SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Narsapur, West Godavari District, A.P. 534280
DEPARTMENT OF ROBOTICS

TEACHINGPLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23RB4T01	Hydraulic and Pneumatics	IV	ROBOTICS		2024-25	16-12-2024

COURSE OUTCOMES

CO1	Describe the Fluid power and operation of different types of pumps. [K2]
CO2.	Discuss the features of hydraulic actuators and Flow control valves. [K2]
CO3.	Describe the flow control and pressure control valves.[K2]
CO4.	Describe the different types of hydraulic circuits and systems. [K2]
CO5.	Describe the working of different pneumatic circuits and systems. [K2]
CO6.	Summarize the various troubleshooting methods and applications of hydraulic and pneumatic systems. [K2]

UNIT	Outcomes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method/ Teaching aids
			FLUID POWER PRINICIPLES AND HYDRAULIC PUMPS			
I	CO1. Describe the Fluid power and operation of different types of pumps. [K2]	1.1	Introduction to Fluid power, Advantages and Applications,	T1, T2, R1	2	Lecture & chalk, Talk, PPT, Active learning
		1.2	Fluid power systems- types of fluids	T1, T2, R2	1	
		1.3	properties of fluids and selection,	T1, T2, R3	1	
		1.4	Basics of Hydraulics – Pascal"s Law, principles of flow,	T1, T2, R1	1	
		1.5	Friction loss, work, power and torque problems,	T1, T2, R3	1	
		1.6	Sources of Hydraulic power : Pumping Theory, Pump classification,	T1, T2, R3	1	
		1.7	construction, working, design, advantages, disadvantages, performance	T1, T2, R2	1	
		1.8	Selection criteria of Linear and Rotary,	T1, T2, R1	1	
		1.9	Fixed and Variable displacement pumps – Problems.	T1, T2, R2	1	

HYDRAULIC ACTUATORS AND CONTROL COMPONENTS

II	**CO2.** Discuss the features of hydraulic actuators and Flow control valves. [K2]	2.1	Hydraulic Actuators: Cylinders – types and construction, application,	T1, T2, R2	2	Lecture & chalk, Talk, PPT, /group discussion
		2.2	Hydraulic cushioning, Hydraulic motors,		1	
		2.3	Control Components - direction control, Flow control and	T2, T1, R1	2	
		2.4	pressure control valves – types,	T1, T2, R2	1	
		2.5	Servo valves – applications,	T1, T2, R2	1	
		2.6	proportional valves applications,	T1, T2, R1	1	
	CO3. Describe the flow control and pressure control valves.[K2]	2.7	construction and operation Accessories - Reservoirs,	T1, T2, R1	1	
		2.8	Pressure Switches, Applications,	T1, T2, R1	1	
				TOTAL	**10**	

HYDRAULIC CIRCUITS AND SYSTEMS:

III	**CO4** Describe the different types of hydraulic circuits and systems. [K2]	3.1	Accumulators, Intensifiers,–	T1, T2, R2	1	Lecture & chalk, Talk, PPT, flipped learning
		3.2	Industrial hydraulic circuits	T1, T2, R1	1	
		3.3	regenerative, Pump	T1, T2, R2	1	
		3.4	Unloading Double- Pump,	T1, T2, R1	1	
		3.5	Pressure Intensifier, ,	T2, R1,R2	1	
		3.6	Air-over oil, Sequence Reciprocation	T2, T1, R1	1	
		3.7	Synchronization, Fail-Safe,	T1, T2, R3	1	
		3.8	Speed Control,Hydrostatic transmission,	T2, T1, R1	2	
		3.9	Electro hydraulic circuits,	T2, T1, R3	1	
		3.10	Mechanical hydraulic servo systems	T1, T2, R2	1	
				TOTAL	**11**	

PNEUMATIC AND ELECTRO PNEUMATIC SYSTEMS:

IV	CO5 Describe the working of different pneumatic circuits and systems. [K2]	4.1	Properties of air, Perfect Gas Laws, Compressor – filters, regulator, lubricator	T1, T2, R2	2	Lecture & chalk, Talk, PPT, model based learning
		4.2	muffler, air control valves,	T2, T1, R1	1	
		4.3	quick exhaust valves	T1, T2, R2	1	
		4.4	pneumatic actuators, Design of Pneumatic circuit	T1, T2, R3	1	
		4.5	cascade method	T1, T2, R2	1	
		4.6	Electro pneumatic system – elements	T1, T2, R2	1	
		4.7	ladder diagram, problems	T1, T2, R2	1	
		4.8	Introduction to fluidics	T1, T2, R1	1	
		4.9	pneumatic logic circuits	T2, T1, R1	1	
			TOTAL		**10**	

TROUBLESHOOTING AND APPLICATIONS:

V	CO6: Summarize the various troubleshooting methods and applications of hydraulic and pneumatic systems. [K2]	5.1	Installation, Selection, Maintenance, Troubleshooting,	T2, T1, R2	1	Lecture & chalk, Talk, PPT, model based learning
		5.2	and remedies in hydraulic and pneumatic systems	T2, T1, R1	2	
		5.3	Design of hydraulic circuits for drilling, planning,	T1, T2, R2	2	
		5.4	shaping, surface grinding, press and forklift applications,	T1, T2, R1	2	
		5.5	Design of pneumatic circuits for pick and place applications and	T2, T1, R2	1	
		5.6	tool handling in CNC Machine tools	T2, T1, R1	1	
		5.7	Low cost Automation, Hydraulic	T1, T2, R4	1	
		5.8	Pneumatic power packs.	T2, T1, R1	1	
			TOTAL		**11**	
			CUMULATIVE PROPOSED PERIODS		**52**	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
T1	1. Anthony Esposito, "Fluid Power with Applications", 5th edition, Pearson Education, 2015.
T2	1. Majumdar S.R., "Oil Hydraulics Systems- Principles and Maintenance", 7th edition, Tata McGraw- Hill, 2016.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
R1	Anthony Lal, "Oil hydraulics in the service of industry", 9th edition, Allied publishers, 2012.
R2	Dudelyt, A. Pease and John T. Pippenger, "Basic Fluid Power", 7th edition, Prentice Hall, 2007.
R3	Majumdar S.R., "Pneumatic systems – Principles and maintenance", 8th edition, Tata McGraw Hill, 2015
R4	Michael J, Prinches and Ashby J. G, "Power Hydraulics", 12th edition, Prentice Hall, 2009.
R5	Shanmugasundaram.K, "Hydraulic and Pneumatic controls", 7th edition, Chand & Co, 2016.

CO - PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1		1	1	1	1	1	1	1	1		3
CO2	3	1	1		1	1	1	1	1	1	1	1		3
CO3	3	1	1		1	1	1	1	1	1	1	1		3
CO4	3	1	1		1	1	1	1	1	1	1	1		3
CO5	3	1	1		1	1	1	1	1	1	1	1		3
CO6	3	1	1		1	1	1	1	1	1	1	1		3
Avg	3	1	1		1	1	1	1	1	1	1	1		3

		Name	Signature with Date
i.	Faculty	Mr.L RAVI KISHORE	L. Ravi 12/01/25
ii.	Course Coordinator	Mr.B MAHESH KRISHNA	
iii.	Module Coordinator	Mr.S SURENDAR	
iv.	Programme Coordinator	Dr.M FRANCIS LUTHER KING	

Principal

4