 8
	20	28-Mar	Differential Analysis	Conservation of Mass and Fluid Kinematics	6.1-6.2.1	
13	21	2-Apr		Navier-Stokes Equations	6.3	
	22	4-Apr	Boundary Layers	Boundary-layer concepts and integral equation	9.1-9.2	HW 9
14	23	9-Apr		Boundary layers with pressure gradient and turbulent flow	9.2	
	24	11-Apr	Lift and Drag	Drag (Form Drag + Skin Friction)	9.3	HW 10
15	25	16-Apr		Lift of Airfoils	9.4	
	26	18-Apr	Compressible Flow	Intro to compressible flow of ideal gases, thermodynamic relations, stagnation conditions	11.1-11.3	
16	27	23-Apr		Integral analysis isentropic flow, 1D duct flow	11.4 - 11.7	HW 11
17	Final Exam	1-May	Final Exam	Semi-comprehensive (10:30am - 12:30pm, WEB 2230)		