

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: IV

Plastic Technology

Subject Code **142302**

Subject Name **Plastic Industrial Hydraulics and Pneumatics**

Sr.No	Course contents
1	General Hydraulics: Introduction - Pascal's law - Advantages and Disadvantages of hydraulic systems - Requirements of hydraulic oil -Maintenance of hydraulic oils: Heat exchanges, Filters and Strainers etc. -Reservoir design criteria - Principle hydraulic jack - Pipes, Packing and Seals.
2	Hydraulic Pumps and Motors: Various types of pumps and motors like Gear type,Piston type ,(radial &axial),Vane type (intra vane etc.) - Selection criteria for a specific application like Injection molding machines, Extrusion,Blow molding etc. - Working principles and Performance.Definitions like Vol. efficiency, Rating (Temp. And pressure); Displacement.
3	Hydraulic valves: Types - Classification - Details of pressure control - Flow control ; Methods of flow control, Meter in, Meter out, Bleed off, Flow control valves like pressure compensated and non pressure compensated in detail with applications. Directional control valves; One way (check valves) of various types inline, right angle, restriction, pilot operated etc., two way valves rotary type, spool type, operating controls, spool central conditions, deceleration valves. Pressure controls - relief valves of types simple and compound, venting and relief valves, unloading valves, sequence valves and its applications, counter balance valve, brake valve, pressure reducing valves like direct acting and pilot operated etc. Principles of operation - Application in molding machines.
4	Accumulators and Pressure Intensifiers: Types like weight loaded, spring loaded, gas charge with and without separator, piston type - with advantages and limitations and applications - intensifiers - its purpose, type like single acting and double acting, applications with various circuits.
5	Servo valves:- Introduction - Construction and its mechanism -Its application in industries
6	Compressor:- Classification-Working principle & construction-Troubleshooting and maintenance

7	FRL Unit:- Types of FRL unit - Working principle, construction-Application
8	Pneumatics Tubing & piping for Pneumatics- Pneumatics circuits-Application of Pneumatics in plastic processing equipments.
9	Symbols for Hydraulic elements and Various types of Hydraulic Circuits – Deceleration circuit, Flow control circuit, Prefill circuit, Injection & clamp control circuit etc.
10	hydraulic, Differences with on-off Hyd. - valves-circuits etc.

Reference Books:

1. Industrial Hydraulics manual by Vickers
2. Hydraulics vol. 1 & 2 by Rexroth
3. Injection molding, theory & practice – I. V. Rubin.