SCHEME OF COURSE WORK

Course Details:

Course Title	**:** DESIGN OF FLUID POWER SYSTEMS		
Course Code	**:** 13ME2115	**L T P C**	**:4 0 0 3**
Program:	**: M.Tech.**		
Specialization:	**: CAAD**		
Semester	**: IInd**		
Prerequisites	**:--**		
Courses to which it is a prerequisite	**:--**		

Course Outcomes (COs):

At the end of the course, the student will be able to

1	summarize the working of hydraulic systems and pumps
2	explain working of hydraulic valves, cylinders and motors
3	design the hydraulic and pneumatic circuits for a given application and execute the same in industry
4	identify the maintenance and trouble shooting of fluid power systems in industry
5	outline the advanced electrical controls in fluid power systems

Program Outcomes (POs):

At the end of the program, the students in CAAD will be able to

1	acquire knowledge in latest computer-aided design and analysis tools
2	create 3D models of real-time components using latest CAD software
3	acquire technical skills to formulate and solve engineering and industrial problems
4	carry out analysis for the design of new products
5	have proficiency to solve problems using modern engineering design tools
6	have capability to work in multidisciplinary streams
7	apply project and finance management skills to organise engineering projects
8	prepare technical reports and present them effectively
9	engage in lifelong learning
10	realize professional and ethical responsibilities
11	conduct surveys, analyse data, plan, design and implement new ideas into action

Course Outcome Versus **Program Outcomes:**

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO-1			M		S						
CO-2			M		S						
CO-3			S		M	M					
CO-4					M	S					
CO-5					M				S		

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction to hydraulic systems, Design and construction of hydraulic reservoir and sizing, gravity type	CO-1	1. Expline working of any type of accumulator 2. Expline working of any type of pump 3. Expline working of any type of valve	Lecture and PPT Animation	Assignment - I (Week 2 - 4)
2	spring-loaded and gas loaded type accumulators	CO-1			
3	gear pumps, vane pumps and piston pumps, sizing of hydraulic pumps, selection of hydraulic pumps ents for convergence	CO-1			
4	Direction control valves, pressure control valves, flow control valves, servo valves.	CO-2			
5	hydraulic cylinder operation and cylinder mountings - hydraulic cylinder design and cushions	CO-2	1. Expline the working of double acting cylinder 2. Expline the working of any type of motor 3. Short notes on hydraulic motor performance - hydrostatic transmissions.	Lecture and PPT Animation	Seminar -I (Week 6 - 8)
6	hydraulic motors - gear, vane and piston motors	CO-2			
7	hydraulic motor theoretical torque, power and flow rate - hydraulic motor performance - hydrostatic transmissions.	CO-2			
8	Control of single and double acting cylinders, regenerative and pump unloading circuit	CO-3			
	Mid-Test 1	CO-1, CO-2			Mid-Test 1 (Week 8)
9	hydraulic cylinder sequence and synchronizing circuits	CO-3	1. With neat sketch and	Lecture and PPT	Assignme

10	speed control of hydraulic cylinder and motor, hydraulic motor breaking system	CO-3	expline the any one type of cylinder sequence circuit 2. With neat sketch and expline the any one type of speed control of hydraulic cylinder With neat sketch and expline the any one type of basic pneumatic circuit	mulation	nt - II (Wee12 - 14)
11	Basic requirements for pneumatic system – air compressor – pneumatic cylinders and air motors – pneumatic valves - basic pneumatic circuits	CO-4	1. Expline the oxidation and corrosion of hydraulic fluids Expline wear of moving parts caused by gases in hydraulic fluids	Discussion Lecture and PPT	Seminar - II (Week 14 - 16)
12	oxidation and corrosion of hydraulic fluids - maintaining and disposing of fluids	CO-4			
13	wear of moving parts due to solid particle contamination of the fluid - problems caused by gases in hydraulic fluids	CO-4	1. Expline the troubleshooting of pneumatic systems 2. Expline the electro-pneumatic circuits for the control of single and double-acting cylinders 3. Expline the troubleshooting of pneumatic systems 4. Expline the electro-pneumatic circuits for the control of single and double-acting cylinders	Lecture and PPT Demonstration Lecture and PPT Demonstration	
14	maintenance and troubleshooting of pneumatic systems	CO-4			
15	troubleshooting of hydraulic system - maintenance and troubleshooting of pneumatic systems	CO-5			
16	examples of simple electro-pneumatic circuits with solenoid operated direction control valve for the control of single and double-acting cylinders	CO-5			
	Mid-Test 2	CO-3, CO-4, CO-5			Mid-Test 2 (Week 16)
17 to 19	End Exams	All COs			