

Lesson Plan/ Course Break – up

PCC-CVE-301-T- ADVANCED FLUID MECHANICS

Name of the Faculty : Mr. Kamaldeep Singh
Discipline : B.Tech in Civil Engineering
Semester : V (3rdYear)
Subject : Advanced Fluid Mechanics
Lesson Plan Duration : 15 Weeks
Work Load (Lecture / Practical) per week (in hrs.) : Lectures – 03

Week	Theory	
	Lecture Day	Topic (Including assignment / Test)
1 st	1	Laminar Flow:Navier Stokes’s equation, Laminar flow between parallel plates
	2	Couette flow, laminar flow through pipes-Hagen Poiseuille law
	3	Laminar flow around a sphere-Stokes ‘law
2 nd	4	Flow through pipes: Types of flows-Reynolds’s experiment, shear stress on turbulent flow,
	5	Boundary layer in pipes- Establishment of flow, velocity distribution for turbulent flow in smooth and rough pipes,
	6	Resistance to flow of fluid in smooth and rough pipes, Stanton and Moody's diagram
3 rd	7	Darcy's weisbach equation, other energy losses in pipes, loss due to sudden expansion
	8	Hydraulic gradient and total energy lines, pipes in series and in parallel,
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4 th	10	Equivalent pipe, branched pipe, pipe networks
	11	Hardy Cross method, water hammer.
	12	Drag and Lift: Types of drag, drag on a sphere, flat plate, cylinder and airfoil,
5 th	13	Development of lift on immersed bodies like circular cylinder and airfoil.
	14	Open Channel Flow: Type of flow in open channels
	15	Geometric parameters of channel section
6 th	16	Uniform flow, most economical section (rectangular and trapezoidal),
	17	Specific energy and critical depth
	18	Momentum in open channel
7 th	1st Minor Test	
8 th	19	Specific force, critical flow in rectangular channel
	20	Applications of specific energy

	21	Discharge diagrams to channel transition
9 th	22	Metering flumes, hydraulic jump in rectangular channel,
	23	Surges in open channels, positive and negative surges
	24	Gradually varied flow equation and its integration, surface profiles.
10 th	25	Compressible flow: Basic relationship of thermodynamics continuity,
	26	Momentum and energy equations
	27	Propagation of elastic waves due to compression of fluid,
11 th	28	Mach number and its significance, subsonic and supersonic flows
	29	Propagation of elastic wave due to disturbance in fluid mach cone, stagnation pressure.
	30	Propagation of elastic wave due to disturbance in fluid mach cone, stagnation pressure.
12 th	31	Pumps and Turbines: Reciprocating pumps, their types
	32	Work done by single and double acting pumps.
	33	Centrifugal pumps, components and parts and working, types,
13 th	34	Heads of a pump-statics and manometric heads
	35	Force executed by fluid jet on stationary and moving flat vanes
	36	Turbines-classifications of turbines based on head and specific speed,
14th	2nd Minor test	
15 th	37	Turbines-classifications of turbines based on head and specific speed,
	38	Component and working of Pelton wheel and Francis turbines,
	39	Cavitation and setting of turbines.