

5113 – INDUSTRIAL HYDRO-PNEUMATIC CONTROL										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory		Practical Ex.		Total	
3	2	5	50		3 Hrs	100	-		150	
Pre-requisite		Source	Semester		Theory	Test	Total	TW	PR	Gr Total
4203		INC			75	25	100	25	50	175

Rationale: The development of mass production on assembly lines, as a standard industrial process, increased the demand for and possible applications of compressed air. This course deals with the pneumatic directional control valve and pneumatic circuitry. Emphasis is also laid on component selection, installation and maintenance and trouble shooting. The course also deals with the practical applications and current developments in pneumatic circuits as well as in hydraulic circuits.

COURSE CONTENTS		Hrs	Mks
1. CONTROL OF PNEUMATIC ENERGY		7	15
Introduction, Valves, Control of pressure, Control of flow rate, Control of Actuator Direction, A simple pneumatic system, Pneumatic symbols.			
2. VALVES-TYPES AND FUNCTIONS		10	20
Introduction, Functional types of valves, Additional valve types, Directional valve Actuators, Delays, Delays with Detented Valves, Delays using the Detented valves			
3. VALVE APPLICATION		10	20
Common pneumatic circuits: - Two-way valve circuitry, Three-way valve circuitry, Four-way valve circuitry, Four- way Five- ported valve circuitry, Basic logic element circuitry, Basic timing element circuitry.			
4. INSTALLATION & MAINTENANCE OF PNEUMATIC COMPONENTS		2	5
Introduction, Installation, Maintenance, Repair			
5. CURRENT DEVELOPMENTS IN PNEUMATIC DIRECTIONAL CONTROL VALVES		7	15
Introduction, Miniaturization, Circuit application (sequencing valve application, limit switch application)			

	3	5
6. INDUSTRIAL PRIME MOVERS A brief system comparison, An electrical System, A hydraulic system, A pneumatic system, A comparison	4	8
7. HYDRAULIC PUMPS AND PRESSURE REGULATION Pressure regulation, Pumps types, Gear pumps, Vane pumps, Piston pumps, Combination pumps.	5	12
8. HYDRAULIC AND PNEUMATIC ACCESSORIES Hydraulic reservoirs; Hydraulic accumulators; Hydraulic coolers and heat exchangers; Hydraulic fluids; Pneumatic piping, hoses and connections; Hydraulic piping, hoses and connections.	48	100
Total		

LIST OF EXPERIMENTS: (Minimum of 8-10)

1. To study the power pack of pneumatic power supply.
2. To execute a bending operation of bending a brass plate into U shape, using a single acting pneumatic cylinder.
3. To built and study the double acting pneumatic cylinder for its push-pull application.
4. To built and study an application of 4/2 way valve using a double acting pneumatic cylinder.
5. To study the working of a delay with detented valve.
6. To built and observe an AND operation using pneumatic directional control valves.
7. To built and observe an OR operation using pneumatic directional control valves.
8. To built and observe a timing element circuitry using the pneumatic directional control valves.
9. To study a limit switch operation of 'Start and stop' type application using the pneumatic directional control valves.
10. To built and observe a sequencing operation using pneumatic directional control valves.
11. To study the power pack of a Hydraulic power supply.
12. To built and observe the 'Push pull action' using hydraulic directional control valves.

TEXT BOOKS:

1. Industrial Pneumatic Control by Z. L. Lansky, Lawrence F. Schnader Jr.
2. Hydraulics and Pneumatics by Andrew Parr

REFERENCE BOOKS:

Industrial Pneumatics and Hydraulics by Faesto Manuals

