



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3132305

Semester – III

Subject Name: Hydraulics & Pneumatics in Plastic Industry

Type of course: Plastic Technology

Prerequisite: NA

Rationale:

A Plastic Technologist has to supervise operations and maintenance of various molding machines. The injection molding, blow molding, thermoforming, extruder, rotational molding machines require knowledge of construction and working of different components of hydraulic and pneumatic systems. Hence the course has been designed to develop these competencies.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Introduction: Pascal's law & its applications, Bernoulli's Principle & its application, Comparison between Hydraulics and Pneumatics, Advantages and Disadvantages of Hydraulics, Hydraulic Oil-Requirements, Maintenance of Hydraulic oil, Gauges, Connectors, Packing and Seals, Filters and Strainers, Reservoirs, Symbols of Hydraulics and Pneumatics	8
2	Hydraulic Pumps and Motors Pump Specification, Construction and working of Various Pumps like Gear pump, vane pump and radial piston pump. Hydraulic motor specification, Construction and working of various motors like Gear Motor, Vane motor and Radial piston motor.	7
3	Hydraulic Valves Classification, Direction Control Valve- Types : Check valve, Two way Valve , Four way Valve its Application. Flow Control Valve. Pressure Control Valve: Relief Valve, Balanced Valve, Piston Type, Unloading Valves , Sequence Valves, Counter Balance Valve, Pressure Reducing Valves	10
4	Accumulators and Pressure Intensifiers, Accumulators Types like Weight Loaded, Spring Loaded, Gas Charged, Pressure Intensifiers Types single stage and double stage	5



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5	Pneumatic System Air Compressor -Single Acting and Double Acting , Components of Pneumatic System, Intercooler, Lubricator, Filter	4
6	Hydraulic Circuit Clamp control circuit, Injection Control Circuit, Reciprocating Screw Circuit, Deceleration Circuit, Prefill Circuit, Hydraulic motor circuit, Hi Low Pump circuit, Pneumatic circuit for Plastic Processing Machine	8

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	21	12	7	10	8

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Industrial Hydraulic Manual- Vickers
2. Injection Moulding- Irwin I. Rubin
3. Hydraulics and Pneumatic- Andrew Parr

Course Outcomes:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

Sr. No.	CO statement	Marks % weightage
CO-1	Draw symbols used in hydraulic systems.	10
CO-2	Classify the valves used in hydraulic systems. Operate different types of valves used in hydraulic systems	30
CO-3	Maintain different valves and auxiliaries.	10



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CO-4	Develop efficient hydraulic circuits.	15
CO-5	Assemble pumps and motors to rectify problems.	25
CO-6	Maintain the pneumatic and hydraulic system	10

List of Experiments: - As per the above syllabus topics

Major Equipment:

List of Open Source Software/learning website:

- i. www.redoaksys.com (for animations)
- ii. www.boschrexroth.com
- iii. www.eaton.in (Vickers)
- iv. www.compair.com/products/compressor_training_animations.aspx