01 – HYDRAULIC & PNEUMATIC CONTROLS

COURSE CONTENT

Name of the Course : ELECTRO HYDRAULIC AND PNEUMATIC CONTROLS
No. of Week(s)          :   2 WEEKS   Course Code :  1.01

Theory
❖ Multimedia presentation on Hydraulics & Pneumatics.
❖ Function and operation of single acting, double acting, Differential cylinders and motors.
❖ Function and use of single, double solenoid valves - 4/2, 4/3, pressure switches.
❖ Function and use of Pressure Control Valves, Flow control valves.
❖ Fundamental circuits most often used in Industrial and mobile hydraulic system.

Practical
❖ Identification of electro-hydraulic and electro pneumatic components by their schematic symbols.
❖ Construction of single, double acting cylinder circuits – Direct & Indirect method.
❖ Circuit’s construction with the use of Relays, Contactors, Electrical Timers, sensors, limits switches.
❖ Construction of Hammer/chisel circuit.
❖ Latching Circuits- Dominant ON & Dominant OFF circuits.
❖ Construction of electro pneumatic sequential circuit for Bending attachment A+(B+C+)(B-C-)A-
❖ Construction of electro hydraulic sequential circuit for press fit components.

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Name of the Course : PLCs IN HYDRAULIC & PNEUMATIC CONTROL SYSTEMS
No. of Week(s)          - 2 WEEKS   Course Code :  1.02

Theory
❖ Multimedia presentation on Hydraulics & Pneumatics
❖ Function and use of single, double solenoid valves - 4/2, 4/3, pressure switches.
❖ Function and applications of Programmable Logic Controllers.
❖ Function and operations of input/output modules in Programmable Logic Controllers.
❖ Translating ladder diagrams into standardized rung diagrams compatible with Programmable Logic Controllers programming.
❖ Functions, applications and advantages of counters and timers in Programmable Logic Controllers.

Practical
❖ PLC Programming, executing, running and verifying accuracy of simple programs.
❖ Simulation, modifying an existing program and executing and verifying its accuracy.
❖ Perform required connections from Programmable Logic Controllers to the input and output devices and verify accuracy of system operation.
❖ Construction of Ladder programming for Hammer/chisel, Bending attachment & press fit circuits.

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Name of the Course: MAINTENANCE of HYDRAULIC AND PNEUMATIC CONTROL SYSTEMS

Theory

- Multimedia presentation on Hydraulics & Pneumatics.
- Preparation and conditioning of compressed air and its distribution.
- Read and interpret a variety of schematic drawings.
- Hydraulic advantage – Mechanical leverage, Multiplication of forces.
- Hydraulic fluid, seal, Accumulators
- Preventive maintenance actions.

Practical

- Identification of hydraulic and pneumatic components by their schematic symbols.
- Troubleshoot common pneumatic components circuits.
- Prevent hydraulic system contamination.
- Troubleshooting of Industrial pneumatic and Hydraulic circuits – Shaping Machine, surface grinder.
- Main failures of the following hydraulic components causes and corrective actions:
  - Pumps– Directional control valves – Pressure control valves – Flow control valves.

Name of the Course: OVERHAULING of HYDRAULIC PUMPS & COMPRESSORS

Theory

- Multimedia presentation on Hydraulics & Pneumatics.
- Hydraulic advantage – Mechanical leverage, Multiplication of forces.
- Construction and functioning of various types of Compressors
- Working Principles of various types of Hydraulic Pumps.

Practical

- Dismantling & assembling of hydraulic pumps – Gear, Vane, Piston pumps.
- Overhauling of 5 ton hydraulic jack.
- Trouble shooting, dismantling & assembling of Reciprocating Single Stage Compressor.
- Trouble Shooting, dismantling & assembling of Reciprocating Two Stage Compressor.
- Trouble shooting, dismantling & assembling of Hydro vane compressor.

Name of the Course: MECHATRONICS (HYDRAULICS & PNEUMATICS)
No.of Week(s)          - 2 WEEKS   Course Code :  1.05

Theory

- Mechatronic system Design
- Multimedia presentation on Hydraulics & Pneumatics.
- Electro pneumatic control.
- Sensor Technology & applications.
- PLC Instruction set.
- Principles of Hydraulics.
- Electro Hydraulic circuits.

Practical

- Identification of electro-hydraulic and electro pneumatic components by their schematic symbols.
- Circuit’s construction with the use of Relays, Contactors, Electrical Timers, sensors, limits switches.
- PLC Programming, executing, running and verifying accuracy of simple programs.
- Simulation, modifying an existing program and executing and verifying its accuracy
- Trouble shooting of hydraulic and pneumatic components.

Name of the Course :   LOW COST AUTOMATION (HYDRAULICS & PNEUMATICS)

No.of Week(s)          - 2 WEEKS   Course Code :  1.06

Theory

- Multimedia presentation on Hydraulics & Pneumatics.
- Identification of Pneumatic, electro pneumatic components by their schematic symbols.
- Construction of circuits for pneumatic and electro pneumatic system.
- Air Logic circuits.
- Identification of hydraulic, Electro hydraulic components by their schematic symbols.
- Construction of circuits for hydraulic, electro hydraulic components system.
- Introduction to PLC – input/output addressing.
- Ladder diagram – Simple circuit.
- Preventive maintenance actions.

Practical

- Identification of hydraulic and pneumatic components by their schematic symbols.
- Construction of single, double acting cylinder circuits – Direct & Indirect method.
- Circuit’s construction with the use of OR, AND, Time Delay, Pressure sequence, Quick exhaust, flow control and Limit switches.
- Construction of Hammer/chisel circuit, sequential circuit A+B+C+C-B-A-
- Construction of regenerative circuit.

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Name of the Course :   PNEUMATIC CONTROLS for SUPERVISORS
Name of the Course: HYDRAULIC & PNEUMATIC CIRCUIT DESIGN USING FLUID SIM SOFTWARE

No.of Week(s) - 1 WEEK  
Course Code: 1.07

Theory

- Multimedia presentation on Fluid Power.
- Identification of pneumatic components by their schematic symbols.
- Compressed Air Theory, production, Purification and Distribution.
- Air Logic circuits.

Practical

- Construction of pneumatic circuit with direct & indirect control, application of roller limit switches
- Construction and applications of pressure control valve and flow control valve with accessories.
- Construction of sequential circuit for A+B+C+C-B-A-

Name of the Course: HYDRAULIC & PNEUMATIC CIRCUIT DESIGN USING FLUID SIM SOFTWARE

No.of Week(s) - 1 WEEK  
Course Code: 1.08

Theory

- Introduction to Pneumatics, Pneumatic Symbol, block diagrams.
- FLUID SIM menus
- Identification of Fluid power components by their schematic symbols
- Component library
- Introduction to simulating & creating circuits using Fluid sim symbols
- Construction of pneumatic circuit with direct and indirect control, application of roller limit switches air logic circuits

Practical

- Identification of Pneumatic valves, Components, parts of Air compressor and to draw the symbols.
- Practical using Fluidsim software
- Construction of single, double acting cylinder circuits – Direct & Indirect method.
- Circuit’s construction with the use of OR, AND, Time Delay, Pressure sequence, Quick exhaust, flow control and Limit switches.
- Construction of Hammer/chisel circuit
- Construction of electro-pneumatic circuits using Latching circuits – Dominant - On, Dominant - Off circuit
- Construction of hydraulic regenerative circuit.