

**SUDDHANANDA ENGINEERING AND RESEARCH CENTER, BBSR ||**

**Lesson Plan**

Discipline : MECHANICAL ENGG.		Semester: 5th Sem	Name of the Teaching Faculty : P.K.Behera
Subject : HM & IFP		No. of Days / per week class allotted : 04	
MONTH	Week	Day	Topics
SEPTEMBER	3rd	4th	Definition and classification of hydraulic machines & turbines, General Layout of Hydroelectric Power Plant
		5th	Various terminologies relating to turbines- Gross head, Net Head, Hydraulic Efficiency, Mechanical Efficiency, Volumetric Efficiency, Overall Efficiency
	4th	2nd	Distinguish between impulse turbine and reaction turbine Construction with various parts and working principle of Impulse turbine/ Pelton Wheel with neat diagram.
		3rd	Velocity diagram of moving blades, work done and derivation of various efficiencies of Impulse turbine, Condition for maximum Hydraulic Efficiency and Maximum Hydraulic Efficiency
		4th	Points to remember for solving Problems on Pelton Wheel. Solving Problems on Pelton Wheel
		5th	Solving Problems on Pelton Wheel
	5th	2nd	Solving Problems on Pelton Wheel
		3rd	Fundamentals regarding Reaction Turbine- Inward radial flow reaction turbine, Outward radial flow reaction turbine, Mixed flow Turbine.
		4th	Construction with various parts and working principle of Francis turbine with neat diagram
	OCTOBER	3rd	5th
2nd			Solving Problems on Francis Turbine
3rd			Construction with various parts and working principle of Kaplan turbine with neat diagram.
4th			Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine
4th		5th	Solving Problems on Kaplan turbine
		2nd	Revision
		3rd	Definition and classification of pump, Construction and working principle of centrifugal pumps
		4th	Derivation for Work done and various efficiencies of centrifugal pump
5th		5th	Important terms like Suction Head, Delivery Head, Manometric Head and various efficiencies like Manometric Efficiency, Mechanical Efficiency, Overall Efficiency and relationship between the efficiencies.
		2nd	Solving numerical problems relating to Centrifugal Pumps
	3rd	Definition of reciprocating pump, construction & working principle of single acting reciprocating pump	
	4th	Derivation of the formula for discharge and power required to drive the single acting pump.	
NOVEMBER	1st	5th	Construction & working principle of Double acting reciprocating pump
		2nd	Derivation of the formula for discharge and power required to drive the Double acting reciprocating pump
		3rd	Definition of slip, Positive Slip and Negative slip, relationship between slip & coefficient of discharge
		4th	Solving numerical problems relating to Reciprocating Pumps
		5th	Revision
	2nd	3rd	Fundamentals of Pneumatic Control Systems, its various components, Applications, Real life examples, its merits and demerits
		4th	Air Compressor: Reciprocating piston Compressor, Diaphragm Compressor, Rotary piston Compressor, Screw Compressor, vane compressor
		5th	Reservoirs, Inlet filters, Air dryers and its types, Service unit: Filter, Regulator and Lubricator (FRL)
	3rd	2nd	Various types of Pneumatic actuators with neat diagram
		3rd	Direction control valves and its functions, 2/2 DCV, 3/2DCV, 4/2 DCV, 5/2 DCV, 5/3DCV explanation with ANSI symbols
4th		Flow control valves and Throttle valves, Supply Air throttling and Exhaust Air throttling	
4th	5th	Quick exhaust valves and Shuttle valve explanation with neat diagram, ISO Symbols of pneumatic components	
	2nd	Pneumatic circuits: Direct control of single acting cylinder ,Operation of double acting cylinder	
	3rd	Fluid Power systems, types and its various components, Applications, Real life examples, its merits and demerits, Basic theory behind how the Hydraulic control systems work.	
	4th	Fluid power pumps: Positive Displacement pump, Gear Pump-External and Internal gear pumps	
	5th	Vane pump, Radial piston pumps	
5th	2nd	Pressure control valves, Pressure Relief valves, pressure regulation valve	
	3rd	Pressure reducing valve, Sequence valve, Counter Balance valve(CBV), Unloading Valve	
	4th	Actuators- Definition, its function, its types with diagram and description	
	5th	Flow control valves- Definition, function, its types with symbol-Fixed, Adjustable, pressure compensated flow control valve, throttle valve	
	2nd	Meter-in and Meter-out Circuit explanation with diagram	
DECEMBER	2nd	3rd	Hydraulic accumulators- Definition, its function, its types- Spring loaded type, Weight loaded type,
		4th	ISO Symbols and reasons of using symbols, ISO symbols of various hydraulic components Flow lines, Reservoirs, Pumps, Direction Control Valves,
		5th	Hydraulic circuits: Direct control of single acting cylinder with diagram
	3rd	2nd	Operation of double acting cylinder with diagram
		3rd	Operation of double acting cylinder with metering in and metering out control
4th		Comparison of Hydraulic and Pneumatic system	
4th	5th	Revision	
	2nd	Revision	
	3rd	Previous Year Question Discussion	
		4th	Previous Year Question Discussion