HYDRAULIC AND PNEUMATIC SYSTEMS
(PROFESSIONAL ELECTIVE-IV)

Course Code: 15ME1139

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Pre-requisites:

Fluid mechanics and Fluid machinery

Course outcomes:

At the end of the Course, the Student will be able to:

CO 1 Describe the working of hydraulic systems

CO 2 Explain working of hydraulic pumps and valves

CO 3 Discuss operation of hydraulic cylinders and motors

CO 4 Design the hydraulic and pneumatic circuits for a given application and execute the same in industry

CO 5 Identify the maintenance and troubleshooting of fluid power systems in industry

UNIT-I **(8 Lectures)**

HYDRAULIC SYSTEMS:

Introduction, Construction of Hydraulic Reservoir, Gravity type, spring loaded and Gas loaded type Accumulators

UNIT-II **(12 Lectures)**

HYDRAULIC PUMPS:

Gear pumps, Vane pumps and Piston pumps, Selection of Hydraulic Pumps

HYDRAULIC CONTROL VALVES:

Direction Control Valves, Pressure Control Valves, Flow Control Valves, Servo Valves

UNIT-III (10 Lectures)

HYDRAULIC CYLINDERS AND HYDRAULIC MOTORS:

Hydraulic cylinder operation and cylinder mountings, Hydraulic cylinder and Cushions, Hydraulic Motors operation- Gear, Vane and Piston motors, Hydraulic Motor performance, Hydrostatic Transmissions

UNIT-IV (10 Lectures)

HYDRAULIC CIRCUITS:

Introduction, Control of a Single-Acting Hydraulic Cylinder, Control of a Double Acting Hydraulic Cylinder, Regenerative Circuit, Pump-Unloading Circuit, Hydraulic Cylinder Sequencing Circuits. Cylinder Synchronizing Circuits, Speed control of a Hydraulic Cylinder, Speed control of a Hydraulic Motor, Basic Pneumatic circuits

UNIT-V (10 Lectures)

MAINTENANCE AND TROUBLE SHOOTING OF HYDRAULIC &PNEUMATIC CIRCUITS AND COMPONENTS:

Oxidation and Corrosion of Hydraulic Fluids, Maintaining and Deposing of Fluids, Wear of moving parts due to solid particle contamination of the fluid, Problems caused by gases in Hydraulic Fluids, Troubleshooting of Hydraulic System, Common problems in Pneumatic Systems, Troubleshooting of Pneumatic Systems

TEXT BOOKS:

1. Anthony Esposito, “Fluid Power with Applications”, PHI, New Delhi, 1st Edition, 2005.
2. Andrew Parr, “Hydraulics and Pneumatics”, Jaico Publishing house, 9th Edition, 2005.

REFERENCES:

1. S.R. Majumdar, “Oil Hydraulic Systems”, Tata McGraw Hill, 1st Edition, 2002.
2. S.R. Majumdar, “Pneumatic Systems”, Tata McGraw Hill, 1st Edition, 2002.
3. www.pneumatics.com
4. www.fluidpower.com.