20FM007 ADVANCES IN HYDRAULICS AND ELECTRO PNEUMATIC CONTROLS

Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P
45	-	-

WA/RA	SSH/HSH	CS	SA	S	BS
-	-	-	-	-	-

Course Description & Objective:

To acquaint and equip with the latest developments in the field of hydraulics and pneumatics with special reference to the usage of these on the modern d ay tractors.

Course outcomes:

Upon completion of this chapter, the student should be able to:

1. explain the meaning of fluid power.
2. list the various applications of fluid power.
3. differentiate between fluid power and transport systems.
4. list the advantages and disadvantages of fluid power.
5. explain the industrial applications of fluid power.
6. list the basic components of the fluid power.
7. list the basic components of the pneumatic systems.
8. differentiate between electrical, pneumatic and fluid power systems.
9. appreciate the future of fluid power in india.

SKILLS:

Knowledge on different logic circuits using hydraulics and electro pneumatics components.

Design of circuits for various applications(Sequencing,timing,safety etc)

UNIT I

Fluid power, its advantages, properties of hydraulic fluids, viscosity, bulkmodulus, density. Concepts of energy of hydraulic systems, laws of fluidflow.

UNIT II

Distribution system, pressure rating of tubing and hoses, couplings.Basicsof hydraulic flow and hydraulic circuit analysis – pumps, types and theoryof operation.Pressure intensifiers.

UNIT III

Fluid power actuators, hydraulic rams,gear motors, piston motors and their performance characteristics, electrohydraulic motors and hydrostatic transmissions, control components.

UNIT IV

Directional pressure safety and servo valves. Hydraulic circuit design.Regenerative pump unloading, pressure intensifier circuits. Speed controlof hydraulic motors, mechanical hydraulic servo systems for tractors.

UNIT V

Pneumatic circuits – properties of air. Compressors, control elements.Design of pneumatic circuits.Electrical control for fluid power circuits.Electronic sensors/ circuits used as controls in modern farm equipment.Maintenance of hydraulic and pneumatic circuits and devices.Troubleshooting.

Text books:

1. Anthony Esposito. 2003. *Fluid Power with Applications*. PearsonsEdu.
2. Krutz G.1984. *Design of Agricultural Machines*. John Wiley & Sons.

Reference books:

1. Merritt HE. 1991. *Hydraulic Control System*. John Wiley a& Sons.
2. Majumdar SR. 2003. *Oil Hydraulic System*. Tata McGraw Hill.

ACTIVITIES:

- *Simulation of logic circuits and troubleshooting.*
- *Seeding application using pneumatics.*