Fundamentals of Industrial Oil Hydraulics and Pneumatics - Video course

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Mechanical Engineering

Coordinators:

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COURSE OUTLINE

Introduction to Hydraulic and Pneumatic Systems. Basic Components. Symbols - (Including fundamentals of fluid flow, fluids etc.) Hydraulic valves General Purpose+Servo valves + Proportional Control Valves, Hydraulic pumps/motors/actuators, Hydrostatic Transmission Systems, Development of hydraulic circuit + basic design + analysis, Regenerative and similar circuits, Control systems, Mechatronics & Electro-hydraulics devices in Fluid Power, Hybrid Hydro-Mechanical Systems, Fundamentals of compressible fluid flow & pneumatic device, Pneumatic valves, Pneumatic Actuators, Pneumatic Circuits & Systems, Fluid Logic, Application of Hydraulics & Pneumatics in industrial Automation, Special topics on Hydraulics & Pneumatics.

COURSE DETAIL

S. No	Topics
1	What is Hydraulic and Pneumatic Systems
2	Basic Components, symbols & circuits
3	Incompressible Fluids – Some Fundamental Properties
4	Incompressible Fluid Flow Related to Fluid Drive
5	Capillary Fluid (Incompressible) Flow & Hydrodynamic Lubrication
6	Basis for Calculating Hydraulic Systems
7	Different type of valves – features and operations – I
8	Different type of valves – features and operations – II
9	Hydraulic Circuits & Valves
10	Hydraulics Servomechanism & Servo and Proportional Control Valves
11	Basic Spool Valve Design Analysis

12	General Control Valve Analysis
13	Critical Centre Spool Valve Analysis
14	Critical Centre Spool Valve Analysis – Stroking force
15	Proportional Solenoid Pilot Operated Two Stage Pressure Relief Valve
16	Proportional Solenoid Pilot Operated Two Stage Pressure Relief Valve (Contd.)
17	Introduction to Positive Displacement Hydrostatic Units (Hydraulic Pumps & Motors)
18	Basic features of some Hydraulic pumps and Motors
19	Analysis of an Axial-Piston Swash-Plate type Hydrostatic Pump (Discharge Flow Characteristics)
20	Analysis of an Axial-Piston Swash-Plate type Hydrostatic Pump (Estimations of Torque on Driving Shaft and Swash Plate)
21	Analysis of an Axial-Piston Swash-Plate type Hydrostatic Pump (Pressure ripple & Swash Plate Torque)
22	A. Design Analysis of Gear Pumps – I
22	B. Design Analysis of Gear Pumps – II
23	Basic Concept of Hydo-Static Transmission (HST) Systems
24	Selection of HST Units and Components
25	Regenerative Circuits
26	Introduction to Fluid Logic
27	Basic Devices, Symbols and Circuits
28	Logic Circuits

29	Design Analysis of ORBIT Motor – I: Basic Design & Feature
30	Design Analysis of ORBIT Motor – II : Geometric volume Displacement
31	Design Analysis of an LSHT motor – III Output Torque & Deformation, Gap & Stresses at Contacts
32	Application and Selection of Accumulators – Part I
33	Application and Selection of Accumulators – Part II
34	Hydraulic Circuits in Industrial Applications
35	Air Preparation - Compressors & accessories
36	Pneumatic Circuits
37	Analysis of Three – Way (Spool and Flapper Nozzle) Valves
38	Analysis of Flapper Nozzle Valves
39	Flow Force Compensation and Spool Design (Elector-hydraulic Valves)
40	Premier and Guide to Oil Hydraulic Fluids and Introduction to Fluid Power Symbols
42	Tutorial on Basic Calculation on HST system & Hydraulic Fluids

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