

Common Course Outline
IMTC 220
BASIC HYDRAULIC/PNEUMATIC SYSTEMS I
4 Semester Hours

The Community College of Baltimore County

Description

Basic Hydraulic/Pneumatic Systems I

Studies the physics of hydraulics and pneumatics, including the concepts of pressure and force, resistance to flow and the measurement of air and fluid flow; covers the properties of flow in closed systems along with the use of valves to control flow and introduces the basic symbols needed to read and interpret hydraulic/pneumatic systems from blueprints.

Prerequisite: IMTC 101.

Overall Course Objectives.

Upon completion of this course the student will be able to:

- A. state the history of air and fluid power.
- B. read ANSI symbols used in present day circuits.
- C. define force, area, pressure, work and horsepower, and be able to calculate the above.
- D. list the physical properties and the effects of flow of air or fluids and pressure drop in a system and explain how it is created.
- E. explain the laws pertaining to fluids and gases (Pascal, Bernoulli, Torricelli, Boyle, Charles).
- F. list the characteristics of a good reservoir and explain its functions.
- G. explain the use of filters and strainers including the types, use, location and purpose of them in a system.
- H. explain the micron ratings.
- I. list the fluids used in industries and their properties including fluids used in industry that must be fire resistant.
- J. identify the various kinds of pumps as gear, vane and piston, positive and non-positive displacement pumps, variable volume and pressure compensated pumps.
- K. identify pressure control valves and define how they function as a system. Compare and contrast relief, unloading, sequence, counterbalance and brake valves.
- L. explain directional valves and their function in a circuit.
- M. list the various kinds of activators, such as cylinders, motors and oscillators, and explain how they function in a system.
- N. identify the flow controls that are used to control the speed of an activator, including types and where they are located.
- O. compare and contrast pneumatic components versus hydraulic components.
- P. explain how accumulators and boosters are used in a system and explain the need for such components.
- Q. read and interpret air and oil circuits that are used in industries.
- R. identify the various causes of malfunctions that arise in pneumatic and hydraulic system and how to correct them.
- S. Use O.H.S.A safety rules for all the above tasks.

Major Topics

- I. Physical characteristics of machines
- II. Force transmission
- III. Energy transmission with hydraulics
- IV. Control of hydraulic energy
- V. Energy transmission with pneumatics
- VI. Control of pneumatic energy
- VII. Hydraulic pumps and compressors
- VIII. Check valves
- IX. Flow control valves
- X. Directional control valves
- XI. Hydraulic fluid conditioning

Course Requirements

Exams 75%

Quizzes 25%

(Subject to revision by the instructor)

Other Course Information