Name of Faculty : Mr. Rampal
Discipline : Mechanical Engineering
Semester : IV
Subject : Hydraulics & Hydraulic Machines
Lesson Plan Duration : 15 Weeks (9 January onwards)

Week	Theory		Practical Day	
	Lecture Day	Topic (Including assignment/test)	Practical Day	Topic
I	1	**1.Introduction:** Fluid, types of fluid, properties of fluid viz mass density, wieght density(Specicific weight)	1	Measurement of pressure by Employing i) Piezometer Tube ii) Single & Double Column Manometer
	2	Specific Volume, Capillarity, Specific gravity, Viscosity, Compressibility		
	3	Surface Tension, Kinematic Viscosity Dynamic viscosity and their units		
II	4	**2.Pressure & its Measurement:** 2.1 Concept of Pressure (Atmospheric Presure, gauge Pressure, absolute Pressure)	2	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	5	Pascal's law, Static Pressure 2.2 Pressure measuring devices: Piezometer tube manometers-Simple U tube		
	6	Differential Single column Manometer		
III	7	Inverted U tube, Micromanometer including simple problems	3	To find out the value of coefficient of discharge for a venturimeter.
	8	Bourdon Pressure gauge, Diaphragm Pressure gauge		
	9	Dead Weight Pressure gauge		
IV	10	**3. Flow of Fluids:**Types of Fluid Flow- Steady and Unsteady, Uniform and non-uniform, laminar and Turbulent	4	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	11	Rate of flow and their units, Continuity Equation of Flow		
	12	Potential Energy of a flowing Fluid, total head		
V	13	Bernoulli's Theorem(Statement & proof) & its applications	5	Measurement of flow by using venturimeter.
	14	Discharge measurement with the help of Venturimeter.		
	15	Discharge measurement with the help of Orificemeter.		
VI	16	Pitot Tube, Limitation of Bernoulli's Theorem, Simple problem	6	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	17	**4.Flow Through Pipes**: Definition of pipe flow, wetted perimeter, Hydraulic mean depth, Hydraulic gradient, Loss of head due to friction		
	18	Chezy's equation and Darcy's equation of head		

		loss(without proof)		
VII	19	Reynods number and its effect on pipe friction, Siphon	7	Verification of Bernoulli's Theorem
	20	Nozzle- Definition, Velocity of liquid flowing through Nozzle, Power developed		
	21	Water Hammer, Anchor Block		
VIII	22	Syphon, Surge Tank (Concept only)	8	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	23	Loss of head in pipes due to sudden enlargement, due to sudden contraction,		
	24	Obstruction to flow path, change of direction & pipe fittings (without Proof)		
IX	25	**5.Flow through orifices:** Cc, Cv, Cd,	9	To study the hydraulic circuit of Hydraulic brakes & Hydraulic Ram
	26	Flow through drowned, partially drowned orifice		
	27	Time required for emptying a tank through circular orifice		
X	28	Simple numerical problems on flow through orifice	10	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	29	**6.Hydraulic Machines**:Description, operation and application of Hydraulic system -Hydraulic Ram, Hydraulic Jack		
	30	Hydraulic Brake, Hydraulic Accumulator		
XI	31	Hydraulic Door closer,Hydraulic Press,	11	Study the working of Pelton Wheel Turbine& Francis Turbine
	32	Selection of specification of above systems for different applications		
	33	**7.Water Turbines and Pumps:** Concept of a turbine, types of turbine-Impulse & reaction(Concept only)		
XII	34	Difference between Impulse & Reaction Turbine	12	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	35	Construction & working of Pelton Wheel Turbine		
	36	Construction & working of Francis Turbine		
XIII	37	Construction & working of Propeller and Kaplan Turbine	13	To study single stage centrifugal pump for constructional details & its operation to find out its normal head and discharge.
	38	Unit speed, unit power, unit discharge,		
	39	Specific speed of Turbine, Selection of turbines based on specific speed		
XIV	40	Concept of Hydraulic Pump, single acting reciprocating pump(construction &operation only)	14	Checking of files and Viva Voce and remedial measures regarding the practical performed (If any)
	41	Vane, Screw and Gear Pumps		
	42	Construction , working & operation of Centrifugal Pumps.		
XV	43	Performance, Efficiencies and specifications of a Centrifugal Pump	15	Final Viva-Voce
	44	Trouble shooting & problems in Centrifugal		

		Pumps.		
	45	Remedial measures, pitting, cavitation, Priming		