PEME 5403 FLUID POWER & CONTROL

Module – I (12 hrs)

Fluid Power

Introduction, History, Basic Law, types and Advantages of Fluid Power.

Hydraulic fluids and properties: Various types of hydraulic fluids (water, petroleum oil, Water glycols, water oil emulsion, phosphate esters and silicones), properties of Fluids and their comparison.

Basic Principles of Hydraulic Flow: Laminar and Turbulent Flow, Reynolds Number, Darcy-Weisbach Equation, Losses in Valves and Fittings and Circuit Calculations.

Hydraulic Pumps and Actuators:

Pumps: Basic Elements of an Oil Hydraulic System, Hydrodynamic and Hydrostatic Pumps, Classification of Positive Displacement Pumps, Gear Pumps, vane pumps and piston pumps, types, principles and application, Pump performance

Hydraulic Actuators: Hydraulic Motors; Types Hydraulic Motor Efficiencies, Semi-rotary Actuators, Vane Type Actuators, Piston Type Semi-rotary Actuator, Helical Screw Semi-rotary Actuator, different types of Hydraulic Cylinders Mounting Configurations, Methods of applying Linear Motion.

Module – II (12 hrs)

Hydraulic Valves: different types of Pressure Controls, Pressure Relief and Direction Control Valves, Flow dividers and other special purpose valves.

Selection of hydraulic components

Seals and Filters, Conditions Affecting the Selection of Sealing Devices Fluid Contamination Cleanliness Standards

Filtration of Fluids Strainers, Filter Media, Types of Filters, Filter Location Accumulators: Types and their operation, Accumulator Circuits

Servo Valves and Proportional Valves: Types, Principles and applications, comparison between servo and proportional valves.

Pneumatic valves: Types and applications, comparison of hydraulic and Pneumatic valves.

Pneumatic actuators, common pneumatic systems, Selection of pneumatic components.

Hydro – Pneumatic: Air-oil Reservoir: Air-oil Cylinder, Air-oil Intensifier, Comparison of hydro-pneumatic and Pneumatic Systems

Module III (12hrs)

Different hydraulic and pneumatic circuits, Electrical and microelectronic control of fluid power Examples of different industrial hydraulic and pneumatic systems applications, installation, maintenance and trouble shooting, Pneumatic Logic Controls

Text book :

Hydraulic and Pneumatic controls by R. Srinivasan, TMH (2nd Edition)

REFERENCE BOOK:

1. Fluid Power Control by J.F. Blackburn, G. Reethof & J.L. Shearer, John Wiley & Son Inc.

2. Fluid Power with microprocessor control: An Introduction by E.W. Reed and I.S. Larman. Prentice Hall International, N.D.