

Hydraulic and Pneumatic Systems

Course Objectives:

- 1) Understand the basics of Fluid Power (Hydraulic and Pneumatic) component design, operation and service.
- 2) Understand the operation of basic hydraulic and pneumatic elements and be able to assemble these elements into a working system
- 3) Know how to employ a simulation software for designing and analyzing hydraulic and pneumatic systems
- 4) Understand basic safety procedures when designing and working with Fluid Power systems
- 5) Gain practical, hands-on skills working with hydraulic and pneumatic systems

Prerequisite:

Basic understanding of fluids and engineering dynamics

Content:

Week 1

- Introduction to Course and Fluid Power, Properties of Hydraulic Fluids and Flow
Industrial, Aeronautical & Civil applications of Hydraulics and Pneumatics
- Introduction to basic components – Cylinders, Pumps and Motors. Types of Valves and properties
- Hydraulic Schematics & Basic Circuits
More Complex Circuits – Counterbalance, Braking, Steering, Flight Control, etc.
- Hydraulic System Design Exercise
- Visit to a Hydraulic component manufacturer

Week 2

- Basic Pneumatic Parameters – properties of air, circuit analysis
Design & mounting of a pneumatic part feeder
- Introduction to Electro-pneumatics
Application to the pneumatic part feeder
- Introduction to PLC programming
Application to the pneumatic part feeder
- Analysis of a pneumatic automated system. Cost analysis (compressed air consumption etc.)
- Visit to a compressor manufacturer

Grading:

In class problem solving, Quizzes and System Design Exercise	20%
Computer & Laboratory Work	20%
Reports about the visits to the manufacturers	20%
Final Exam	40%