

GANPAT UNIVERSITY
B. TECH. SEM. V – MECHANICAL ENGINEERING
ME – 504 FLUID POWER ENGINEERING

Teaching scheme (Hrs)			Examination scheme (Marks)							
			Theory				Practical			Grand Total
L	P	Total	Internal Asses.	Sem End		Total	Internal Asses.	Sem End	Total	
4	2	6	30	70	3	100	25	25	50	150

- 1. Hydropower Station:** Utilization of energy of water – development of hydraulic power stations – selection of basic parameters for hydro station – types of hydraulic power stations – layout of power station.
- 2. Flow through pipes:** Fluid friction, hydraulic gradient of pipe, losses of head due to friction in pipe – siphon pipe- Equivalent size of a pipe - parallel flow through pipes, time of emptying tank through a pipe, time of flow from one reservoir to another through long pipe, branched mains, Hydraulic Power Transmission through pipes, flow through nozzles, Venturi & Orifices , Water hammer.
- 3. Principle of working of Turbo – Machinery:**
Impact of jet on different types of flat and curved plates, fixed and moving, single and series of plates, derivation of condition for maximum efficiency, hinged plate and pipe bends.
- 4. Hydraulic Turbines:**
Classification of turbines, Impulse and reaction, Radial, Axial, and mixed flow turbines, Major components of different turbines, Expressions for work done and efficiency of Pelton wheel, Bucket of Pelton wheel, Size and number of buckets, Single jet and multi jet Pelton wheel, Francis turbine, Kaplan turbine and Propeller turbines.
- 5. Performance of Turbines:**
Specific speed, Range of Specific speed for different turbines, performance curves of turbine, Selection of turbines according to available head, discharge and load, Governing of turbines.
- 6. Pump & Compressors:**
Roto dynamic pumps, Centrifugal turbine pumps and axial flow pumps, constructional features and working theory, pressure rise through impeller, characteristic curves of C.F. pump, Priming, maximum suction limit – Minimum starting speed to deliver the discharge, specific speed of pumps, suction specific speed.
Centrifugal and axial compressors, Drag and lift on aerofoil blade, pressure rise, Power input, Drag and lift co-efficient. Calculation of pressure ratio, static and total Pressure static and total temperatures, work done, power input factor, and work Done Factor, pressure coefficient, slip factor, compressibility effect, pre-whirl, Compressor

Performance curve, efficiency and losses, surging and stalling.

7. Miscellaneous Hydraulic Machines :

Construction & application of Hydraulic Press, Hydraulic Accumulator, Hydraulic Intensifier, Hydraulic Crane, Hydraulic Jack, Hydraulic lift, Hydraulic Ram.

Fluid couplings and fluid torque converter, Hydraulic Dynamometer, Hydraulic clutch.

• **Term work:** -

The term work shall be based on experimental and analytical work on topics mentioned above

• **Practical & Oral:** -

The candidate shall be examined orally / practically on the base of above term work.

BOOKS &

1. Fluid mechanics and hydraulic machines by R. K. Bansal
2. Fluid Power Engineering by D.S. Kumar

REFERENCE BOOKS:

1. Hydraulic and hydraulic machines by Jagdishlal.
2. Hydraulic Machines by Vasandani
3. Gas turbines & Jet propulsion by Khajuria & Dubey