

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma in Mechanical Engineering

Semester: 3

Subject Code

Subject Name FLUID MECHANICS AND HYDRAULIC MACHINES

Sr. No.	Course content
1.	FLUID AND FLUID PROPERTIES: 1.1 Concept and classification. 1.2 Properties of fluid.
2.	FLUID STATICS: 2.1 Pressure and pressure measurement of fluid, laws of fluid statics. 2.2 Selection of pressure measuring devices.
3.	FLUID KINEMATICS: 3.1 Fluid flow : types and equations including ideal, laminar, turbulent and compressible.
4.	FLUID DYNAMICS: 4.1 Basic equations. 4.2 Bernoulli's equation and its applications. 4.3 Euler's equation and its applications.
5.	FLOW MEASUREMENT: 5.1 Notches, Venturimeter, Orifice meter, Nozzles, Rota meters. 5.2 Selection criteria for flow measuring devices.
6.	FLOW THROUGH PIPES: 6.1 Reynolds's experiment, friction factor, Darcy's equation Moody's chart. 6.2 Water hammer effect. 6.3 Selection criteria for pipes and pipe sizes
7.	IMPACT OF JETS: 7.1 Impact of jet on flat and curved-stationary and moving plates. 7.2 Work done and efficiency calculations. 7.3 Impact of jet on series of curved and flat plates.

8.	HYDRAULIC PRIME MOVERS: 8.1 Classification, construction, working and application of various hydraulic prime movers. 8.2 Specific speed and its importance 8.3 Selection and maintenance of turbines.
9.	PUMPS: 9.1 Concepts, classification and application of pumps. 9.2 Detailed study (construction, working) of (1) Centrifugal pump (2) Reciprocating pump (3) Turbine pump (4) Submersible pump (5) Rotary positive displacement type pumps (6) Gear pump 9.3 Performance of pumps, importance of efficiency, discharge, head and power consumption. 9.4 Selection of pumps. 9.5 Maintenance of pumps. 9.6 Faults, remedies and safety precaution for pumps. 9.7 Filtration-importance 9.8 Specific speed for pumps. 9.9 Characteristic curves of submersible and centrifugal pumps.
10.	HYDRAULIC DEVICES: 10.1 Flow control valves- types, construction, working and applications. 10.2 Hydraulic control valves- types, construction, working and applications. 10.3 Hydraulic cylinders-types, construction, working and applications. 10.4 Hydraulic proportional valve-construction, working and applications. 10.5 Hydraulic motors- types, construction, working and applications. 10.6 Fluid couplings-construction, working, applications. 10.7 Filters-types, working, applications 10.8 Construction, hydraulic circuits, working, common troubles, probable causes and their remedies and preventive maintenance of: <ul style="list-style-type: none"> - Intensifier - Hydraulic lift - Accumulator - Hydraulic ram - Hydraulic crane - Hydraulic press 10.9 Advantages and limitations of hydraulic systems

11.	PNEUMATIC DEVICES : 11.1 Introduction to pneumatics as power transmission device. 11.2 Pneumatic elements used in pneumatic circuits -types, construction, working, applications and common troubles and remedies in working of them, precautions in installations and assembly. 11.3 Working principle ,working and applications of pressure regulators. 11.4 Pneumatic circuit diagrams for typical mechanical units. 11.5 Advantages and limitations of pneumatic systems.
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Reference Books:

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| 1. | Fundamentals of Fluid Mechanics (in S.I. Units), | Dr.D.S.Kumar | Katson Pub.House, |
| 2. | Fluid Mechanics & Hydraulic Machines (In S.I.Units) | R.S.Khurmi | S.Chand & Co.Ltd. |
| 3. | Hydraulic Machines & Fluidics | Dr.Jagdishlal Book Co. | Metropolitan |
| 4. | Hydraulic & Hydraulic Machines Priyani | Prof.V.P. Pub.House | Charotar |
| 5. | Hydraulics & Hydraulic Machines | Prof.R.C.Patel & A.D.Pandya | Acharya Book Depot, |
| 6. | Fluid mechanics and Hydraulic Machines | S.C.Gupta | PEARSON Education |
| 7. | Fluid Mechanics | Douglas | PEARSON Education |
| 8. | Industrial Pneumatic Control | Z.J.Lansky | Marcel Dekker,Inc |