SRM UNIVERSITY
SCHOOL OF MECHANICAL ENGINEERING

LESSON PLAN

COURSE CODE & TITLE : ME0562- DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS
DEGREE / BRANCH: M.Tech. / CAD
YEAR / SEMESTER: I I/ III

Sl. No.	Hr.	TITLE	REF. BOOK	CHAPTER NO.
		HYDRAULIC SYSTEMS		
1	1	Introduction to fluid power system, Hydraulic fluids- functions, types, properties, selection and application.	T1	Ch-1, Ch-2
2	1	Components of Hydraulic components,Pneumatic System -comparison between Hydraulic,Pneumatic and Electric drive system	T1	Ch-5
3	1	Construction, operation, characteristics and graphical symbols – pumps(Gear pump –Lobe, Gerotor and Screw)	T1	Ch-5
4	1	Construction, operation, characteristics and graphical symbols – pumps(Vane pump – principle, Variable-displacement, pressure-compensated and balanced)	T1	Ch-5
5	1	Construction, operation, characteristics and graphical symbols – pumps(piston pump - Bent-Axis Piston Pump, Swash type Piston pump and Radial Piston Pump)	T1	Ch-5
6	1	Linear actuators(Cylinder- single and double acting) –Cushioning of cylinder and Telescoping arrangement of cylinder	T1	Ch-6, Ch-7
		Rotary actuator (Gear ,vane and piston motors)-Motor rating		
7	1	Types of hydraulic transmission-pump motor combination- open loop,closed loop system-application	T1	Ch-8
9	1	Pressure control valve – Pressure relief valve, Compound pressure relief valve, Pressure Reducing valve- Application circuits	T1	Ch-8
10	1	Pressure control valve – Sequence valves, Unloading valve and Counter balance Valve - Application circuits	T1	Ch-8
11		**DESIGN OF HYDRAULIC CIRCUIT**		
12	1	Manual or Automatic Hydraulic systems-grinding machine-	T2	Ch -12
13	1	Regenerative circuit-concept-simple problems	T2	Ch -12
		Cycle test 1		
14	1	use of check valve – Meter-in, Meter-out and bleed off	T2	Ch -12
15	1	selection of pump-hi lo system- flow isolation system	T2	Ch -12
16	1	Basic circuits: Tandem Centre Valve,Sequential operation,Indirect control,Clamping force	T2	Ch -12
17	1	Servo control for Extrusion process	T2	
18	1	Microprocessor control in a hydraulic system	T2	
19	1	Accumulator-types-Application circuits	T1	
		PNEUMATIC SYSTEMS		
20	1	Construction, operation, characteristics symbols of pneumatic components – compressor and its types	T1	Ch-13
21	1	Air treatment - principles and components-FRL	T1	Ch-13
22	1	Sensors - types, characteristics and applications.	T1	Ch-16
23	1	Introduction to fluidics- Flip flop, preference flip flop, Gates – OR, AND, XOR	T1	Ch-16
24	1	MPL and,or,not functions	T1	Ch-16

Sl. No.	Hr.	TITLE	REF. BOOK	CHAPTER NO.
		HYDRAULIC / PNEUMATIC CIRCUITS		
		Cycle test 2		
25	1	Cascading circuits – Two cylinders	T1	Ch-9, Ch-14
26	1	Cascading circuits – Three cylinders	T1	Ch-9, Ch-14
27	1	Circuits using electrical switches,timers	T1	Ch-9, Ch-14
28	1	Logic circuits- using PLC	T1	Ch-9, Ch-14
29	1	Feedback control circuits	T1	Ch-9, Ch-14
		DESIGN OF FLUID POWER SYSTEMS		
30	1	Speed, force and time calculations	T1	Ch-9
32	1	Calculation of pressure and pressure drop across components,	T1	Ch-9
33	1	Sizing of actuators, pumps - problems	T1	Ch-9
35	1	Sizing of reservoirs and accumulators - problems	T1	Ch-11,Ch-14
36	1	Calculations on Heat generation in fluid	T1	Ch-11
		APPLICATION, MAINTENANCE AND TROUBLE SHOOTING		
37	1	Hydraulic / pneumatic circuits applied to machine tools	T1	Ch-9, Ch-14
38	1	Hydraulic / pneumatic circuits - presses	T1	Ch-9, Ch-14
39	1	Hydraulic / pneumatic circuits - material handling systems	T1	Ch-9, Ch-14
40	1	Hydraulic / pneumatic circuits - automotive systems	T1	Ch-9, Ch-14
41	1	Hydraulic / pneumatic circuits - packaging industries	T1	Ch-9, Ch-14
42	1	Hydraulic / pneumatic circuits - manufacturing automation	T1	Ch-9, Ch-14
43	1	Maintenance of fluid power systems - preventive and breakdown.	T1	Ch-12
44 45	2	Maintenance procedures. Trouble shooting of fluid power systems - fault finding process, equipments/tools used, causes and remedies.	T1	Ch-12

TEXT BOOKS

1 Anthony Esposito, Fluid Power with applications, Prentice Hall International, 1997
2 Majumdar S.R., Oil Hydraulics, Tata McGRaw Hill, 2002
3 Majumdar S.R., Pneumatic systems - principles and maintenance, Tata McGraw-Hill, New Delhi,

REFERENCE BOOKS

1 Werner Deppert / Kurt Stoll, Pneumatic Application, Vogel verlag, 1986
2 John Pippenger, Tyler Hicks, Industrial Hydraulics, McGraw Hill International Edition, 1980
3 Andrew Parr, Hydraulics and pneumatics, Jaico Publishing House, 2003
4 FESTO, Fundamentals of Pneumatics, Vol I, II and III
5 Hehn Anton, H., Fluid Power Trouble Shooting, Marcel Dekker Inc., NewYork, 1984
6 Thomson, Introduction to Fluid power, Prentcie Hall, 2004

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