



Gujarat Council of Vocational Training Gandhinagar



1. Name of Course:

Industrial Hydraulic and Pneumatic

N.C.I.T. No. for Skill Covered
(Please refer National Classification of
Occupations - 2004 available
on www.dget.mca.gov)

2. Engineering OR Non-engineering: Engineering

3. No. of students per batch: 20

4. Duration in Hours. : 96

5. Duration in Week: 2 (8 Hour/Day)

6. Examination Scheme:

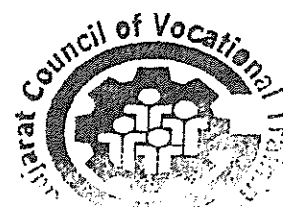
No.	Name of Subject	Teaching Hours during full course.	Maximum Marks. (Excluding Sessional)	Minimum Marks required for Passing (Excluding Sessional).	Sessional Marks if any.
Subject-1	Course Theory	32	50	20	
Subject-2	Course Practical	64	100	60	
Subject-3					
Subject-4					
Subject-5					

7. Entry qualification for Trainee:

Minimum entry qualification (Essential):	10 th Pass/ Diploma/ B. Tech.
Desirable:	Basic Knowledge (Technical / Non-Technical)

8. Minimum qualification for Trainer:

Minimum qualification (Essential):	Diploma Engg.(Mechanical / Electronics)
Desirable:	Technical Knowledge



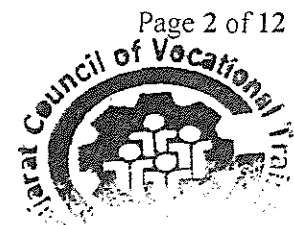
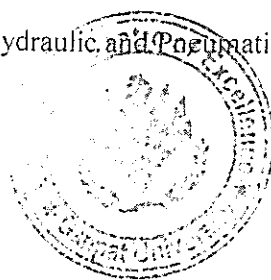


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3. Syllabus Committee Member:

Sr. No	Name	Organization	Designation	Technical Qualification	Experience in Years	Signature
1.	Mr. Chetan Rajdev	Bosch Rexroth India Ltd. Sanand	DGM	BE (Mech.)	20	
2.	Nitin Sapre	Bosch Rexroth India Ltd. Sanand	Sr. Manager	M.Tech. PhD(Pursuing)	23	
3.	Dr. J.P.Patel	Ganpat University	HOD (Mkt.)	PhD	17	
4.	D.I.Patel	ITI, Mehsana	SI	Diploma	20	
5.	C.K.Chauhan	ITI, Mehsana	Principal	Diploma	20	





10. Terminal Skills of trainee: (Should be well defined and having reference to NCO):

The trainee, after successful completion of training, will have following skills...

1. On successful completion of training one should be able to Design a system
Trouble shoot the system in Automation.
2. Technical Skill will help to get recruited in a reputed organization.
3. Using this technical expertise he can become an entrepreneur.
4. Technical Skill will help him her to get job across Globe.
5. Technical competence makes one confident & self-dependent.

(Please attach separate sheet, if more space is required)

11. Approximate cost of Tools
Equipments Machinery for
Starting one batch of the course:

Rupees
Rs. 1.00 Crore

Reference Year
2016

12. Area required for practical Workshop for one batch.

75 Sq. Meters

13. Minimum Power connection required

1 KW

14.1 No of items in Standard list of Trainer kit:

2

14.1.1. Page NO from 5 to 6.

14.2 No of items in Standard list of Components

1

14.2.1. Page NO from 5 to 5

14.3 No of items in Standard list of Accessories:

3

14.3.1. Page NO from 5 to 5.

14.4 No of items in Standard list of Device set:

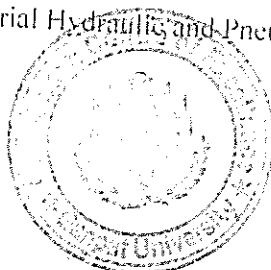
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14.4.1. Page NO from 6 to 6.

14.5 No of items in Standard list of Equipment set:

2

14.5.1. Page NO from 5 to 6.





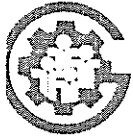
***** FOR OFFICIAL USE *****

Approved by GCVT in Governing Body meeting on : 18-02-2017

Syllabus implemented w.e.f. admission session : next session

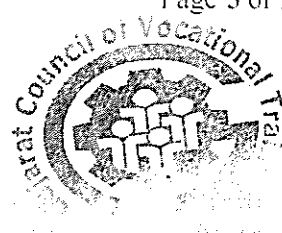
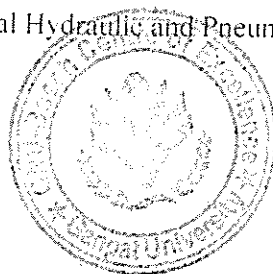
Revision History :
1. Revision No..... Revision Date.
2. Revision No..... Revision Date.
3. Revision No..... Revision Date.





Standard List of Trainer kit Components Accessories Equipment set Device set
For Trade of Industrial Hydraulic and Pneumatic

Sr. No.	Description of Item with detailed specifications	Item type i.e. Machinery / Equipment OR Shop Outfit OR Trainee Toolkit	Quantity Required per one Batch of Students	Quantity Required per one Batch of Students for Instructor	Total Quantity Required (Total of previous two columns)
1.	Hydraulics WS290 work station WS290 work station, hydraulics, 230V/50Hz, double sided for 4 to 6 trainees, complete - assembled, including packaging	Trainer kit	1 Nos.		1 Nos.
2.	WS200 component carrier for hydraulic components WS200 work station, double sided component carrier - assembled, including packaging	Components	1 Nos.		1 Nos.
3.	Accessories/spare parts for WS290 work station Accessories for WS290:	Accessories	1 Nos.		1 Nos.
4.	On/off hydraulics learning topics Equipment set TS-HS 201- 1X	Equipment set	1 Nos.		1 Nos.
5.	Continuous control valve technology component sets - proportional hydraulics	Accessories	1 Nos.		1 Nos.
6.	Pneumatics WORKSTATION TS- DS3-1X/LK0E00T0-M	Trainer kit	1 Nos.		1 Nos.
7.	Storage cupboards and accessories	Accessories	1 Nos.		1 Nos.

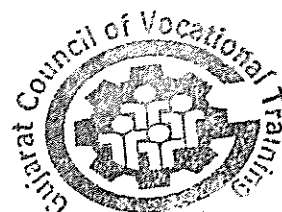
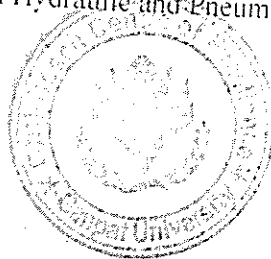




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8.	Pneumatic device sets - pneumatic control	Device sets	1 Nos.	1 Nos.
9.	Equipment set for setting up pneumatic pressure control or position control	Equipment set	1 Nos.	1 Nos.





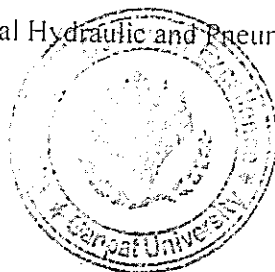
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GANDHINAGAR

Name of Syllabus: Industrial Hydraulic and Pneumatic

Sector: Automation Sector

Terminal Competency: On successful completion of training one should be able to Design a system Trouble shoot the system in Automation.

Sr. No.	PRACTICAL	THEORY
1.	<p>Practical of Basic Industrial Pneumatics</p> <ul style="list-style-type: none"> - Elements of Pneumatic system. - Hierarchy, Comparison between Pneumatics & Hydraulics. - Air Preparation & Distribution. - Air regulator, Filter, Lubricator . Service units. - Air Leakage & its effects - Different types of Dryers & Filters - Directional Control Valves, Valve Port numbering & Lettering system. - Cylinder and its types. - Control of Single Acting & Double Acting Cylinder. - Flow control valves. Simple Throttle & One way Flow Control valve, its operation.. - Meter-in & Meter – out - Understanding various mounting possibilities - Drawing Basic Pneumatic Circuit . - Using Different components in circuit. - Special Purpose valves . say 	<p>Contents of Basic Industrial Pneumatics</p> <ul style="list-style-type: none"> □ Fundamentals of Pneumatics covering: Basic Laws say Boyle – Mariotte’s Law etc. - Advantages & Limitations - Elements of Pneumatic system. - Hierarchy, Comparison between Pneumatics & Hydraulics. - Properties of different Energy Media. - Air Preparation & Distribution. - Air regulator, Filter, Lubricator , Service units. - Air Leakage & its effects - Different types of Dryers & Filters - Directional Control Valves, Valve Port numbering & Lettering system. - Cylinder and its types. - Control of Single Acting & Double Acting Cylinder. - Flow control valves. - Simple Throttle & One way Flow Control valve, its operation.. - Meter-in & Meter – out - Understanding various mounting possibilities - Drawing Basic Pneumatic Circuit . - Using Different components in



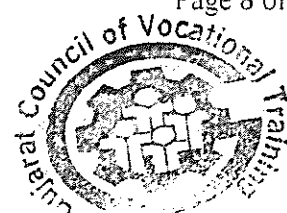


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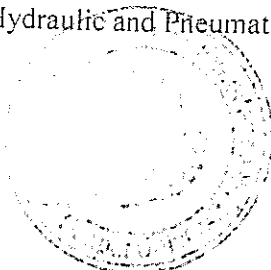
સૌરાષ્ટ્ર ચલન

<p>Dual Pressure valve, Shuttle valve, Quick Exhaust Valve etc. Logical Building Block. Functional Block Diagram. Safety Consideration & Troubleshooting. Latching Circuits.</p>	<p>circuit. Special Purpose valves , say Dual Pressure valve, Shuttle valve, Quick Exhaust Valve etc. Logical Building Block. Functional Block Diagram. Safety Consideration & Troubleshooting. Latching Circuits.</p>
<p>2. Practical of Advanced Industrial Pneumatics Elements of Pneumatic system. .Hierarchy, Comparison between Pneumatics & Hydraulics. Properties of different Energy Media. Air Preparation & Distribution. - Air regulator, Filter, Lubricator , - Service units. - Air Leakage & its effects Different types of Dryers & Filters Directional Control Valves. - Valve Port numbering & Lettering system. - Cylinder and its types. - Control of Single Acting & Double Acting Cylinder. Flow control valves. Simple Throttle & One way Flow Control valve, its operation.. - Meter-in & Meter - out .Understanding various mounting possibilities Drawing Basic Pneumatic Circuit . - Using Different components in circuit. - Special Purpose valves , say Dual Pressure valve, Shuttle valve, Quick Exhaust Valve etc. - Logical Building Block.</p>	<p>Contents of Advanced Industrial Pneumatics □ Fundamentals of Pneumatics covering: Basic Laws say Boyle – Mariotte’s Law etc. Advantages & Limitations Elements of Pneumatic system. .Hierarchy, Comparison between Pneumatics & Hydraulics. Properties of different Energy Media. Air Preparation & Distribution. Air regulator, Filter, Lubricator . Service units. Air Leakage & its effects Different types of Dryers & Filters Directional Control Valves. Valve Port numbering & Lettering system. - Cylinder and its types. Control of Single Acting & Double Acting Cylinder. Flow control valves. Simple Throttle & One way Flow Control valve, its operation.. Meter-in & Meter - out .Understanding various mounting possibilities - Drawing Basic Pneumatic Circuit . Using Different components in circuit. - Special Purpose valves , say Dual Pressure valve, Shuttle valve, Quick Exhaust Valve etc.</p>





<ul style="list-style-type: none"> - Pressure Relief. Pressure sequence etc. Concept of Multifunctional valves. Flow Control Valves. Construction of Simple Throttle and Temperature compensated throttle valve. - Meter-in & Meter – out .Understanding various mounting possibilities Check Valves. Various types of Check Valve like direct & Pilot operated etc. Cylinder and its types. Control of Double Acting Cylinder. - Using Different components in circuit. Logical Building Block. Hydraulic accessories. Accumulator, Pressure switch, Filters & Gauges. - Importance of Oil cleanliness/ Contamination control in Hydraulics. - Safety Consideration & Troubleshooting. - Latching Circuits. 	<p align="right">कोशलम् जलम्</p> <ul style="list-style-type: none"> Concept of Multifunctional valves. Flow Control Valves. Construction of Simple Throttle and Temperature compensated throttle valve. Meter-in & Meter – out .Understanding various mounting possibilities Check Valves. Various types of Check Valve like direct & Pilot operated etc. Cylinder and its types. Control of Double Acting Cylinder. Drawing Basic Hydraulic Circuit . Using Different components in circuit. Logical Building Block. - Hydraulic accessories. - Accumulator, Pressure switch, Filters & Gauges. Importance of Oil cleanliness/ Contamination control in Hydraulics. Safety Consideration & Troubleshooting. Latching Circuits.
<p>4</p> <p>Practical of Advanced Industrial Hydraulic</p> <ul style="list-style-type: none"> □ Elements of Hydraulic system, .Hierarchy, Comparison between Pneumatics & Hydraulics. Properties of different Energy Media. Function. Construction, Working Principles and Characteristics of Hydraulic Pumps like Gear, Vane and Piston Pumps. Installation of Pump. Construction of Power pack unit. Directional Control Valves. 	<p>Contents of Advanced Industrial Hydraulic</p> <ul style="list-style-type: none"> □ Fundamentals of Hydraulics covering: Basic Laws say Pascal’s Law, Brahma’s Principle, Reynold’s number etc. Elements of Hydraulic system. .Hierarchy. Comparison between Pneumatics & Hydraulics. Properties of different Energy Media. Function, Construction. Working Principles and Characteristics of Hydraulic Pumps like Gear, Vane and Piston Pumps. Installation of Pump. Construction of Power pack unit. Directional Control Valves.





<ul style="list-style-type: none"> - Poppet design concept. Spool design concept. Various switch overlaps & its effect on function of Directional Control Valves. - Pressure Control Valves. Pressure Relief. Pressure sequence etc. - Concept of Multifunctional valves. Flow Control Valves. - Construction of Simple Throttle and Temperature compensated throttle valve. Meter-in & Meter - out .Understanding various mounting possibilities - Check Valves. - Various types of Check Valve like direct & Pilot operated etc. Cylinder and its types. Control of Double Acting Cylinder. - Drawing Basic Hydraulic Circuit . - Using Different components in circuit. - Logical Building Block. - Hydraulic accessories. - Accumulator, Pressure switch, Filters & Gauges. - Importance of Oil cleanliness/ Contamination control in Hydraulics. - Safety Consideration & Troubleshooting. - Latching Circuits. Properties of Electro - Hydraulics . Principal & Operation of Solenoid Valve. . - Various Types of Electrical Contacts . Switching Symbols . 	<p style="text-align: right;">કોસલમ - વલમ</p> <ul style="list-style-type: none"> Poppet design concept. Spool design concept. Various switch overlaps & its effect on function of Directional Control Valves. Pressure Control Valves. Pressure Relief. Pressure sequence etc. Concept of Multifunctional valves. Flow Control Valves. Construction of Simple Throttle and Temperature compensated throttle valve. Meter-in & Meter - out .Understanding various mounting possibilities Check Valves. Various types of Check Valve like direct & Pilot operated etc. - Cylinder and its types. - Control of Double Acting Cylinder. Drawing Basic Hydraulic Circuit . Using Different components in circuit. Logical Building Block. Hydraulic accessories. Accumulator, Pressure switch. Filters & Gauges. - Importance of Oil cleanliness/ Contamination control in Hydraulics. - Safety Consideration & Troubleshooting. Latching Circuits. Properties of Electro - Hydraulics . - Principal & Operation of Solenoid Valve. . Various Types of Electrical Contacts . Switching Symbols . Relay & Its Operation Logical Building Block (Electrical). Basic Electro - Hydraulic Circuit Diagram.
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Relay & Its Operation Logical Building Block (Electrical). Basic Electro - Hydraulic Circuit Diagram. - Electrical Latching Circuits. - Electrical Circuits using Latch. - Stroke/Pressure Dependent Control. - Exercises to related topics. Hydraulic Calculations.	Electrical Latching Circuits. Electrical Circuits using Latch. Stroke/Pressure Dependent Control. Exercises to related topics. Hydraulic Calculations.
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Signature:

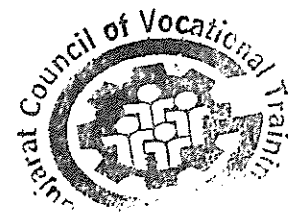
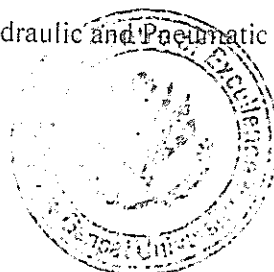
Mr. Chetan Rajdev

Nitin Sapre

Dr. J.P.Patel

D.I.Patel

C.K.Chauhan





<p>Functional Block Diagram. Safety Consideration & Troubleshooting. Latching Circuits. Properties of Electro – Pneumatics . Principal & Operation of Solenoid Valve. . Various Types of Electrical Contacts . Switching Symbols . Relay & Its Operation Logical Building Block (Electrical). Basic Circuit Diagram. Electrical Latching Circuits. Electrical Memory Circuits. Stroke Dependent Control. Pressure Dependent Control. Exercises to related topics. Piston Diameter & Air consumption calculations.</p>	<p>Logical Building Block. Functional Block Diagram. Safety Consideration & Troubleshooting. Latching Circuits. Properties of Electro – Pneumatics . Principal & Operation of Solenoid Valve. . Various Types of Electrical Contacts . Switching Symbols . Relay & Its Operation Logical Building Block (Electrical). Basic Circuit Diagram. Electrical Latching Circuits. Electrical Memory Circuits. Stroke Dependent Control. Pressure Dependent Control. Exercises to related topics. Piston Diameter & Air consumption calculations.</p>
<p>3 Practical of Basic Industrial Hydraulic - Elements of Hydraulic system, .Hierarchy. Comparison between Pneumatics & Hydraulics. - Properties of different Energy Media. - Function, Construction, Working Principles and Characteristics of Hydraulic Pumps like Gear. Vane and Piston Pumps. Installation of Pump. Construction of Power pack unit. - Directional Control Valves, Poppet design concept. Spool design concept. Various switch overlaps & its effect on function of Directional Control Valves. - Pressure Control Valves.</p>	<p>Contents of Basic Industrial Hydraulic Fundamentals of Hydraulics covering: Basic Laws say Pascal's Law, Brahma's Principle. Reynold's number etc. Elements of Hydraulic system, .Hierarchy. Comparison between Pneumatics & Hydraulics. Properties of different Energy Media. Function. Construction. Working Principles and Characteristics of Hydraulic Pumps like Gear. Vane and Piston Pumps. Installation of Pump. Construction of Power pack unit. Directional Control Valves. Poppet design concept. Spool design concept. Various switch overlaps & its effect on function of Directional Control Valves. Pressure Control Valves. Pressure Relief. Pressure sequence etc.</p>

