



Workshop on Fluid Power Systems: Hydraulics and Pneumatics

March 10 – 14, 2025, 1st Run: Lagos & Abuja

September 1 – 5, 2025, 2nd Run: Lagos & Port Harcourt

For Tutor -Led Class: 9am – 4:30pm

Workshop fee: N350, 000 per Participant

For online: Delivery via Zoom

Online course fee: N300, 000 per Participant

Available for In-plant Training

**700 US\$ for foreign
Participants**

Program Overview:

Fluid power systems (hydraulics and pneumatics) offer an alternate means of controlling industrial systems without a large number of electrical components. Forces can be quickly transmitted over considerable distances efficiently with little loss and large components can be controlled with very small forces, and with smooth, uniform action.

This course provides participants with the knowledge to construct and operate all the individual components essential for the optimum operation of the overall fluid power system. It includes the supply of fluid (gas or liquid), the use of fluid powered control cylinders, control valves and motors as well as the tools associated with the maintenance and repair of fluid power systems.

For Whom:

This course is designed for professionals involved with, and responsible for, the operation of fluid power systems including maintenance managers, maintenance supervisors, engineers, project managers, technicians and plant operators.

Learning Objectives:

At the end of the program, participants will be able to:

- describe the development and applications of modern fluid power systems (hydraulics and pneumatics) including the different types of fluids and the three general classes of piping;
- apply Pascal's law to the design and operation of fluid power systems and circuits;
- outline the types of seals and components in fluid power systems and their respective benefits;
- operate a fluid power system circuit, given a system schematic; and
- prevent, identify and troubleshoot common failures of fluid power systems.

Course Outline:

Day 1: Pneumatic theory

- Advantages of fluid power
- Transmission of forces through fluids
- Pascal's law
- Force and pressure
- Computing force, pressure and area
- Multiplication of forces
- Differential areas
- Compressibility and expansion of gases (Boyle's law/ Charles's law)
- Work and energy
- Fluid flow

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Lagos: Human Capital Associates Global Consult Ltd: Acme House 2nd Floor, Ogba Industrial Scheme, Ogba, Ikeja – Lagos

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- Volume and velocity of flow
- Steady and unsteady flow
- Streamline and turbulent flow
- Factors involved in flow
- Relationship of force, pressure, and head
- Static and dynamic factors
- Bernoulli's principle
- Minimizing friction
- Advantages of pneumatics
- Pneumatic applications and symbols

Day 2: Pneumatic components

- Purification equipment
- Preliminary filtering - dry-type/wet-type filters
- Moisture removal and drying
- Additional filtering
- Filtering contaminants
- Filter classes and ratings
- Surface/depth filters
- Lubrication of heavy/fine lubricators
- Pneumatic cylinders
- Single-acting/ Double-acting cylinders
- Two-piston cylinder
- Cushioning devices
- Pneumatic control valves
- Control valve elements
- Two/three/four/five-way valves
- Manually operated valves
- Pilot and solenoid valves
- Air receivers
- Pneumatic motors
- Motor classification
- Pneumatic motor construction
- Pneumatic tools

Day 3: Pneumatic circuits

- Basic pneumatic system
- Simple circuits
- Timing circuits
- Safety circuits
- Pneumatic circuits
- Determining causes of failures
- Understanding the system
- Troubleshooting procedures
- Checking air supply systems
- Troubleshooting the actuator
- Checking the control valve
- Checking a control valve actuator
- Checking sequence valves
- Checking master control valves

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- Making final adjustments
- Pneumatic system troubleshooting chart

Day 4: Hydraulic theory & Hydraulic components

- Hydraulic development
- Hydraulic applications
- Advantages of hydraulics
- Physics of hydraulics
- Hydraulics' pressure
- Pascal's law
- Fluid flow
- Hydraulic symbols
- Hydraulic liquids
- Hydraulics' properties
- Viscosity and viscosity index
- Lubricating power
- Types of hydraulic liquids (water/petroleum/synthetic)
- Piping and connectors
- Rigid pipe
- Semi-rigid (tubing)
- Flared connectors
- Bite-type connectors
- Sealing devices
- Materials (synthetic rubber/cork/metal)
- Types of seals
- O-rings and backup washers
- Hydraulic reservoirs
- Accumulators
- Weight-loaded type
- Spring-loaded type
- Air or gas-type
- Hydraulic pumps
- Rotary pumps
- Reciprocating pumps
- Control valves
- Directional control valves
- Flow control valves
- Solenoid operated valves
- Cylinders/actuators
- Ram-type cylinders
- Piston-type cylinders

Day 5: Hydraulic circuits

- Basic hydraulic system
- Hydraulic circuits
- Common causes of failure
- Dirt
- Heat
- Misapplication
- Improper fluids

LOCATIONS

1 - HCA Learning Centre. Acme House 2nd Floor, 23, Acme Road, Ogba, Industrial Scheme, Ikeja, Lagos, Nigeria

2 - Pearls Learning Hub, Plot 756, Opposite Divine Hand of God Ministry, Area 1, Garki, Abuja.

3 - Pakiri hotel Ltd., 4 Okwuruola Street, off Stadium Road, Rumuola, Port Harcourt, Rivers State.

Open Course Fee: N350, 000

In-plant Fee Negotiable

WORKSHOP FEE:

N350, 000 per participant, VAT –N26, 250

Note: this covers Workshop Fee, Tea/coffee break, Lunch, course materials and certificate of attendance.

Payment should be made into our Accounts:

Account Name: Human Capital Associates Global Consult Ltd.

Union Bank of Nig. PLC: Account No: 0097961537

First Bank of Nig. PLC: Account No: 2033683960

Keystone Bank Ltd.: Account No: 1007150325

**For Booking / Enquiry, Call: 234-8051365946, 234-7087578814
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- Maintenance
- Improper design or installation

Training Methodology

Lectures, discussions, exercises, case studies, audio-visual aids will be used to reinforce these teaching/learning methods.

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